

**Community Learning and Empowerment
Through Participatory Irrigation Management:
Case Studies from Thailand**

By

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A Thesis Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements
For the Degree of

Doctor of Philosophy

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Abstract

Participatory Irrigation Management (PIM) was adopted in Thailand in 2004 to encourage the efficient use of water in the agricultural sector. Agriculture is closely linked to water resource management issues, since seventy percent of global water use is utilized for agriculture. In several developing countries, it accounts for up to 95% of overall water use. PIM is one approach to improving water allocation and effective water use being tested within agriculture systems that are striving to be more sustainable. PIM refers to the participation of water users at all phases of irrigation management such as planning, operation, maintenance, monitoring, and evaluation of the system.

The purpose of this research was to understand the relationships between public participation, learning, and the implementation of more sustainable water practices through PIM in Thailand. The objectives set included the following: 1) To identify the current status and approaches of PIM implementation across the country. 2) To explore the participatory nature of community involvement in water management decision-making through PIM. 3) To establish ways that new deliberative space can be created for civic engagement in PIM. 4) To examine the elements of individual learning occurring through PIM implementation. 5) To consider whether and how participation and learning through PIM leads to social action aimed at achieving more sustainable water practices.

The empirical research undertaken to satisfy these objectives was qualitative in nature, and based on an interactive, adaptive approach. An exploratory case study design was applied to gain insights into the connection between public participation, learning, and sustainable water management. Two integrated water user groups (IWUGs) were selected from the Krasiew Reservoir, Suphanburi Province, as case studies in order to control variable factors such as topography, weather, type of irrigation system, irrigation areas, percentage of irrigation efficiency, type of water user organization, crop pattern, norms, and culture, that may affect the ability to manage irrigation water of any target case studies. Data collection included document review, semi-structured telephone interviews, semi-structured face-to-face interviews, observation, and informal meetings. NVivo software was used to identify themes and organize a coding system for the collected data from the fieldwork.

The analysis of the public participation process in PIM was grounded in the public participation and participation in water management literatures. Analyzing the learning outcomes was established through transformative learning theory using specific constructs such as instrumental and communicative learning. Moreover, the individual suggestions of the research participants, as well as researcher's own experiences, contributed to the data interpretation and analysis.

Findings revealed that PIM implementation failed prior to 2004, primarily due to the discontinuity in PIM policy, non-allocated budgets, and uncooperative public irrigation officials. "Learning from past failures" could best describe how PIM is currently being conducted in Thailand. Four key players in PIM implementation and operation were the Royal Irrigation Department, the water user organization (WUO), the Joint Management Committee for Irrigation (JMC), and the local administrative organization. At an overall country level, farmers were authorized to set their own ditch rules and patterns of water allocation within a ditch after farmers had organized a basic group called a water user group (WUG). However, the joint water

management decision-making between public irrigation staff and local farmers normally started when farmers established a united WUO. Most committee respondents of the united WUOs indicated that they worked cooperatively with public irrigation staff on behalf of individual farmers and influenced the decision-making at the canal level in profound ways. At the reservoir level, the JMC members at the Krasiew Reservoir, for example, which was made up of local people, and the IWUG representatives in particular, made decisions about water allocation and distribution before each crop season, a decision typically made in the past by the public irrigation staff. Eighteen JMCs have been founded throughout the country to date. Positive outcomes in the findings related to the Krasiew Reservoir could bode well for what is happening in the other 17 JMCs, as they seem to have a similar structure and authority over water allocation and distribution.

Case study data from the Krasiew Reservoir showed that after the water allocation and delivery schedule were developed and agreed on by JMC members, the final water delivery pattern (i.e. rotational or continual water delivery) at each canal was made by a majority vote among members at an IWUG general meeting. The final water allocation strategy at each canal was based on a discussion among IWUG committee members. WUG chiefs and WUG members were responsible for designing their own water allocation pattern and schedule for ditches. Further, it was found that public irrigation staff at the Krasiew Operation and Maintenance Office now acted as technical advisors by providing relevant water information in IWUG committee meetings, IWUG general meetings, and JMC meetings, rather than acting as decision makers.

Results showed that participating in PIM activities (e.g. WUG meetings, IWUG general meetings, JMC meetings, operation and maintenance practices, training sessions, and study tours) fostered both instrumental and communicative learning among PIM participants. The instrumental learning outcomes included: new skills and information; the development of political, legal, economic, social, or administrative procedures; a determination of the cause-effect relationships; and task-oriented problem solving. The communicative learning outcomes involved: a better understanding of the issue at hand; a more critical understanding of themselves or situations; insight into the interests of others; communication strategies and methods; and comparative reflection.

Findings also revealed that local farmers had begun implementing more sustainable water practices after receiving comprehensive water information through PIM. Relevant water information on everything from water supply, water demand, and how much water could be saved, was provided and updated by public irrigation staff either in a meeting or through various means (i.e. biweekly newsletter, village loudspeaker announcement, and local radio stations). Constantly receiving comprehensive water information allowed farmers and other stakeholders to develop an understanding of a reservoir as a finite water resource, particularly in regards to the conservation of water and consequential availability in subsequent crop seasons. As a result, water saving awareness was fostered among farmers in order to protect their own interests in maintaining a water supply for all crop seasons.

Further, updated information from public irrigation staff at an IWUG general meeting, a JMC meeting, or a training session additionally validated the fact that farmers were key players in irrigation water management. This helped instill a sense of ownership among local farmers. Recognizing human dignity and initiating a sense of ownership were imperative to bringing forth the very best in people and promoting meaningful actions for sustainability. In addition, communicating compassionately

through participating in PIM activities (e.g. meetings) could foster further social action among local farmers. The 2005 water crisis in the irrigation area was another factor which triggered a sense of urgency among farmers about the need for water conservation. First-hand experiences of water shortage played a decisive role in changing farmers' behavior, helping to motivate local farmers to finally use more sustainable water practices in the irrigation areas.

From the fieldwork experiences, three essential implementation approaches could be applied to enhance PIM success and sustainability in Thailand. These approaches included: public participation in planning, survey, and design for water development projects; participatory WUO establishment; and participatory meetings for PIM evaluation.

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Dedication

For His Majesty the King Bhumibol Adulyadej of Thailand, His presence as a living example of selflessness, dedication, and perseverance for the well-being of Thai people has inspired me to serve the country. His Majesty is my hero who holds a special place in my heart.

Long Live the King.

Table of Contents

<i>Abstract</i>	<i>iv</i>
<i>Acknowledgements</i>	<i>vii</i>
<i>Dedication</i>	<i>viii</i>
<i>List of Tables</i>	<i>xii</i>
<i>List of Figures</i>	<i>xiii</i>
<i>List of Acronyms</i>	<i>xiv</i>
Chapter 1 Introduction	1
1.1 Background.....	1
1.1.1 <i>Water management in Thailand</i>	3
1.1.2 <i>Context for change</i>	5
1.1.2.1 <i>Sustainable water management</i>	5
1.1.2.2 <i>Sensible traditional practices</i>	8
1.2 Purpose.....	9
1.3 Objectives.....	9
1.4 Theoretical considerations.....	9
1.4.1 <i>Public participation</i>	9
1.4.2 <i>Learning and empowerment through participation</i>	11
1.5 Methods.....	14
1.6 Organization of thesis.....	14
Chapter 2 Public participation, empowerment, and learning	16
2.1 Introduction.....	16
2.2 Public participation in resource and environmental management.....	16
2.2.1 <i>Public participation process</i>	19
2.2.1.1 <i>Public participation techniques</i>	22
2.2.2 <i>Design of meaningful public participation</i>	22
2.2.3 <i>Empowerment through participation</i>	27
2.3 Public participation in water management.....	30
2.3.1 <i>Participatory irrigation management</i>	31
2.3.2 <i>Lessons learned from PIM implementation</i>	33
2.4 Transformative learning.....	43
2.4.1 <i>Key concepts of transformative learning</i>	43
2.4.2 <i>Critical transformative learning</i>	45
2.4.3 <i>Learning through public participation in resource and environmental management</i>	49
2.5 Summary.....	50
Chapter 3 Research design	52
3.1 Research philosophy.....	52
3.2 Research approach.....	53
3.2.1 <i>Exploratory case study</i>	53
3.2.2 <i>Justification of case study sites</i>	53
3.2.3 <i>Role of researcher</i>	56
3.3 Data collection methods.....	58
3.3.1 <i>Document review</i>	58
3.3.2 <i>Interviews</i>	59

3.3.3	<i>Observation</i>	62
3.3.4	<i>Informal meetings</i>	63
3.4	Data analysis	64
3.5	Validity and dissemination	65
3.5.1	<i>Validity</i>	65
3.5.2	<i>Dissemination</i>	66
3.6	Ethical considerations	66
Chapter 4 Irrigation management in Thailand		67
4.1	Introduction.....	67
4.2	Country profile.....	67
4.2.1	<i>Geography and land use</i>	67
4.2.2	<i>Climate and water resources</i>	69
4.3	Irrigation development.....	71
4.4	Irrigation management.....	73
4.4.1	<i>Definition of state irrigation</i>	73
4.4.2	<i>Types of irrigation structures</i>	73
4.4.3	<i>Types of irrigation projects</i>	74
4.4.4	<i>Structure of the RID</i>	76
4.4.5	<i>Operation and maintenance</i>	78
4.4.6	<i>Difficulties in irrigation management</i>	81
4.5	PIM in Thailand	82
4.5.1	<i>Background</i>	82
4.5.2	<i>Definition of PIM</i>	83
4.5.3	<i>PIM implementation approach</i>	83
4.5.4	<i>Expected benefits</i>	85
4.5.5	<i>Roles and responsibilities of key players</i>	86
4.5.6	<i>Types of WUOs</i>	87
4.5.7	<i>Joint-management procedures in O&M</i>	92
4.5.8	<i>Key performance indicators of joint-management in O&M</i>	97
4.5.9	<i>Evaluating competence of WUOs</i>	97
4.6	Summary and discussion	98
Chapter 5 PIM implementation in Thailand		104
5.1	Introduction.....	104
5.2	Early implementation difficulties	104
5.3	The evolving place of traditional WUOs in Thailand.....	105
5.4	WUO structure.....	106
5.5	PIM implementation through construction	108
5.6	PIM implementation through operations	109
5.7	PIM implementation through maintenance.....	114
5.8	WUO conflict resolution mechanisms.....	116
5.9	PIM capacity building.....	117
5.10	Summary and discussion	121
Chapter 6 Public participation and learning through PIM		131
6.1	Introduction.....	131
6.2	Case study settings.....	131
6.3	Organizational relationship and administration.....	133
6.3.1	<i>Organizational relationship</i>	133

6.3.2 <i>Organizational administration</i>	142
6.4 Learning through PIM implementation and operation	148
6.4.1 <i>Instrumental learning</i>	149
6.4.2 <i>Communicative learning</i>	159
6.5 Sustainable water practices	168
6.6 Discussion.....	172
6.6.1 <i>Meaningful public participation</i>	172
6.6.2 <i>Empowerment through PIM implementation</i>	177
6.6.3 <i>Learning through PIM implementation</i>	179
6.6.4 <i>Critical transformative learning</i>	186
6.7 Summary.....	193
Chapter 7 Conclusions.....	195
7.1 Introduction.....	195
7.2 Conclusions.....	195
7.3 Context for change.....	209
7.3.1 <i>PIM implementation and operation</i>	209
7.3.2 <i>Sustainable water management</i>	215
7.4 Future research directions	217
7.5 Concluding comments	218
References	219
Appendix I: Sample of open-ended interview questions in fieldwork	233

List of Tables

<i>Number</i>	<i>Page</i>
Table 2.1: Essential elements of meaningful public participation.....	25
Table 2.2: Features of PIM case studies	34
Table 2.3: Conditions that facilitate public participation and empowerment in PIM implementation in each case	41
Table 2.4: Needs for enhancing PIM sustainability in each case	42
Table 3.1: Potential sites of case studies.....	55
Table 3.2: Methods used in Phases 1 and 2 of the fieldwork	59
Table 3.3: Details of the interview participants in Phases 1 and 2 of the fieldwork ...	60
Table 4.1: Characterization of irrigation projects	74
Table 4.2: Details of water resource development as of 2006.....	77
Table 4.3: Number of WUOs in large-scale and medium-scale irrigation projects at each RIO as of 2009	93
Table 5.1: Conditions that facilitate public participation and empowerment in PIM implementation in Thailand.....	122
Table 5.2: Needs for enhancing PIM sustainability in Thailand.....	122
Table 6.1: Instrumental learning outcomes through PIM implementation and operation of two case studies	150
Table 6.2: Communicative learning outcomes through PIM implementation and operation of two case studies	160

List of Figures

<i>Number</i>	<i>Page</i>
Figure 2.1: Stages of public participation planning	21
Figure 2.2: Strengths and weaknesses of participatory techniques.....	23
Figure 4.1: Location of Thailand	68
Figure 4.2: Thailand's land use pattern in 2003	70
Figure 4.3: Agricultural land use of Thailand in 2003.....	70
Figure 4.4: Contribution of GDP in 2006	70
Figure 4.5: Water demand for different sectors in the year 2001 and 2021	72
Figure 4.6: Storage capacity from each type of water project as of 2006	77
Figure 4.7: Typical organization structure of the RIO.....	78
Figure 4.8: Diagram of a typical irrigation system	80
Figure 4.9: PIM implementation approach	84
Figure 4.10: Types of WUOs in Thailand	88
Figure 4.11: Organization structure of WUG	89
Figure 4.12: Organization structure of IWUG	89
Figure 4.13: Diagram of coverage area of WUG and IWUG	91
Figure 4.14: Standard procedures of joint-management in O&M.....	94
Figure 6.1: Location of case study site	132
Figure 6.2: Cropping pattern of the Krasiew Reservoir.....	132
Figure 6.3: Location of case study settings.....	134
Figure 6.4: Characteristics of all IWUGs in the irrigation areas.....	134
Figure 6.5: PIM as a venue to facilitate learning, empowerment, and sustainable water management	181
Figure 6.6: Conceptual connection between PIM, empowerment, and learning. . .	184
Figure 6.7: Diagram of how PIM leads to social action aimed at achieving more sustainable water practices.....	190

List of Acronyms

ADB	Asian Development Bank
ARDA	Agricultural Research Development Agency (Thailand)
BOT	Bank of Thailand
CBR	Community-based research
EGAT	Electricity Generating Authority of Thailand
EIA	Environmental impact assessment
FAO	Food and Agriculture Organization
FG	Farmer group (Thailand)
GDP	Gross Domestic Product
IAP2	International Association for Public Participation
IHP	International Hydrological Programme
IWUG	Integrated water user group (Thailand)
JMC	Joint Management Committee for Irrigation (Thailand)
NESDB	Office of the National Economic and Social Development Board (Thailand)
NSO	National Statistical Office (Thailand)
LAO	Local administrative organization (Thailand)
O&M	Operation and maintenance
PA	Participatory appraisal
PIM	Participatory irrigation management
RDPB	Office of the Royal Development Projects Board (Thailand)
RID	Royal Irrigation Department (Thailand)
RIO	Regional Irrigation Office (Thailand)

UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America
US\$	United States Dollar
WBI	World Bank Institute
WCED	World Commission on Environment and Development
WUA	Water user association
WUC	Water user cooperative (Thailand)
WUG	Water user group
WUO	Water user organization

Chapter 1

Introduction

1.1 Background

The royal speech of His Majesty the King Bhumibol Adulyadej of Thailand, titled “Water is life” (as cited in Royal Irrigation Department [RID], 2008, p. 37) completely expresses how essential water is for human life. Water helps to maintain healthy ecosystems and permeates all aspects of human activities including household, agriculture, and industry. The increasing global population is responsible for expanded urbanization and an industrial-driven economic base that is precipitating increased demands on limited freshwater resources. These higher demands put pressure on limited freshwater resources, which leads to tensions and conflicts among users, and adverse effects on the environment (United Nations [UN]-Water, 2006).

The United Nations Development Programme ([UNDP], 2006) captures the global water crisis in the Human Development Report 2006 in the following way:

Unlike wars and natural disasters, the global crisis in water does not make media headlines. Nor does it galvanize concerted international action. Like hunger, deprivation in access to water is a silent crisis experienced by the poor and tolerated by those with the resources, the technology and the political power to end it. Yet this is a crisis that is holding back human progress, consigning large segments of humanity to lives of poverty, vulnerability and insecurity. (p. 9)

Accounting for 60% of the world’s population, Asia currently experiences the acute pressure of inadequate regional water resources supplies because it only possesses 36% of global water resources (UN-Water, 2005). By 2025, nearly two billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under what the UN terms “stress conditions” (UN-Water, 2006). Coming to terms with this water crisis will be one of the greatest

challenges faced by every nation on earth during the early 21st century (UNDP, 2006).

Agriculture is closely linked to water resource management issues.

Worldwide, 70% of water use is related to agriculture, climbing to 95% in several developing countries. It is estimated that freshwater usage for agricultural purposes will increase 14% over the next 30 years to meet the growing food demands of an increasing population (UN-Water, 2006).

Irrigated agriculture, of which 58% of the world's total is in Asia, inevitably comes under intense pressure to improve efficiency of water use in response to scarce water resources (UNDP, 2006). To promote the efficiency of water use, there needs to be a focus on enhanced governance and capacity building at all levels that integrates the basic principles of transparency, subsidiarity, and equity (UN-Water, 2006).

Decentralizing water governance in agriculture and developing equitable cost-sharing mechanisms within irrigation systems assists in achieving more effective use of water (UN-Water, 2005).

Participatory irrigation management (PIM) is one approach to improving water allocation, and effective water use being tested within agriculture systems that are striving to be more sustainable. PIM refers to the participation of water users at all phases of irrigation management, such as the planning, operation, maintenance, monitoring, and evaluation of the system (World Bank Institute [WBI], 1998). The common problems of irrigation, including inequitable water distribution, poor irrigation system maintenance, inadequate water availability, and lack of incentives for saving water, can be considered through a PIM approach. However, employing PIM simply by decentralization and transfer of authority to local water user organizations (WUOs) does not guarantee automatic success. Institutional capacity building needs to be done step by step (UNDP, 2006). The first challenge is in

considering how to empower local WUOs by changing their roles within policy decision-making and governance structures.

1.1.1 Water management in Thailand

The Kingdom of Thailand is located at the heart of Southeast Asian mainland, covering an approximate area of 513,000 km². Thailand is acknowledged as an agriculturally-based country. The latest Agriculture Census in 2003 reveals that the population of Thailand is nearly 64 million, of which approximately 22 million, or 34%, are engaged in the agricultural sector (National Statistical Office [NSO], 2004). Agriculture occupies about 183,000 km² or 36% of the country (NSO, 2004), of which 44,781 km² or 24% is irrigated (RID, 2007a).

The Department of Water Resources, founded in 2002 under the Ministry of Natural Resources and Environment, serves as a primary agency for integrated freshwater management and water hazards mitigation. The Electricity Generating Authority of Thailand (EGAT), which is a state enterprise instituted in 1969 under the Ministry of Energy, is responsible for the operation and maintenance of all hydropower dams. The Royal Irrigation Department (RID), established in 1902 under the Ministry of Agriculture and Cooperatives, is a supporting agency focusing on water resource use for agricultural purposes. The main responsibilities of the RID cover: developing water resources for agriculture; equitably allocating irrigated water; and preventing water hazards. The capacity of storage dams built by the EGAT and the RID in 2006 is 74,318 million m³ or about 35% of the annual surface water of the country before all major rivers flow into the Gulf of Thailand (RID, 2007a). A storage dam undoubtedly is as an integral part of water management at the catchment level.

As in other countries, these government departments in Thailand are currently trying to come to terms with a water crisis that has resulted from population increase,

urban expansion, and economic growth. The export-driven agricultural economy, which focuses on growth, is progressively exploiting finite water resources and causing rivalry among water users. The water shortages in the dry season, floods in the wet season, and low water quality in the main rivers frame the key water problems in Thailand. At present, the National Water Act, which establishes precise roles and responsibilities among responsible public agencies and clarifies rights to access water among various sectors, is under process of enactment by the parliament (National Assembly, 2010).

The widespread difficulties relating to irrigation management in Thailand include: irrigation project developments that do not immediately respond to farmers' needs; irrigation systems that are poorly maintained thus providing low efficiency; and inequitable water allocation resulting in some farmers being left in need (RID, 2006). The Good Governance Reform Royal Decree 2003 calls for more transparency and accountability from every public agency. Due to increasing conflicts among water users, the RID recommended PIM in the Department's Strategic Plan in 2004 to enhance equitable water allocation and economical water use at the farm level. The document indicates that the ultimate goal of PIM should be sustainable irrigation. The objectives of PIM under the Plan are: to promote equitable and effective water allocation; to build a sense of ownership for irrigation projects in communities; to extend the continual maintenance of irrigation infrastructure; and to transfer operation and maintenance of small irrigation projects to local communities. The principal activities of PIM under the Plan involve establishing WUOs and strengthening those WUOs (RID, 2006).

Traditional or informal WUOs have been functioning in Northern Thailand for 700 years (RID, 2005a). Their common success stems from collaboration in planning,

construction, operation, and maintenance along with empathic communication (Amornsanguansin, 2005). The number of traditional WUOs has decreased over the years due to socioeconomic and environmental changes. However, several traditional WUOs located outside the irrigation areas of the government-built systems do still operate in northern Thailand (Shivakoti & Bastakoti, 2006).

1.1.2 Context for change

1.1.2.1 Sustainable water management

The notion of sustainability was launched by the World Commission on Environment and Development (WCED) in 1987. Seeking sustainability requires new ways of thinking about the interdependencies between economic, social, and environment spheres, as well as facilitating equity over time and place (Flint, 2007). Sustainability promotes development that meets the needs of the present generation without compromising the needs of future generations (WCED, 1987). Such development will enhance the well-being of all people within the natural resources' carrying capacity, thus enabling a long-lasting activity (Flint, 2007).

The UNDP (2007a) also recognizes strategies for sustainable development as country-owned systems which are composed of participatory and continually improving processes. The strategies imply an interactive process of planning, setting priorities, implementing choices relevant to a country's needs, and learning from experiences to consistently improve people's quality of life (UNDP, 2007a).

The UNDP (2007b) indicates that sustainable water management can only be achieved through effective water governance. Water governance refers to the range of political, social, economic, and administrative systems that develop and manage water resources and water service delivery at different levels of society. By engaging many stakeholders, participatory water governance could articulate their priorities, help

exercise their legal rights, meet their needs, and mediate their differences.

It is imperative that participation from all stakeholders in managing (i.e. planning, operating, supervising, and monitoring) water resources or water service delivery be a core element to achieving sustainable water management. Such water management, moreover, demands incorporation of various domains affecting water use including political, educational, technical, cultural, social, economic, and ecological concerns (UNESCO International Hydrological Programme [IHP], 2007) to meet the needs of the present generation without threatening the needs of future generations (WCED, 1987). Pahl-Wostl et al. (2008) establish that, “New participatory and adaptive water management approaches will not be implemented in a sustainable fashion unless they are more deeply rooted in a cultural change in society” (p.493). The importance of the social and cultural dimensions in water management is also highlighted by the water vision of the United Nations Educational, Scientific and Cultural Organization (UNESCO) which states that, “[S]ustainable management of water is as much cultural as it is technical” (UNESCO/IHP, 2007).

Sustainable development in the Thai context refers to a holistic development approach that balances the use of natural resources with local wisdom and traditional practices through all stakeholders’ participation in order to achieve the self-sufficiency and well-being of Thai people (Office of the National Economic and Social Development Board [NESDB], 2003). The main strategies used to accomplish sustainable natural resources and environment management include: educating the public of the finite nature of natural resources; involving local people/communities in decision-making processes about natural resources and environment management; promoting more ecological-based rather than administratively-based management (i.e.

river basin water management); collecting local wisdom and adequately integrating that wisdom into decision-making and incorporating new technology; and improving social capital and expanding collaborative networks (NESDB, 2003).

The Thai sustainable development indicators that relate most directly to environment and ecology include: (1) percentage of forest area; (2) percentage of mangrove forest; (3) amount of aquatic animals economically caught per hour; (4) percentage of consumed surface water and groundwater per water supply; (5) percentage of surface water resources that have fair water quality; (6) number of major cities that have poor air quality; (7) amount of hazardous waste that gets proper treatment; and, (8) amount of chemical use in agriculture (NESDB, 2005).

In support of sustainable water management, the Tenth National Economic and Social Development Plan of Thailand covering the years 2007-2011 recognizes water as: economic capital that is a particularly important input in agriculture production; social capital that is intimately associated with norms and local wisdom; and natural resource capital that assists in maintaining healthy ecosystems (NESDB, 2007). This signals the opportunity to build meaningful common ground for prospective water management in Thailand.

The ultimate goal of PIM as stated by the RID is sustainable irrigation. As such, this research deals with the sustainability of an irrigation system that encourages more equitable water allocation and effective water use practices among water users. The term “sustainable water practices” in this study refers to both farmers’ irrigation practices and system operational practices that enhance more effective use of water in an irrigation system.

However, it should be noted that the sustainability of an irrigation system is closely linked with sustainable water management at a catchment level because the

irrigated water from the system will eventually flow into a natural waterway in an area. Using water efficiently and sustainably within an irrigation system reduces the system requirements for water from the catchment area to fill a reservoir, as well as ensuring sufficient water is retained for maintaining natural flow levels in the downstream waterway. Moreover, an irrigation system plays an important role in coping with the increasing drought and flood problems caused by climate change (RID, 2008, 2009b).

1.1.2.2 Sensible traditional practices

An orthodox scientific paradigm (Kapoor, 2001; Shiva, 1989; Uphoff, 1992), which is based on empirical and rational presuppositions, views things - including nature - as objects that can be broken down into component parts, analyzed, and then acted upon. Under this paradigm, human beings are able to consume and control nature without concern for subsequent adverse effects, as science will find ways to deal with problems (Kapoor, 2001). Adopting such a scientific paradigm has long eroded the oriental wisdom of “nature center” that pays respect to nature as an origin of life (Wongsuwan, 2006). This scientific paradigm mainly views water and other natural resources as economic capital, whereas oriental wisdom appreciates those resources as social capital. Thus the scientific paradigm tends to value natural resources as production inputs, which leads to excessive consumption in response to human need. The capitalist regime has also encouraged Thailand to shift from a traditionally self-sufficient agricultural society to an export-driven economic one. It urges people to acquire ownership, ignores traditional practices of sharing natural resources, and eventually limits access to common resources in communities (Jamarik, 2005; Kapoor, 2001). These tendencies can cause the collapse of local wisdom and institutions, resulting in chronic problems regarding economic, social,

and environmental management in Thailand (Jamarik, 2005). A further challenge is how to balance the traditional practices with foreign influence. Community learning and empowerment could cultivate the path to success.

1.2 Purpose

The purpose of this research is to understand the relationships between public participation, learning, and implementing more sustainable water practices through PIM in Thailand.

1.3 Objectives

- 1) To identify the current status and approaches of PIM implementation across the country.
- 2) To explore the participatory nature of community involvement in water management decision-making through PIM.
- 3) To establish ways that new deliberative space can be created for civic engagement in PIM.
- 4) To examine the elements of individual learning occurring through PIM implementation.
- 5) To consider whether and how participation and learning through PIM leads to social action aimed at achieving more sustainable water practices.

1.4 Theoretical considerations

1.4.1 Public participation

Public participation or public involvement is a broad term widely used to describe the process of engaging the public in political, economic, or management

decisions. Participation has been fundamental to political decision-making activities as Arnstein (1969) captures, “Participation of the governed in their government is, in theory, the cornerstone of democracy—a revered idea that is vigorously applauded by virtually everyone” (p. 216). Lineberry (1989) also supports the importance of participation from an economic standpoint, “You cannot achieve sustainable economic development without participation by people. You cannot achieve genuine participation without profound commitment and a change of heart” (p. xi). As well, the well-known report, *Our Common Future* (1987), formally calls for greater public participation in environmental decision-making in order to promote sustainable development in the face of rapid global development (WCED, 1987).

Incorporating public participation in resource and environmental management is well-supported in literature (Fitzpatrick & Sinclair, 2003; Ludwig, 2001; Mitchell, 2002; Sinclair & Diduck, 2001; Sinclair & Diduck, 2005; WCED, 1987; UNDP, 2006; Webler, Kastenholz, & Renn, 1995). This is largely due to the benefits it provides, such as: facilitating active dialogue regarding conflicts and concerns; ensuring stakeholders’ concerns are taken into account in decision-making; allowing access to local knowledge and alternative resources; advancing the legitimacy of proposed projects; and increasing project sustainability (Diduck, 1999; Shepard & Bowler, 1997; Sinclair & Diduck, 2005; Usher, 2000; Webler et al., 1995). Moreover, public participation encourages individual and social learning that could help in the transformation to sustainability (Diduck & Mitchell, 2003; Fitzpatrick & Sinclair, 2003; Palerm, 2000; Sinclair & Diduck, 2001; Sinclair & Diduck, 2005; Webler et al., 1995).

Promoting more transparent mechanisms for participation in resource decisions, such as PIM, underscores the need for good governance. Governance can

be defined as “the manner in which power is exercised in the management of a country’s economic and social resources for development” (Asian Development Bank [ADB], 2007a). Good governance encompasses accountability, participation, predictability, and transparency (ADB, 2007b). Public participation is therefore critical to the advancement of good governance. It enables citizens to have more input into decision-making processes, thus improving the efficiency of public services. It helps local government be more accountable; increases a sense of ownership of projects and activities among citizens; enhances sustainability outcomes of policies or programs; and deepens understanding of more participatory forms of democracy (ADB, 2007b; Bakker, 2003).

At present, there is still no consensus on meaningful public participation among scholars. In an oriental setting, especially Thailand, it appears that the passive practices for engaging the public in resource and environmental management are common perhaps due in part to cultural norms. As such, more research is needed to understand public participation processes in Thailand.

1.4.2 Learning and empowerment through participation

Resource and environmental management tends to be characterized by change, complexity, uncertainty, and conflict (Diduck, 1999; Mitchell, 1997, 2002; Tyler, 2006). Customary adult education, in terms of awareness-raising on social and environmental issues, is unlikely to respond to such change and complexity in current resource and environmental management. As commented by Finger & Asun (2001), “In our view the ecological crisis is the ultimate challenge to adult education, as there is no way out of this vicious circle except through individual and collective learning” (p. 120). In this regard, the learning outcomes through a central activity (e.g. public participation) in managing resources and the environment could promote better

understanding of the social context around issues of conflict and complexity and lead to the ultimate sustainable practices (Diduck, 1999; Keen, Brown, & Dyball, 2005; Sims & Sinclair, 2008; Webler et al., 1995). Numerous scholars have supported the use of transformative learning theory in resource and environmental management (Alexander, 1999; Diduck, 1999; Diduck & Mitchell, 2003; Marschke & Sinclair, 2009; Palerm, 2000; Sims & Sinclair, 2008; Sinclair & Diduck, 2001). The advantages of applying transformative learning theory are further recognized by Baumgartner (2001), who found that “research using Mezirow’s theory had yielded insights into the importance of relationships, feelings, and context in the process” (p. 22). As well, Merriam (2001) notes that transformative learning is about “transforming not just what we learn but the way we learn, and it is absorbing, imagining, intuiting, and learning informally with others” (p.96).

Transformative learning theory, also known as transformation theory, is a formal adult learning theory. It was introduced in 1978 by Jack Mezirow, who is now an emeritus professor of adult and continuing education at Teachers College, Columbia University. It has been acknowledged as a theory in progress which has benefited from other scholars’ comments and criticisms over the past three decades. The ultimate goal of transformative learning is to help adults gain more autonomy, self-development, and self-governance (Mezirow, 2000). Transformative learning refers to a process by which adults transform their experiences or beliefs by critically reflecting and assessing new beliefs and finally reintegrating new beliefs into their lives (Mezirow, 1991, 1995, 2000). According to Merriam & Caffarella (1999), “transformational learning theory is about change—dramatic, fundamental change in the way we see ourselves and the world in which we live” (p. 318).

There is an interconnection between participatory democracy and

transformative learning theory. Warren (1992) argues that democracy facilitates self-transformation, “[W]ere individuals more broadly empowered, . . . , their experiences would have transformative effects: they would become more public spirited, more tolerant, more knowledgeable, more attentive to the interests of others, and more probing of their own interests” (p. 8). Mezirow (2000) also recognizes this interconnection:

[T]ransformative learning inherently creates understandings for participatory democracy by developing capacities of critical reflection . . . and participation in discourse that reduces fractional threats to rights and pluralism, conflict, and the use of power, and foster autonomy, self-development, and self-governance. (p. 28)

In addition, the ultimate goal of transformative learning - becoming an autonomous thinker - could help participants to develop a sense of self-empowerment (Mezirow, 2000; Siegel, 1988) by “liberating ourselves from reified forms of thought that are no longer dependable” (Mezirow, 2000, p. 27). Hart (1990a) also advises that consciousness raising could be an empowering process for marginalized groups based on the notion that, “Consciousness raising is a process of reclaiming social membership . . . in terms that tend to abolish all special claims and privileges for any identifiable social group (p. 70).

This research applies transformative learning in a non-formal adult learning and cross-cultural context with localized groups of Thai farmers who are often marginalized. Transformative learning theory has been largely developed through case studies in a western context underscoring the need for study in a cross-cultural context. Consideration of the transformative potential of PIM could illuminate how individual behavior changes and, moreover, how individual learning leads to collective action and empowerment for sustainable water practices.

1.5 Methods

This research was qualitative in nature, and based on an interactive, adaptive approach (Nelson, 1991). The design of the research was built using the literature on case studies (e.g. Yin, 2003). The research was conducted in Thailand because of funding and the potential to contribute to the sustainable water management discussion in the country. The research was carried out in two phases. Phase 1 established how PIM was being implemented and identified related key agencies at the country level. The collected data helped in the identification of two specific case study locations for Phase 2. Phase 2 took place at the community level and considered the aspects of participation and learning occurring through PIM. The methods, which included document review, interviews, observation, and informal meetings, were implemented to study the relationships between public participation, learning, and sustainable water practices in PIM implementation and operation. NVivo software was used to help with data analysis to organize a coding system and identify themes from the data, details are provided in Chapter 3.

1.6 Organization of thesis

The thesis is organized into seven chapters. Following the introduction, Chapter 2 examines relevant public participation literature, especially participation in water management. The lessons learned from PIM implementation in various countries regarding public participation and empowerment are also reviewed. The chapter describes key concepts and illustrates the connection between public participation and transformative learning through participation in resource and environmental management. Chapter 3 outlines the research design including data collection tools and data analysis approach used in this research. Chapter 4

characterizes irrigation management and PIM in Thailand. Chapter 5 reports the information from the fieldwork done in Phase 1. Chapter 6 details the findings and emergent issues reflecting the data from the field research in Phase 2 and provides a discussion of how this relates to the literature and theories. Chapter 7 summarizes findings from the study in relation to the research objectives as well as establishing ways to improve and sustain PIM in Thailand.

Chapter 2

Public participation, empowerment, and learning

2.1 Introduction

This chapter introduces the literature surrounding public participation, empowerment, and learning. The chapter first focuses on considering public participation in a resource and environmental management context. In this regard the benefits and barriers of employing public participation, public participation process, public participation techniques, and the design of meaningful public participation are discussed. This chapter also explores how public participation relates to the empowerment of marginalized people in developing countries. Secondly, public participation in water management, particularly PIM concept, is outlined. The lessons learned from PIM implementation in different countries are also reviewed to establish the emergent issues in relation to public participation and empowerment. Thirdly, the chapter describes the key concepts of transformative learning and considers questions of the learning theory with regard to an oriental setting. Lastly, the chapter discusses how learning interconnects with public participation in a resource and environmental management context.

2.2 Public participation in resource and environmental management

Resource and environmental management is currently characterized by change, complexity, uncertainty, and conflict (Diduck, 1999; Mitchell, 1997, 2002; Tyler, 2006). Interconnected resource and environmental problems are no longer solved by science or technical experts alone (Bocking, 2004; Ludwig, 2001) as Ludwig (2001) notes, “We must acknowledge the importance of ethics and social

justice in environmental problems. They cannot be resolved without the participation of those most affected” (p. 763). The characteristics of environmental problems and new approaches to environmental decision-making were popularly introduced by the WCED in *Our Common Future* (1987):

Environmental and economic problems are linked to many social and political factors . . . It could be argued that the distributions of power and influence within society lies at the heart of most environment and development challenges. Hence new approaches must involve . . . to promote local participation in decision making. (p. 38)

There has been growing recognition of the importance of public participation in resource and environmental management by numerous authors (for example, Kapoor, 2001; Keen et al., 2005; Leeuwis & Pyburn, 2002; Sayer & Campbell, 2004; Sidaway, 2005; Tyler, 2006; Webler, Tuler, & Krueger, 2001).

Definitions of public participation vary from ones that seek social change to those that focus on participatory techniques. In the view of the International Association for Public Participation ([IAP2], 2007), public participation can be defined as “any process that involves the public in problem-solving or decision-making and that uses public input to make better decisions.” The IAP2 (2007) recommends basic requirements for public participation as including: easy access to information; equal opportunity to participate; chance to have a say in decisions that affect their lives; recognition of needs and interests of all participants; and communication on how public input affects the decision. A common thread among most definitions is “the commitment to people having a say in decisions that affect their lives” (Sidaway, 2005, p. 119).

The value of public participation in resource and environmental management is well situated by the literature. By embracing all affected parties in resource and environmental decision-making, public participation generally helps:

- to provide a communicative forum for stakeholders (Kapoor, 2001; Webler et al., 2001);
- to identify problems more effectively (Mitchell, 2002);
- to ensure public's needs are established (Innes & Booher, 2004; Shepard & Bowler, 1997);
- to gain more understanding and information beyond the scientific approach (Bocking, 2004; Ludwig, 2001; Mitchell, 2002);
- to incorporate local knowledge in decisions (Innes & Booher, 2004; Kapoor, 2001; Tyler, 2006; Usher, 2000; Webler et al., 1995);
- to advance fairness and justice (Innes & Booher, 2004; Kapoor, 2001; Webler et al., 2001);
- to transfer decision-making power (Kapoor, 2001; Webler et al., 2001);
- to maintain popular legitimacy (Innes & Booher, 2004; Kapoor, 2001; Webler et al., 2001);
- to initiate a sense of ownership (Kapoor, 2001; Mitchell, 2002); and
- to minimize conflict during an implementation stage (Diduck, 1999; Mitchell, 2002; Sidaway, 2005).

This literature also explicitly states that incorporating public participation in resource and environmental management could enhance sustainability of a proposed project or policy.

General barriers to engaging the public in decision-making have been mentioned by a number of authors. Schatzow (1977), for example, points out the barriers from the perspective of government officials in federal environmental decision-making in Canada as the following: (a) the government elected through

democratic processes maintains absolute right to represent the public; (b) the government knows what the public wants and does not require additional input on each decision; (c) public participation is troublesome and time consuming; (d) the government is unwilling to be inspected by the public through joint decision-making processes; (e) the government needs only technical advice in which the public is not competent; and, (f) public participation can be a forum for unrepresentative groups to raise their concerns and may lead to conflict and noise. Delli Priscoli (1978) discusses the misconceptions of public participation by federal and regional agencies in the USA including: (a) public participation leads to invalidity and discontinuation; (b) public participation is misused by single groups; (c) the public is irrational and emotional; and, (d) public participation overthrows the authorities. These misconceptions of public participation become barriers to involving the public in environmental decision-making. Sidaway (2005) supports the reasoning that internal problems of government agencies, ranging from conflicts between technical and political interests to lack of experienced and skilled staff, contribute to a reluctance to commit to public participation.

Many researchers consider barriers to public participation from the public's perspective. In one empirical study in Canada, Diduck & Sinclair (2002) note that the non-participant case in environmental assessment processes is mainly based on: a belief that participation would not make a difference because of a foregone conclusion; and people do not know when the environmental assessment processes would be conducted.

2.2.1 Public participation process

It is necessary to develop a more systematic approach to involve the public in resource and environmental management decision-making. However, it should be

remembered that, “there is no single way to ‘do’ participation: some methods work in some situations but not in others” (Sidaway, 2005, p. 140). Yet the first important step to successful participation might be to readjust organizational cultures as noted by Hildyard, Hedge, Wolverkamp, & Reddy (2001):

Indeed, perhaps the first step that the agencies that are serious about participation and pluralism might take is not to reach for the latest handbook on participation techniques, but to put their own house in order: to consider how their own internal hierarchies, training techniques and office cultures discourage the receptivity, flexibility, patience, open-mindedness, non-defensiveness, humour, curiosity and respect for the opinions of others that active solidarity demands. (p. 70)

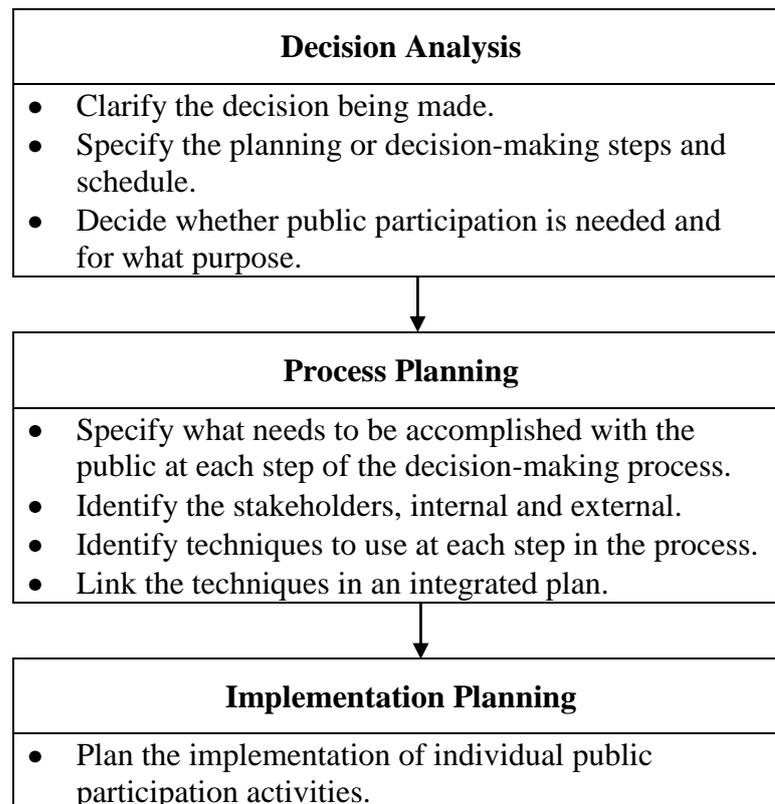
Creighton (2005) proposes three main stages in developing a public participation plan, namely: decision analysis, process planning, and, implementation planning. Decision analysis is designed to clarify the decision-making context within one’s own organization and finally to make a decision whether public participation is needed, and if it is, what level of participation is required. Decision analysis encompasses six steps, as follows: (1) decide who needs to be involved in decision analysis; (2) clarify who the decision maker will be; (3) justify the problem being solved; (4) specify the stages and schedule in the decision-making process; (5) identify institutional constraints or special circumstances that could influence the public participation process; and, (6) decide whether public participation is needed, and if so, what level of participation is required.

The process planning stage is associated with a careful analysis of what one is trying to accomplish with the public and identifying the techniques that best meet those objectives. It helps to identify specific public participation activities for each stage in a decision-making process and then put them on a time line. Process planning includes these eight steps: (1) decide who needs to be on the planning team; (2) identify stakeholders, potential issues, and concerns; (3) assess the probable level of

controversy; (4) define public participation objectives; (5) analyze the information exchange; (6) identify special considerations that could affect the selection of techniques; (7) select public participation techniques; and, (8) prepare a public participation plan.

Implementation planning would involve important details of each public participation activity, for example, how many meetings are needed; where will the meetings be held; how will the meetings be publicized; who is going to facilitate the meeting; and who is responsible for setting up the room. The summary of public participation process planning is illustrated in Figure 2.1.

Figure 2.1: Stages of public participation planning



Source: ©Creighton, James. (2005). *The public participation handbook: Making better decisions through citizen involvement*. San Francisco: Jossey-Bass, p. 28. Figure P2.1 Stages of Public Participation Planning was reproduced with permission of John Wiley & Sons, Inc. on April 5, 2010.

2.2.1.1 Public participation techniques

Common public participation techniques in resource and environmental management include open house, public hearings, and written comment solicitation. Strengths and weaknesses of various participation techniques are shown in Figure 2.2.

2.2.2 Design of meaningful public participation

A number of authors are considering aspects of effective or meaningful public participation processes (Creighton, 2005; Innes & Booher, 2004; Kapoor, 2001; Mitchell, 2002; Sidaway, 2005; Sinclair & Diduck, 2005; Stewart & Sinclair, 2007; Webler et al., 2001; Widditsch, 1972; Wilcox, 1994). There is still no consensus on what constitutes meaningful public participation. Meaningful public participation in this research refers to “participatory processes that incorporate all of the essential components of participation, from information sharing to education, and it includes the active and critical exchange of ideas among proponents, regulators, and participants” (Sinclair & Diduck, 2005, p. 53-54). Thus the design of meaningful public participation demonstrates the essential elements echoed by numerous scholars (such as Creighton, 2005; Innes & Booher, 2004; Kapoor, 2001; Mitchell, 2002; Sidaway, 2005; Sinclair & Diduck, 2005; Stewart & Sinclair, 2007; Webler et al., 2001; Widditsch, 1972; Wilcox, 1994). These elements are nicely summarized by Sidaway (2005) into four principles of public participation, that is, initiation, inclusiveness, information, and influence as illustrated in Table 2.1. Each principle is described as the following:

Initiation relates to the clarity of purpose, process, and expectations of a public participation process. This requires mutual agreement from all parties at the outset. Honesty of intentions and joint commitment enhance trust and public credibility (Sidaway, 2005)

Figure 2.2: Strengths and weaknesses of participatory techniques

Techniques	Strengths	Weaknesses
Collaborative techniques		
<ul style="list-style-type: none"> - Conferences (e.g. ‘Future search’ and consensus conferences) 	<ul style="list-style-type: none"> - Combination of plenary sessions and workshops. Useful in presenting information, developing ideas and getting feedback from wide range of participants. Value of opportunities for networking. 	<ul style="list-style-type: none"> - People may be reluctant to speak in open forum. Costly and long lead time for planning. Audience may be self-selecting.
<ul style="list-style-type: none"> - Participatory appraisal (e.g. PA and Planning for Real) 	<ul style="list-style-type: none"> - Use of visual techniques particularly effective at encouraging participation by all sections of the community. PA uses a variety of techniques and provides triangulation. Able to move from values to action plans relatively quickly. 	<ul style="list-style-type: none"> - As in other techniques, careful consideration needs to be given to the influence community appraisals have on subsequent decision-making to ensure that expectations are not raised falsely.
<ul style="list-style-type: none"> - Forums and panels (e.g. citizen juries/panels) 	<ul style="list-style-type: none"> - Allows lay representative to interrogate experts and organizations and provide dispassionate assessment. 	<ul style="list-style-type: none"> - May not reach consensus. Difficulty of obtaining representative or randomly selected group. Cost of providing facilitation, expertise, briefing, and steering committee.
<ul style="list-style-type: none"> - Joint working groups, advisory groups, task forces 	<ul style="list-style-type: none"> - Valuable ways of tapping expertise, undertaking detailed analyses and gaining credibility. Can operate on continuing basis. 	<ul style="list-style-type: none"> - Terms of reference have to be clear and achievable. Composition has to be representative. Administration can be costly.
<ul style="list-style-type: none"> - Facilitated workshops 	<ul style="list-style-type: none"> - Effective way of exchanging information, developing and evaluating alternative proposals. 	<ul style="list-style-type: none"> - Need to be carefully designed and facilitated by experienced specialists. Costly if they have to be replicated to cover a wide range of opinion.
Consultative techniques		
<ul style="list-style-type: none"> - Websites 	<ul style="list-style-type: none"> - Comparatively fast to set up. Can provide links to wide range of information. 	<ul style="list-style-type: none"> - Not accessible to large sections of community. Concerns about confidentiality and security.
<ul style="list-style-type: none"> - Site visits 	<ul style="list-style-type: none"> - Increases awareness and understanding in selected interest groups. 	<ul style="list-style-type: none"> - Time commitment to preparation and staffing. Likely to reach limited audience.
<ul style="list-style-type: none"> - Staffed exhibitions/open houses 	<ul style="list-style-type: none"> - Attractive way to present information. May reach beyond interest groups. Staff can obtain feedback and build rapport in informal discussions. 	<ul style="list-style-type: none"> - Requires specialist display skills. Staffing exhibit is time-consuming and costly.

Figure 2.2: Strengths and weaknesses of participatory techniques (continued)

Techniques	Strengths	Weaknesses
- Public meetings	- Attract general public interest.	- Agenda and procedures need careful consideration. Rarely represent the full range of public opinion. Tend to polarize views, be dominated by vocal minority and discourage general participation.
Information gathering techniques		
- Focus groups	- Opportunity to test proposals and gain rapid response from selected target groups.	- Relatively expensive to get representative groups.
- Face-to-face meetings and interviews	- Provide important information on issues and the extent to which interest groups wish to participate.	- Provide limited representation of public opinion. Labor intensive to administer and analyze.
- Telephone ‘hotlines’	- Convenient way to communicate with relatively large numbers of people. Easy to update.	- Impersonal. Staff must be briefed to deal effectively with critical public comment.
- Social surveys	- Provide a cross-section of opinion to set against views of interest groups.	- Cost of obtaining a statistically reliable sample likely to be high.
Information providing techniques		
- Reports and brochures	- Direct way of conveying a large amount of information economically.	- Presentational skills may have to be obtained from outside an organization. Direct mailing expensive and frequently disregarded.
- Press releases/media events	- Reach a wide public and can encourage participation. Quickly organized.	- May be difficult to control unless regular contact maintained with media. Liable to reduce message to sound bites.

Source: ©Sidaway, Roger. (2005). *Resolving environmental disputes: From conflict to consensus*. London: Earthscan Ltd., p. 141-142. Figure 7.8 Strengths and Weaknesses of Participatory Techniques was reproduced with permission of Roger Sidaway on April 22, 2010 and Earthscan Ltd. www.earthscan.co.uk on May 28,2010.

Table 2.1: Essential elements of meaningful public participation

INITIATION

- Sincerity of lead agency (Stewart & Sinclair, 2007).
- Patience and perseverance (Mitchell, 2002).
- Clarifying the purposes of participation (Sidaway, 2005; Stewart & Sinclair, 2007; Wilcox, 1994).
- Identifying the desired level and timing of participation and the final decision-maker (Sidaway, 2005; Stewart & Sinclair, 2007; Wilcox, 1994).

INCLUSIVENESS

- Transparency (Mitchell, 2002; Stewart & Sinclair, 2007).
- Engaging all interested and affected parties (Creighton, 2005; Innes & Booher, 2004; Kapoor, 2001; Stewart & Sinclair, 2007; Widditsch, 1972).
- Fair notice (Stewart & Sinclair, 2007).
- Meetings at time and place convenient to all participants (Widditsch, 1972).
- Seeking to address the interest of all (Innes & Booher, 2004; Mitchell, 2002).
- Participants treated equally (Innes & Booher, 2004; Mitchell, 2002; Webler et al., 2001).
- Multiple and appropriate techniques (Creighton, 2005; Stewart & Sinclair, 2007).
- Authentic dialogue (Innes & Booher, 2004; Mitchell, 2002; Stewart & Sinclair, 2007; Webler et al., 2001).
- Mutual learning (Innes & Booher, 2004; Mitchell, 2002; Sinclair & Diduck, 2005).

INFORMATION

- Adequate and accessible information (Kapoor, 2001; Stewart & Sinclair, 2007; Widditsch, 1972).
- Equal information distribution to every stakeholder (Sidaway, 2005).

Table 2.1: Essential elements of meaningful public participation (continued)

INFLUENCE

- Early and ongoing participation (Creighton, 2005; Kapoor, 2001; Sinclair & Diduck, 2005; Stewart & Sinclair, 2007; Widditsch, 1972).
 - Allowing time to review and digest information (Innes & Booher, 2004; Stewart & Sinclair, 2007).
 - Support for building more knowledge (Stewart & Sinclair, 2007).
 - Feedback to participants (Stewart & Sinclair, 2007; Widditsch, 1972).
-

Source: Table is a summary based on information from Creighton, 2005; Innes & Booher, 2004; Kapoor, 2001; Mitchell, 2002; Sidaway, 2005; Sinclair & Diduck, 2005; Stewart & Sinclair, 2007; Webler et al., 2001; Widditsch, 1972; Wilcox, 1994.

Inclusiveness pertains to working for broader participation. Flexible processes and multiple techniques are necessary to engage diverse opinions among participants. Authentic dialogue, where participants are listened to and heard respectfully, serves as a focal activity to understand other perspectives, generate new professional and personal relationship, build trust, create networks, and jointly develop solutions among participants (Innes & Booher, 2004). A good facilitator is another key factor to advancing inclusiveness and authentic dialogue in participation processes (Stewart & Sinclair, 2007).

Information cannot be withheld to develop a source of power (Sidaway, 2005). There must be equal access to relevant information by all interested parties. The quality and presentation of information have an effect on the quality of a participation process (Stewart & Sinclair, 2007).

Influence demonstrates the delegation of authority in decision-making

(Sidaway, 2005). It also involves appropriate channels for the public to have more influence in the decision-making process. Incorporating the public from the project planning phase to the evaluation phase is the key consideration (Sinclair & Diduck, 2005). More appropriate ways to ensure influence in the decision-making process include: feedback to demonstrate how public inputs were used in decision-making; adequate time for interested parties to learn the issues at hand; and resources for the public to build more knowledge to effectively debate (Stewart & Sinclair, 2007).

2.2.3 Empowerment through participation

The term empowerment has particular meanings in different social, cultural, and political contexts. The perception of being empowered also varies across time and concerns of a person's life, for example, in India, a low caste woman currently feels empowered when her voice is heard in a public meeting; in Brazil, citizens express feeling empowered if they are able to participate in decisions on budget allocations; in Ethiopia, citizens feel empowered by being consulted during a program preparation; in the USA, immigrant workers believe they are empowered through unionization which allows them to negotiate working conditions with employers; and in the UK, a battered woman feels empowered when she is free from the threat of violence and is able to make decisions about her own life (World Bank, 2007a).

Marginalized people are generally recognized by their voicelessness and powerlessness (World Bank, 2002). Empowerment for marginalized people principally involves promoting how their voices would be heard and how they would obtain more power in making decisions that affect their lives (World Bank, 2007a). In the context of local development, empowerment means “people and communities, especially those frequently marginalized, having both the opportunity and the capability to participate effectively in social, economic, and political spheres”

(Helling, Serrano, & Warren, 2005, p. 15). Empowering marginalized people requires increasing the quantity and quality of their opportunities to participate in local governance and local service delivery as well as enhancing their capability to make the best use of such opportunities (Helling et al., 2005).

To create opportunities for marginalized people to participate in local governance and local service delivery entails institutional reform which rearranges inequalities relating to voice, choice, and access among local populations (Helling et al., 2005). There is no single institutional model for empowerment (World Bank, 2007a). However, key components that promote institutional reform are: access to information; inclusion and participation; and accountability (World Bank, 2002). Two-way information exchange between government and citizens is essential for responsive and accountable governance. Informed citizens are better prepared to take advantage of opportunities, access services, exercise their rights, negotiate effectively, and hold multi-actors accountable. Without relevant, timely, and understandable information, it is impossible for marginalized people to take effective action (World Bank, 2007a). Inclusion and participation is critical to treat marginalized people as valuable personnel. It provides an opportunity to listening to the marginalized voices and, conceivably, to jointly making decisions in local governance and local service delivery (World Bank, 2002). Accountability in public performance and service delivery implies the need of various service providers and participatory evaluation in public performance and service delivery. It then urges institutional reform which develops more opportunities for marginalized people to participate and shifts power and control to the marginalized (World Bank, 2007a).

In addition to creating opportunities to participate in local governance and local service delivery, empowering marginalized people requires enhancing the

capability of people to participate effectively (Helling et al., 2005). People's capability needs to be built at both individual and collective levels (World Bank, 2002). At an individual level, capability building depends on increasing access to basic resources including financial, informational, and organizational resources (Helling et al., 2005) as well as developing skills through education, training, and learning experiences (Lyons, Smuts, & Stephens, 2001). At a collective level, social capital, which refers to the process between people in communities that establish networks, norms, organizations, and social trust to facilitate collective action (Putnam, Leonardi, & Nanetti, 1993; World Bank, 2007b), plays an important role in: acting collectively to influence government's decision-making; and gaining collective negotiation power with suppliers of raw materials, buyers, and financial institutions (Helling et al., 2005; World Bank, 2007b). There has been a close relationship between fostering high degrees of social capital and success not only in local development but also in participatory natural resources management (Amornsanguansin, 2005; Narayan, 1997; Pantoja, 2002; Reid & Salmen, 2002).

It can be said that participation and empowerment go hand in hand in local development context. The design of 'meaningful public participation' (Sinclair & Diduck, 2005) explicitly serves as a means to empowerment. Meaningful public participation, which embraces initiation, inclusiveness, information, and influence as key components, fulfils the central limits on voice and power of marginalized people. 'Authentic dialogue' (Innes & Booher, 2004), which is a core of the inclusiveness component, responds to their voicelessness by promoting listening to all concerns respectfully with minimal judgment. In terms of powerlessness, 'early and ongoing participation' (Sinclair & Diduck, 2005), which is a fundamental aspect of the influence component, encourages more control in decision-making processes in local

governance and local service delivery. Empowered people, in turn, earn more opportunity and capability to effectively participate in local development.

2.3 Public participation in water management

At the World Summit on Sustainable Development in 2002, the international community acknowledged the importance of the water scarcity challenge by highlighting the need for a multi-sectoral, people-centered, integrated water resource management approach (UN, 2002). Participation from the public and non-government agencies is necessary for effective water management because water management functions are currently associated with various players and the government simply cannot play every role (de Loe, 2007; Rogers & Hall, 2003). A key challenge of a new form of water management is to balance the roles between government and non-government actors, and to readjust between regulatory and non-regulatory practices (de Loe, 2007). Rogers & Hall (2003) state that, “There is no single model of effective water governance; indeed to be effective governance systems must fit the social, economic and cultural particularities of each country” (p. 27). However, the pillars of effective water management constitute open and transparent, inclusive and communicative, coherent and integrative, and equitable and ethical practices (Rogers & Hall, 2003). Broad participation is understood to be a backbone to creating a new form of water governance (Bakker, 2003).

Agriculture is the main source of the global food supply and the principal source of livelihood for billions of people in rural areas (UNDP, 2006). Irrigated agriculture, which represents only 20% of the world’s farmland, produces about 40% of the world’s food supply and 60% of cereals (UN-Water, 2005). As the single biggest water consumer in most countries, agricultural managers need to focus on the

efficient use of all water sources (groundwater, surface water, and rainfall) and on water allocation strategies that maximize the economic and social returns to finite water supplies (UN-Water, 2006). Such strategies call for radical changes in water governance in irrigated agriculture. The primary changes entail decentralized top-down planning and involvement of water users at all levels in planning and management of irrigation (UN-Water, 2005).

One of the most influential institutional changes in irrigation management has been the introduction of PIM and the development of WUOs. The UNDP (2006) agrees that, “decentralization and devolution of authority to water user associations are seen as fast-track routes to empowerment. But empowerment is more complex than administrative reform” (p. 192). The sustainable reform of irrigation management requires a combination of financial and institutional empowerment and capacity building (UNDP, 2006). All water users need to be empowered by gaining influence on decision-making and receiving adequate financial support from water authorities (UN-Water, 2005). Enhancing PIM approach could require readjustment of underlying attitudes, values, and beliefs among stakeholders. Thus the first challenge of PIM is to examine how to rearrange the roles of local WUOs within policy decision-making and governance structures and to do it in a way that promotes the sustainable use of water.

2.3.1 Participatory irrigation management

Participatory irrigation management, so called PIM, is not a new concept. A number of countries, particularly in Asia, have traditional farmer-managed irrigation systems that are centuries old (Azumi, 1995). The first attempt to promote PIM was observed in the United States in 1950s, France in the 1960s, and more than 50 countries (e.g. Chile, Peru, Mexico, Pakistan, and India) since the 1980s (Tortajada,

Tigre, & Sanchez-Meza, 2006; World Bank, 2005).

The recognition of PIM is emphasized by major funding agencies, e.g. the World Bank and the ADB. In the 1970s and 1980s, the World Bank extensively invested in infrastructure development including large irrigation and drainage schemes. In the 1990s, the Bank often supported system rehabilitation and management and, more recently, small irrigation schemes under community-driven development projects (Meinzen-Dick & Reidinger, 1995; World Bank, 2006). After several decades of investing in physical infrastructures in developing countries, it is evident that many large-scale irrigation projects are not sustainable because of poor management. This has led donor agencies to reevaluate and shift their focus from building physical structures to organizing institutional structures that help manage the irrigation system in a more sustainable manner through user participation in design, operation, and maintenance of the system (Ostrom, 1992). The importance of user participation is noted by the ADB (1973) as, “The success of an irrigation project depends largely on the active participation and cooperation of individual farmers. Therefore, a group such as a farmers’ organization should be organized . . . Irrigation technicians alone cannot satisfactorily operate and maintain the system” (p. 50).

The World Bank Institute outlines participatory irrigation management as:

[T]he involvement of irrigation users in all aspects and at all levels of irrigation management. “All aspects” includes the initial planning and design of new irrigation projects or improvements, as well as the construction, supervision, financing, decision rules, operation, maintenance, monitoring, and evaluation of the system. “All levels” refers to the full physical limits of the irrigation system, up to the policy level in the capital city. Any management function, including the setting of policies, can and should have a participatory dimension to it. (Groenfeldt, 2000, p. 2)

Other terms related to participatory irrigation management include turnover, irrigation management transfer, handing over, devolution, or privatization. These terms are

more specialized terms that refer to transfer of responsibility and authority for irrigation system management from public agencies to WUOs or other private sector entities (International Network on Participatory Irrigation Management [INPIM], 2001; Svendsen, Trava, & Johnson III, 2000).

Since farmers depend on irrigation water for their crops, they hold the strongest incentive to conduct irrigation management in a realistic fashion that potentially solves basic problems (e.g. inequitable water allocation, poor maintenance of the system, and inefficient water use) faced by irrigation managers (WBI, 1998).

2.3.2 Lessons learned from PIM implementation

PIM is being organized and implemented in different places with varied results. The implementation of PIM in diverse regions such as Mexico, Turkey, and Indonesia offers some lessons related to participation and empowerment. The experiences thus far with these programs could help to establish what is happening in other jurisdictions regarding irrigation management, document types, and level of participation and establish who is being empowered. The features of PIM case studies are reviewed in Table 2.2. The details of PIM implementation in each case are as follows:

1. Mexico case

In 1989, the federal government of Mexico adopted a new policy of decentralized program that transferred responsibility for operation, conservation, and management of the irrigation districts to water user associations or WUAs under the 20-year concession. The WUAs are reorganized to be autonomous at the secondary canal level and in some cases federated at the primary canal level. Farmers pay water fees to the WUAs, and a small portion of the fee is passed to the federal water

Table 2.2: Features of PIM case studies

Features	PIM case studies		
	Mexico	Turkey	Indonesia
1. Beginning year of program	1989	1993	1987
2. Implementing agency	Federal	Federal	Federal
3. Targeting agency	WUAs	Local government, WUAs	WUAs
4. Type of program	Voluntary basis (20-year concession)	Voluntary basis	Customary basis (pilot projects)
5. Areas covered by the transfer	95% (2000)	96% (2005)	22% (1996)
6. Type of first-level management unit	District	District	Small irrigation (<5 km ²)
7. Type of canal management unit	1 st and 2 nd canals	2 nd and 3 rd canals	3 rd canal and ditch
8. Facility ownership	Government	Government	Government
9. Special law on the transfer	Yes (1992/1994)	No	Yes (1989)
10. Fee base	Area/crop	Area/crop	Area (only large irrigation, >5 km ²)
11. Cost sharing by WUAs in O&M	72% (2000)	Most	Most (only large irrigation)
12. Cost sharing by government in rehabilitation before transfer	100%	33%	100%

Source: Table is a summary based on information from Bruns & Helmi, 1996; Garcés-Restrepo, 2001; Svendsen et al., 2000; Svendsen & Nott, 2000; Tortajada et al., 2006.

authority. The program aims to: put water users in charge of operation and management; ensure the WUAs are financially self-sufficient; reduce the financial burden on the federal government; and decrease the number of public officers in the irrigation districts (Tortajada et al., 2006). The transfer program is initially started in the most productive irrigation districts, which are best organized and occupied by the most commercially oriented farmers. By February 2000, the program had transferred the irrigation infrastructures, which covered 32,000 km² or 95% of all irrigation districts of the country, to 474,000 users organized into 427 WUAs (Garces-Restrepo, 2001).

The new arrangements have been effective in improving water delivery to farmers and clearing the maintenance backlog. Before the transfer program, the contribution of operation and maintenance cost of the federal government was 85% and that of farmers was 15%. In 2000, the federal government contributed with 28% of the cost and farmers with the balance of 72% (Garces-Restrepo, 2001; Tortajada et al., 2006). However, financial self-sufficiency is hard to attain even though the water fee is increased as much as 400% (Palacios, 2000). The main reason is the water fee is only based on volumetric water delivery. In case of a dry season, the income substantially reduces and could drop to zero which causes bankruptcy for some WUAs.

In a review of the program, Garces-Restrepo (2001), Palacios (2000), and Tortajada et al. (2006) suggest that the following lessons can foster participation and empowerment: (1) support from high-level politicians and the water law which provides clear roles and responsibilities of related agencies is required; (2) the WUAs are empowered by enabling them to set their own rules and hire their own technical and office staff for operating and maintaining the secondary canal level; (3) the

government enhances the WUA capability through allocating the federal budget for infrastructure rehabilitation and new machinery and equipment supply at the beginning of the transfer process; and, (4) both government and WUA staff are provided training, that is, operation and maintenance techniques, by the federal government.

The main barrier to participate is a legal deficiency regarding the priority of rights among competing water users at basin, district, and sub-district levels that raises conflicts and impedes participation from related parties (Palacios, 2000; Tortajada et al., 2006). Palacios (2000) and Tortajada et al. (2006) recommend the following practices to promote participation and empowerment: (1) an appropriate legal framework that defines the rights to individual competing water users, forms of organization, and responsibilities of each party across levels should be clarified; (2) at the outset of transfer program the advantages of implementing PIM should be announced through various channels (e.g. meetings, workshops, and brochures) to develop more knowledge and participation from stakeholders; (3) the information access should be distributed among small landholding farmers to stimulate voting and active participation; and, (4) continuous training and financial support mechanism from the federal government should be established to enhance capacity building among relevant parties.

2. Turkey case

The Turkish government initiated the policy of transferring operation and maintenance of smaller and more remote irrigation projects to the existing local administrations and leaders since 1954, but the pace of this transfer was very slow, about 20 km² per year (Svendsen, 2001). The Accelerated Transfer Program was implemented in 1993 in conformity with the World Bank's mission. The objectives of

the Program are: to increase the efficiency of operation and maintenance services; to enhance self-management of the WUOs at the secondary and tertiary canal levels; and to decrease the operation and maintenance costs for the government. The Transfer Program is done on a voluntary basis. The Program conforms to the current legislation and transfers operation and maintenance, through the existing local government structures and leaders, rather than through a coalition of farmers' organizations. The water rights and facilities' ownership still remain with the government. The implementation is characterized by flexibility, experimentation, and learning processes. As of 2005, ninety-six percent of all irrigation schemes covering 18,600 km² had been transferred to the WUOs including WUAs, cooperatives, municipalities, and village authorities (Tortajada et al., 2006).

According to the Turkish legislation, water is a public good that everyone is entitled to use. The irrigation water fee is subsidized by the government. The water fee structure is therefore based on operation and maintenance costs and the areas under irrigation. The Transfer Program in Turkey remains impressive. The Program results in a remarkable reduction of operation and maintenance costs, number of conflicts and complaints, and energy use. The collection rate of water fee becomes double. The Program, moreover, achieves reliable and equitable water distribution and improves collaboration between farmers and local administrations (Svendsen & Nott, 2000; Tortajada et al., 2006).

Svendsen & Nott (2000) and Tortajada et al. (2006) address a number of issues that help promote participation and empowerment in the Transfer Program: (1) the government provides the initial and on-going training for related parties; (2) an extensive series of workshops and seminars are conducted to deliver values and skills to public officials who are responsible for implementing the Program; (3) at the

implementation stage, an appropriate guidance is given to the WUOs and, especially, allows to adapt to local conditions and constraints; and, (4) at the beginning of the Transfer Program, about one-third of the cost of infrastructure rehabilitation and new machinery and equipments is shared by the government that allocates the budget through the World Bank's loan.

Svendsen (2001), Svendsen & Nott (2000), and Tortajada et al. (2006) emphasize some obstacles to participation and other concerns regarding the Transfer Program as the followings: (1) individual farmer water users are not active participants in meetings and water management because the Program transfers operation and maintenance to the existing local government structures; (2) there is no legal basis or regulation for who has priority water use among different users in a basin which inhibits the effective water management; (3) according to the present legislation, WUOs cannot process a bank loan which limits their financial resources; and, (4) WUO staff should be provided other skill areas, including database management and maintenance, computer applications development and use, budgeting, and financial management, to nurture the sustainability of the Transfer Program.

3. Indonesia case

In 1987, the Indonesian government introduced the turnover of operation and maintenance for small irrigation systems (less than 5 km²) to WUAs and the establishment of an irrigation service fee for large irrigation systems (more than 5 km²) on a nationwide basis. The government goals are: to reduce demands on financial and human resources; to create a better collaboration between government and farmers; and to gain access to international funding. The irrigation systems have to be restored before the turnover. The WUA formation is supported by the

government and requires registration with district authorities. The WUAs gain authority in enforcing rules for water distribution and maintenance. By 1996, the small irrigation systems covering about 2,000 km² or 22% of total small irrigated areas had been transferred or were fully prepared to transfer to WUAs (Bruns & Helmi, 1996).

The irrigation service fee for large irrigation systems is formulated to support the operation and maintenance expenditures in district government. The irrigation service fee is usually based on landholding areas. In a pilot area, farmers could contribute more than 1,500,000 Indonesia Rupiahs/km²/year or about US\$164 per km²/year (US\$1 = 9,160 Indonesia Rupiahs). In addition, the service fee needs to be divided among landowners and tenants in a reasonable manner. The WUAs assist in collecting fees and identifying priority needs for improving operation and maintenance. The district revenue office serves as a controlling agency to collect the irrigation service fee and to allocate budget from the collecting service fee. By 1996, the irrigation service fee had been introduced to over 7,000 km² or 20% of large irrigation systems (Bruns & Helmi, 1996).

The turnover program shows a very slow pace after ten years of implementation. This implies numerous constraints towards the program. However, promising experiences relating to participation and empowerment are still achieved. In the program reviews, Bruns & Helmi (1996) and Food and Agriculture Organization or FAO (2007a) indicate the following conditions that encourage participation and empowerment: (1) local cost sharing initiates a sense of ownership for farmers, thus promoting contribution to the project; (2) public participation in irrigation management helps improve project planning by providing valuable local information, preventing possible problems, and optimizing use of local resources; (3)

the government enhances capacity building of public officials and farmers through a huge amount of training to sustain the programs; and, (4) the national policy supports local organizations, such as WUAs, to gain more influence on decision-making in irrigation management.

Particular lessons on deterring participation and empowerment also emerge based on the program reviews by Bruns & Helmi (1996) and FAO (2007a) as follows: (1) the registration process of the WUAs requires a substantial number of meetings and significant amount of paperwork without providing incentives for farmers' contributions; (2) the standard model of the WUAs provides little adjustment to fit local circumstances and regularly excludes traditional leaders from leadership positions of the WUAs; (3) almost every project manager holds an engineering background with little knowledge of institutional building and thus generally lacks skills to facilitate public participation; (4) farmers hesitate to participate in the programs since they receive little information on what difference the turnover program has made in irrigation performance (e.g. water delivery, crop yields, and farmer's income) and how the collected service fee has been allocated; and, (5) the irrigation service fee program puts more emphasis on collecting fee rather than promoting farmer participation in planning, operation, maintenance, and evaluation.

To enhance participation and empowerment for local parties the following recommendations are suggested by Bruns & Helmi (1996) and FAO (2007a): (1) the implementation of future programs should be simpler with less bureaucratic procedures to encourage more participation from local institutions; (2) the priority water use among competing users in a basin should be clarified to facilitate an optimal water allocation; (3) crop diversification should be promoted in an irrigated area to increase farmer's income, thus inducing more participation from farmers; (4) the

collected irrigation service fee should be used within the same irrigation system to acknowledge the importance of service fee contribution; and, (5) more training needs, including cultivating techniques, marketing, and post-harvesting technology, as well as informational and financial resources would be necessary to sustain the programs.

The lessons learned from PIM implementation clearly differ in each of the cases. Key lessons from PIM implementation in relation to public participation and empowerment are summarized in Tables 2.3 and 2.4 respectively. As noted by Bruns & Helmi (1996), “The sustainability of irrigation systems ultimately lies in the sustainability of the organizations which manage them” (p. 8). Trying to develop institutions that are transparent and participatory is definitely tricky in the face of off-loading costs from central government agencies.

Table 2.3: Conditions that facilitate public participation and empowerment in PIM implementation in each case

Conditions	Cases		
	Mexico	Turkey	Indonesia
Facilitating public participation			
1. National policy support.	√	√	√
2. Legal support (e.g. clear roles and responsibilities of related agencies).	√	X	X
3. Adequate guidance.	X	√	X
4. Local cost sharing.	√	√	√
Facilitating empowerment			
1. WUAs can set their own rules and hire technical staff.	√	√	X
2. Budget for infrastructure rehabilitation and new equipment supply from government.	√	√	√
3. Initial training for related agencies.	√	√	√
4. On-going training for related agencies.	X	√	√

Source: Table is a summary based on information from Bruns & Helmi, 1996; FAO, 2007a; Garcés-Restrepo, 2001; Palacios, 2000; Svendsen & Nott, 2000; Tortajada et al., 2006.

Table 2.4: Needs for enhancing PIM sustainability in each case

Needs	Cases		
	Mexico	Turkey	Indonesia
Enhancing public participation			
1. Clarify the priority of rights among competing water users at basin, district, and sub-district levels.	√	√	√
2. Disseminate the benefits of PIM through various channels (e.g. meetings, workshops, and brochures).	√	X	√
3. Provide more PIM information to small landholding farmers.	√	X	X
4. Simplify registration process of WUAs.	X	X	√
5. Promote crop diversification to increase farmer's income.	X	X	√
6. Allocate the irrigation service fee within the same irrigation system.	X	X	√
7. Provide training for government officials to effectively facilitate public participation.	X	X	√
Enhancing empowerment			
1. Provide financial support mechanisms for WUAs.	√	√	√
2. Arrange on-going technical training for WUAs.	√	X	X
3. Require more training on computer skills, database management, financial management, cultivating techniques, post-harvesting technology, and marketing for WUAs.	X	√	√
4. Provide training on institutional building for government officials.	X	X	√
5. Enable to modify rules in conformity with local circumstances and constraints.	X	X	√

Source: Table is a summary based on information from Bruns & Helmi, 1996; FAO, 2007a; Palacios, 2000; Svendsen, 2001; Svendsen & Nott, 2000; Tortajada et al., 2006.

International experiences show that the elements most likely to contribute to promising outcomes of PIM are: legal support, through policies and legislation; solid, transparent, autonomous financial management; good governance in the involved organizations; and capacity building to bridge gaps in knowledge and skills and to

improve cooperation between public officers and farmers (INPIM, 2001; Meinzen-Dick & Reidinger, 1995; Merrey, 1996; Raymond, 2004; Svendsen, Trava, & Johnson III, 2000).

2.4 Transformative learning

2.4.1 Key concepts of transformative learning

Transformative learning is a formal adult learning theory. It is recognized as a theory in progress which welcomes comments from other scholars (Mezirow, 2000). Mezirow (1997) asserts that understanding one's own experience is a basic quality of the human state. The central goal of transformative learning is "to help adults realize their potential for becoming more liberated, socially responsible, and autonomous learners" (Mezirow, 2000, p. 30). Individuals with different personalities and backgrounds could transform their experiences in different ways (Cranton, 1997).

Transformative learning has been inspired by various doctrines:

Although the context and terminology were different, our understanding of transformative learning was influenced by the concept of paradigm, made popular as a factor in the development of scientific thought by Thomas Kuhn (1962), and that of conscientization, described by Paulo Freire in his influential *Pedagogy of the Oppressed* (1970) . . . The work of psychiatrist Roger Gould (1978) was also an influence in the development of Transformation Theory. Another influence was the development of Critical Theory by the Frankfurt School of German philosophers and social critics that saw critical reflection as the means of unmasking hegemonic ideology. Later, the work of Jurgen Habermas (1984) was a major influence on Transformation Theory. (Mezirow, 2000, p. xiii)

Transformative learning refers to: a process by which adults transform their frames of reference; then critically reflect and assess reasons for new beliefs; and finally reintegrate the new beliefs into their lives (Mezirow, 1991, 1995, 2000). In other words, transformative learning is a process by which adults interpret, validate, and reformulate the meaning of their experiences (Cranton, 1994). It can also be viewed

that transformative learning explains how adults' attitudes or beliefs become transformed based on individuals' cultural and background experiences (Taylor, 1998).

A frame of reference is a structure of assumptions and expectations which are processed through sense impressions (Mezirow, 2000). It may include the results of interpreting experiences based upon cultural paradigms, learned philosophy, sociological theories, and psychological orientations. It involves cognition, affection, and conation processes. Frame of reference consists of two dimensions, a habit of mind and resulting points of view (Mezirow, 2000). A habit of mind is a set of assumptions, including cultural, social, educational, economic, political, or psychological premises, that act as a filter to interpret the meaning of one's experiences. A habit of mind becomes articulated in resulting points of view which are expressed as sets of immediate specific expectations, beliefs, feelings, attitudes, and judgments (Mezirow, 1997, 2000).

Transformative learning consists of two major domains of learning, namely instrumental and communicative learning. Instrumental learning describes how to control and manipulate the environment or other people through empirical testing. The empirical testing aims to determine the truth or to achieve technical success in order to meet the objectives (Mezirow, 2000). Communicative learning relates to learning what others mean when they communicate through rational discourse. Rational discourse involves showing feelings, intentions, values, and moral issues to make a tentative best judgment (Habermas, 1984; Hart, 1990b; Mezirow, 2000).

Discourse is central to human communication and learning and Mezirow (2000) states that, "[Discourse] is that specialized use of dialogue devoted to searching for a common understanding and assessment of the justification of an

interpretation or belief” (p. 10) and also recognizes that, “Discourse is the forum in which “finding one’s voice” becomes a prerequisite for free full participation” (p. 11). The ideal conditions for discourse include: accurate and complete information; freedom from coercion; objective assessment; openness and empathy to alternative points of view; ability to critically reflect one’s belief; equal opportunity to participate; and readiness to accept an emerged consensus (Mezirow, 1994, 2000).

Learning can occur in four ways: (1) by elaborating existing frames of reference; (2) by learning new frames of reference; (3) by transforming points of view; or, (4) by transforming habits of mind (Mezirow, 2000). Transformation of one’s belief often follows ten steps, including: (1) disorienting dilemma (triggered by a life crisis, major life transition, or accumulation over period of time); (2) self-examination with feelings; (3) critical assessment of assumptions; (4) recognition of shared transformation process; (5) exploration of new roles or actions; (6) development of a plan for action; (7) acquisition of knowledge and skills for implementing the plan; (8) trying the plan; (9) development of competence and self-confidence in new roles; and, (10) reintegration into one’s life based on new perspective (Mezirow, 1995, 2000).

2.4.2 Critical transformative learning

This research will study individual learning occurring through PIM in rural communities of a developing country. To ensure the benefit from this study in relation to the theory, it is necessary to further consider specific points of transformative learning that remain unclear such as: (1) transformative learning in a cross-cultural context; (2) considering marginalized voices; (3) rationality of learning process; and, (4) social action contributions.

1. Transformative learning in a cross-cultural context

Transformative learning has drawn more attention and criticism than any other adult learning theories. However, the discussion has emphasized a theoretical framework, with little consideration for empirical perspectives and cross-cultural contexts (Merriam & Caffarella, 1999; Taylor, 2000). Mezirow (2000) remarks on the importance of cultural sphere as follows, “The possibility for transformative learning must be understood in the context of cultural orientations embodied in our frames of reference, including institutions, customs, occupations, ideologies, and interests, which shape our preferences and limit our focus” (p. 24). More empirical discussion from diverse geographical settings is needed to generalize transformative learning. Perhaps each culture has different needs and processes of learning. Investigating how adults from different cultures, holding various norms, values, and beliefs respond to their experiences and what learning outcomes occur would add richness and contribute to the generalization of transformative learning theory.

2. Considering marginalized voices

Transformative learning focuses on highly competent and mature adults according to the preconditions of discourse indicated by Mezirow (2000):

Preconditions for realizing these values and finding one’s voice for free full participation in discourse include elements of maturity, education, safety, health, economic security, and emotional intelligence. Hungry, homeless, desperate, threatened, sick, or frightened adults are less likely to be able to participate effectively in discourse to help us better understand the meaning of our own experiences. (p. 15-16)

Belenky & Stanton (2000) argue that discourse could include immature and marginalized people because participation in reflective discourse would allow them (and us) to understand the meaning of their experiences as well as the nature of their society and develop a more inclusive, fair, and democratic society.

Marginalized groups are usually a part of a society. The marginalized should instead get the priority support from others in a society to overcome their voicelessness and powerlessness. Ignoring the marginalized from participation in discourse would decrease their opportunities of being heard from societies. Excluding the marginalized would, moreover, erode the ultimate goal of transformative learning that aims to help adults becoming more liberated and socially responsible persons.

3. Rationality of learning process

Transformative learning has long been criticized for neglecting the emotional context of the learning process (Clark & Wilson, 1991; McDonald, Cervero, & Courtenay, 1999; Taylor, 1998). Rational discourse is seen as a key component to fostering transformative learning (Cranton, 1994; Merriam & Caffarella, 1999). Mezirow (2000) explains the term rationality as “assessing reasons supporting one’s options as objectively as possible and choosing the most effective means available to achieve one’s objectives” (p. 10). However, several studies have found that the emotional dimension plays an important role in promoting transformative learning as reviewed by Taylor (2000):

Brooks (1989), in a study focusing on critical reflection and organizational change, found that “critically reflective learning processes consist of more than just the critical thought strategies generally thought to comprise them” (p. 175). . . . Morgan (1987), Coffman (1989), and Sveinunggaard (1993) found that critical reflection can only begin once emotions have been validated and worked through. (p. 303)

Dirkx (2001) claims that, “Emotions always refer to the self, providing us with a means for developing self-knowledge. They are an integral part of how we interpret and make sense of the day-to-day events in our lives” (p. 64-65). Similar to Dirkx (2001), Taylor (2000) acknowledges the role of emotion in facilitating transformative learning by suggesting that “It is through building trusting relationships that learners

develop the necessary openness and confidence to deal with learning on an affective level, which is essential for managing the threatening and emotionally charged experience of transformation” (p. 308). In addition, Merriam & Caffarella (1999) point out that rational thinking is a particularly Western concept, which is a product of the Enlightenment and Descartes’ mind-body split.

4. Social action contributions

Social action context in transformative learning remains controversial (Merriam & Caffarella, 1999). The criticism of transformative learning is the fact that Mezirow draws heavily from Habermas’s critical theory, of which radical social change is a core concept, but he apparently focuses on individual transformation in his theory (Collard & Law, 1989; Hart, 1990b). In fact, Mezirow (1990) states that:

[W]e must begin with individual perspective transformations before social transformations can succeed. It is also clear that the individual perspective transformation process includes taking action, which often means some form of social action-which in turn can sometimes mean collective political action. (p. 363)

Mezirow (2000) further suggests that adult educators (or facilitators) may choose to work with learners (or participants) who have a feeling of solidarity to encourage social action such as social movements or community development programs. A number of scholars, moreover, agree that, “People learn through projects that are real and meaningful; they take action by working on real challenges in the organization . . . Social action is both a goal and a means of learning in preparation for further action” (Wiessner & Mezirow, 2000, p. 335). Considering how learning through PIM leads to social action in this research will help illuminate the connection between individual learning and social action.

2.4.3 Learning through public participation in resource and environmental management

The learning implications of decision-making processes in resource and environmental management have been recognized by a number of scholars (Diduck, 1999; Diduck & Mitchell, 2003; Fitzpatrick & Sinclair, 2003; Keen et al., 2005; Keen & Mahanty, 2006; Marschke & Sinclair, 2009; Sims & Sinclair, 2008; Sinclair & Diduck, 2001; Webler et al., 1995). As stated by Keen & Mahanty (2006), “A learning approach to natural resource management allows us to treat our interventions as learning processes that can contribute to continuous improvement and expand our understanding of the interactions between people and their environment” (p. 497). The learning outcomes of public participation in resource and environmental management could enhance knowledge of the social dimension of resource management and help achieve a sustainable future in resource use (Diduck, 1999; Keen et al., 2005; Sims & Sinclair, 2008; Webler et al., 1995). As such, this research will also contribute to a small but growing literature that considers learning, particularly transformative learning in the context of participation in resource and environmental decision-making.

Sims & Sinclair (2008) reveal that farmers in Costa Rica engage both instrumental learning (e.g. obtaining skills and information, determining the cause-effect relationships, and task-oriented problem-solving) and communicative learning (e.g. understanding values and normative concepts, and understanding others' points of view) in the Instituto Costarricense de Electricidad's watershed management agricultural programme. Marschke & Sinclair (2009) also find that Cambodian fishermen experience in both instrumental learning (e.g. learning about administrative procedures) and communicative learning (e.g. insights into the need of mangrove

conservation) in participatory resource management. The findings from Costa Rica and Cambodia, moreover, show that such learning has resulted in change in relation to individual behavior and resulted in social action aimed at more sustainable resource management (Marschke & Sinclair, 2009; Sims & Sinclair, 2008). While, Diduck & Mitchell (2003) argue that public participation in environmental assessment is unlikely to facilitate the ideal conditions of learning, they note that learning does occur through environmental assessment. Further, Fitzpatrick & Sinclair (2003) reveal that an environmental hearing has influence on critical education and potentially transformative learning among participants. Public participation can, moreover, initiate social learning processes which transform divided individual actions into collective action (Webler et al., 1995).

2.5 Summary

Participation is important to resource and environmental decision-making. It creates more opportunities for the public to influence decision-making and provides a venue to seek joint solutions among stakeholders. When a range of stakeholder interests are involved, such agreement leads to ultimate project decisions that are more sustainable. Participation, moreover, provides an opportunity and forum for authentic dialogue among participants in collaborative situations. Authentic dialogue, in turn, facilitates learning different perspectives so as to create mutual learning (Innes & Booher, 2004; Webler et al., 1995) that enables transformative learning. Transformative learning, which focuses on the process of learning (Sinclair & Diduck, 2001) and provides the social context in which learning occurs (Merriam, 1993a, b; Merriam & Caffarella, 1999), could promote a better understanding of community learning and empowerment through PIM in Thailand. In addition, the

lessons learned from PIM implementation in various regions could help direct an appropriate approach to promote sustainable PIM in Thailand.

Chapter 3

Research design

3.1 Research philosophy

As stated in Chapter 1, the purpose of this research is to understand the relationships between public participation, learning, and implementing more sustainable water practices through PIM in Thailand. The research was qualitative in nature, and based on an interactive, adaptive approach (Nelson, 1991). A qualitative study can be defined as “[A]n inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants and conducted in a natural setting” (Creswell, 1994, p. 1-2). The detailed perceptions and experiences of relevant parties in the setting serve as a key to illuminate the inquiring relationship. The qualitative procedure therefore facilitates such understanding and helps to achieve the purpose of this research.

As noted, the embedded characteristics of present resource and environmental management display change, complexity, uncertainty, and conflict (Diduck, 1999; Mitchell, 1997, 2002; Tyler, 2006). These characteristics are exactly why Nelson (1991) suggests adopting an interactive, adaptive approach. Since it allows the researcher to observe the processes, such as PIM, reflect upon the emerged perceptions, attitudes, values, preferences, and expectations of related parties as the fieldwork proceeds and makes adjustments to approach if necessary. This approach also promotes the learning process and idea exchange between the researcher and participants.

According to Yin (2003), a case study approach provides in-depth knowledge of a specific case, especially in the context of contemporary social phenomenon. An

exploratory case study design was applied to gain insights into the connection between public participation, learning, and sustainable water management in a specific setting. The insights from the case study serve as the basis for “analytical generalization” (Yin, 2003, p. 32), in which the research results are compared to the applied theories, that is, public participation and transformative learning. Such insights, moreover, provide meaningful practical resources to achieve sustainable PIM practices in Thailand.

3.2 Research approach

3.2.1 Exploratory case study

The research was done in two phases. Phase 1 was carried out to provide an overview of PIM activities at the country level. The goals of Phase 1 were to examine how PIM was being implemented, how it was currently operating including self-administration, how communities were included in an overall design, and to identify related key agencies and institutions. The collected data from Phase 1 helped in identifying of two specific case study settings for Phase 2. Phase 2 was conducted at the community level to examine the elements of participation and learning occurring through PIM. The goal of Phase 2 was to provide in-depth analysis of WUO workings and the communities they represented.

3.2.2 Justification of case study sites

This research is funded by the Agricultural Research Development Agency (ARDA), Thailand and the Social Sciences and Humanities Research Council of Canada. The ARDA key missions are to build capacity among Thai researchers and to develop research projects related to the agricultural sector of the country (Agricultural Research Development Agency [ARDA], 2007). I had been working as an

Environmental Scientist with the RID for five years at the time I received a scholarship from the ARDA for my studies. During the five-year working period, I have experienced the RID passive practices of engaging the public in environmental impact assessment (EIA) processes with regard to new reservoir projects. Such passive practices have long impaired the agency's trust and caused opposition from the public.

The RID adopted the PIM approach to irrigation management in 2004 to promote efficient water use due to the increasing national water crisis. Thus far government evaluation of PIM has focused just on the number of WUOs established and the success of self-administration in each of these cases. PIM has never been studied in the context of relationship between public participation (governance) and learning occurring through PIM processes. Such direct learning from conducting case studies in Thailand could improve public participation processes and contribute to the sustainable water management discussion in the country. Furthermore, the learned experiences may be applied towards sustainable water management practices at a regional level. Therefore, I saw the potential of this research work for the ARDA as well as for local people and academia, but the ARDA had in no way participated in my choice of research topic.

The collected data from Phase 1 helped in identifying three potential sites of case studies as shown in Table 3.1. The preliminary criteria for site selection of both case studies included the followings: (a) evidence of successful PIM implementation in an area; (b) presence of an active WUO; (c) similar technical and administrative aspects of the sites (e.g. coverage areas under the WUOs, types of irrigation system, and percentage of irrigation efficiency); and, (d) willingness of the key persons associated with PIM implementation to participate in the study. Site 3, the Krasiew

Table 3.1: Potential sites of case studies

Features	Site 1	Site 2	Site 3
	Pasak River	Sappradu Reservoir	Krasiew Reservoir
1. Province	Saraburi	Nakhon Ratchasima	Suphanburi
2. Region	Central	Northeastern	Central
3. Type of WUO	IWUG	WUA	IWUG
4. WUO title	Kaset Samakee Ruamjai	Huai Sappradu	2L-1R
5. Established WUO	2001	1971	2001
6. National award	2005	1988 & 2007	2008
7. Responsible irrigation system	2 nd canal	1 st canal	2 nd canal
8. WUO coverage areas (km ²)	10.4	19.2	21.5
9. No. of WUGs	49	87	31
10. No. of members	313	727	885
11. Water source	Pasak River	Sappradu Reservoir	Krasiew Reservoir
12. Type of project	N/A	Medium-scale	Large-scale
13. Storage capacity (MCM)	N/A	27.6	240.0
14. Irrigation method	Electrical pump	Gravity flow	Gravity flow
15. Founded JMC	No	No	Yes (2003)
16. Main crop	Rice	Rice	Rice & Sugar cane

Reservoir, was chosen as a case study setting because it represented a typical Thai gravity flow irrigation method. The Reservoir was one of five large-scale pilot projects of PIM implementation funded by the ADB from 2001-2003. The Krasiew Reservoir, moreover, has a complete PIM framework at all three levels of the irrigation system including reservoir, canal, and ditch levels. The Joint Management

Committee for Irrigation, which manages irrigation water at a reservoir level, at the Krasiew Reservoir is the most active Committee of the country (Informant No. 2, personal communication, February 13, 2008).

An integrated water user group or IWUG serves as a target WUO for the case study since it usually contributes a significant decision-making to irrigation management at a canal level in an area (Informant No. 2, personal communication, February 13, 2008). Two IWUGs, i.e. IWUG 2L-1R and IWUG Ruamjai Patthana, were selected from the Krasiew Reservoir as case studies in order to control variable factors, e.g. topography, weather, type of irrigation system, irrigation areas, percentage of irrigation efficiency, type of WUO, crop pattern, norms, and culture, that may affect the ability to manage irrigation water of the target WUOs.

IWUG 2L-1R was an easy choice because it received a national award for being an outstanding WUO in 2008. IWUG Ruamjai Patthana was an active WUO with a tendency to have insufficient irrigation water and when it was available the delivery was often not timely because it is situated at the half-end of the 1R-1R Canal. It is also a borderline location for irrigation areas where the illegal removal of water by farmers outside of the irrigation areas is prevalent. The participatory nature of community involvement in water management decision-making and individual learning occurring through PIM from both case studies helped me to understand what encourages and constrains community participation and empowerment in Thailand and what could be a means to build capacity among marginalized people.

3.2.3 Role of researcher

Qualitative research particularly challenges the role of researchers as they are the principal data collection instrument. Thus the recognition of researcher's values and biases at the onset of the study is necessary. Serving as an Environmental

Scientist of the RID, I had not been involved in the PIM implementation processes. This implied that I was not directly affected by the research results and would consider myself as an outsider to the implementation processes. My role in this study was therefore an investigator aimed at achieving the research purpose. Even so, local communities could perceive me as a government official. This perception contained both advantages and disadvantages. Representing the irrigation authority could impress related local communities in terms of expressing the authority's concern and actually enhance further collaboration and cooperation from local people. Conversely, local communities could hesitate to express their real feelings and bad experiences with PIM implementation and operation processes. However, conveying clarity and sincerity in conducting this research could encourage more participation from relevant parties. I always remained cognizant of my role as a researcher and aware of the potential perceptions that could be caused if I was identified as a government official.

Based on my self-introduction and clarification of the purpose of the research before starting an interview, every participant understood that I was a student attending the University of Manitoba on leave from the RID who was conducting research to improve PIM implementation and operation. Irrigation staff participants were enthusiastic to share their PIM experiences and opinions. Specifically, irrigation staff participants from the Office of Public Participation and the Krasiew Operation and Maintenance Office are keen for me to send a report to them regarding my findings and recommendations after I go back to Thailand. All WUO participants cooperated in the research, of which one-quarter made it clear that they appreciated both the research and the way it was being conducted through field interviews and not distributing a regular survey as is often the case.

3.3 Data collection methods

Working for the RID, I had access to PIM information and documentation related to the responsible persons, past implementation processes, and current operations. Nevertheless, I introduced this research through a formal intra-circulation letter. The letter was issued by the director of my office, Office of Project Management, and be delivered to related RID offices in January 2008. This acknowledged the status of this research as a department concern to encourage more cooperation from the RID officials.

The main methods in Phase 1 involved document review, observation, and personal and telephone interviews. I started with personal interviews of key informants at central offices in Bangkok to get a broad view of present PIM activities. The RID consists of 17 regional offices throughout the country. Telephone interviews were therefore the most feasible means to attain needed information about what was happening in each district. Three site visits of potential case studies were undertaken in central and northeastern regions to talk directly to irrigation staff and WUO participants.

Phase 2 focused on the components of participation and learning occurring through PIM at the community level. The principal data collection methods in Phase 2 encompassed observation, face-to-face interviews, and informal meetings. The methods used in Phases 1 and 2 are summarized in Table 3.2. The detail of each data collection approach is described in the following sub-sections.

3.3.1 Document review

Relevant documents associated with PIM implementation processes, guidelines, and progress were collected from RID headquarters and related regional offices. Past experiences with irrigation and water resources management were drawn

Table 3.2: Methods used in Phases 1 and 2 of the fieldwork

	Document review	No. of interviews		Observation	No. of informal meetings
		Face-to-face	Telephone		
Phase 1	√	12	32	√	-
Phase 2	√	55	-	√	2

from articles and theses searched through the National Research Council of Thailand, Irrigation Development Institute, and Thai National Committee on Irrigation and Drainage. Various Thai institutions including the Ministry of Natural Resources and Environment, the Thailand Research Fund, the Thailand Research Development Institute, the Hydro and Agro Informatics Institute, and the Office of the National Economic and Social Development Board provided useful information regarding public participation in natural resources management, good governance, participatory communication, social capital, community development, community empowerment, and community learning. The documents were reviewed to determine how PIM was being implemented and currently operating, and to specify related key parties and institutions. The findings from these documents also illustrated the existing problems and concerns with PIM in Thailand as well as possible ways to improve the situation.

3.3.2 Interviews

Two types of interviews were used in this research: (1) face-to-face interviews; and, (2) telephone interviews. All interviews were conducted in Thai and audio-recorded. I also took notes of the main points emerging during interviews. Before starting an interview, permission for audio recording and any photography was sought. All interviews were anonymous. The details of the interview participants in Phases 1 and 2 are shown in Table 3.3. The descriptions of each interviewing strategy can be explained as follows:

Table 3.3: Details of the interview participants in Phases 1 and 2 of the fieldwork

	Face-to-face interviews						Telephone interviews				Total
	RID	RIO	Farmer			Private agency	RIO	Farmer			
			WUO member	JMC member	Non-WUG member			WUO member	JMC member	Non-WUG member	
Phase 1	4	4	4	-	-	-	16	16	-	-	44
Phase 2	-	5	36	5	5	4	-	-	-	-	55
Total	67						32				99

1. Face-to-face interviews

Semi-structured face-to-face interviews were used in Phase 1 and 2. Four key informants from the RID central offices, four staff members of the RID regional offices, and four members of WUOs were interviewed in Phase 1. The face-to-face interviews took up to 60 minutes. In Phase 2, face-to-face interviews involved 55 people associated with PIM implementation and operation from both case studies. The interviews lasted up to 130 minutes and respondents consisted of 46 farmers, five regional irrigation officials, and four members of private agencies. The forty-six interviewed farmers consisted of 30 farmers at ditch levels and six IWUG executive members from two case studies, five members of the Joint Management Committee for Irrigation, and five farmers outside of the irrigation areas.

In each case study, five farmers who used irrigated water from ditches at the beginning, in the middle, and at the end of an irrigation canal totaling 15 farmers were randomly interviewed to portray what was going on in a selected IWUG. The administration as well as relationship between the target IWUGs and other organizations was observed by interviewing relevant parties including IWUG

executive members of each case study, members of Joint Management Committee for Irrigation, farmers outside irrigation areas, regional irrigation officials, and private agencies. Informal interviewing was utilized to build rapport and enhance true expression related to PIM activities. Open-ended interview questions were also applied to facilitate a meaningful dialogue between the researcher and interviewees. Some farmers were met on more than one occasion during the field season.

2. Telephone interviews

Semi-structured telephone interviews were used to collect the nationwide information about PIM implementation in Phase 1. One government official and one member of an active WUO from each regional office, totaling 32 persons, participated in telephone interviews lasting up to 105 minutes. The Regional Irrigation Office 17 was excluded from the target group of telephone interviews due to a sensitive security issue of receiving telephone calls and travel in this area of unrest in Southern Thailand.

The list of key responsible personnel for PIM implementation from every RID regional office as well as their contact numbers was searched through the latest RID staff directory. Additional lists of related persons involved in PIM implementation were requested from every interviewee. To facilitate the interviews, the key responsible person from each regional office was contacted and advised of the research purpose and tentative open-ended interview questions. Their current responsibility and willingness to participate in this research was confirmed. Follow-up phone calls were made to schedule a telephone interview. On the community side, the list and contact numbers of key local persons relating to PIM implementation and operations in each region were obtained from document review as well as from each government responsible person.

3.3.3 *Observation*

Observation is a strategy that facilitates data collection for both quantitative and qualitative studies in fieldwork. A researcher observes the ongoing activities in a natural setting which facilitates sound data analysis (Bernard, 1988). Researcher's roles may vary from a complete participant to a complete observer in an observation (Creswell, 2003). This research engaged both participant observer and complete observer roles as the following details.

I embraced the participant observer roles in various activities in Phase 1 including: a facilitator team member of the RID community-based research project; a 5-day workshop titled "How to Be a Facilitator to Develop a Water User Organization" held by the RID headquarters; and a facilitator team member of water user group or WUG establishment before ditch construction. The complete observer roles were used at a general meeting regarding PIM policy hosted by the RID headquarters and a study tour of two WUOs arranged by two regional irrigation offices at the Krasiew Reservoir.

In Phase 2, the participant observer role occurred at a 5-day workshop titled "Organic Farming: An Approach to Achieve Sufficiency Economy" held by the Nong Kradone Mon Community Learning Center, Suphanburi Province. The complete observer role was undertaken whenever I stayed in a community during the 6-month period or attended related activities at my case study site, for example, IWUG meetings, a Joint Management Committee for Irrigation's meeting, workshops for farmers provided by the Krasiew Operation and Maintenance Office, and study tours at the Krasiew Reservoir. These observations offered insights into current practices and routines of related parties in each community. Such insights helped in constructing sensible questions for succeeding interviews.

The complete observer role also helped to build rapport in fieldwork, which I believed was a critical factor to promote a meaningful dialogue among Thai participants. Furthermore, the observation helped in maximizing the validity of data from fieldwork for the following reasons: (a) people in a setting are less likely to change their behavior thus validity of data is higher; and, (b) they extend researcher's understanding of what one learns from interviewing and observing in a natural setting (Bernard, 1988). I always carried a field-jottings notepad and a digital camera whenever I engaged in fieldwork. Any main issues, striking ideas, feelings, or emerging concerns observed through the complete observer role were noted in Thai on the spot. The digital photos were taken to present the environment of a case study location as well as social interaction among community members. The field jottings were extended into field notes daily so as to capture the entire message from fieldwork experiences.

3.3.4 Informal meetings

Two informal meetings were planned between relevant parties in each case study location. The objective of the first informal meeting was to present preliminary research findings, to verify those findings, and to brainstorm how to redesign the meaningful public participation processes in PIM. I kept notes on a flip chart and noted my reflections on the meeting immediately afterwards. The second informal meeting will be conducted after I resume my job at the RID. The second meeting will provide feedback from the RID to the community regarding the redesign PIM. I encouraged informal meetings in order to build rapport and facilitate authentic dialogue among Thai participants, who are generally shy and lack confidence in public speaking. The meetings were audio-recorded and note-taken in Thai.

3.4 Data analysis

According to Creswell (2003), the six general steps of qualitative data analysis comprise: (1) organizing and preparing data for analysis; (2) obtaining a general sense of information; (3) coding; (4) identifying the main themes; (5) representing the main themes in a qualitative narrative; and, (6) interpreting data in relation to the literature or theories. It should be reminded that “[Data analysis] is an ongoing process involving continual reflection about the data, asking analytic questions, and writing memos throughout the study” (Creswell, 2003, p. 190).

Based upon Creswell’s guideline, the audio recording from interviews was transcribed verbatim in Thai daily. The field jottings were also extended into field notes every day. The field notes, moreover, integrated my attempt to repeatedly connect between field data and research concerns. Every digital photo was downloaded into a computer. All Thai transcripts and field notes from different sources, including document review, interviews, observation, and informal meetings, were read thoroughly in order to gain a general sense of the information, and then classified into English themes. These themes were revised as necessary conforming to an interactive, adaptive approach (Nelson, 1991). NVivo software was used to identify themes and organize a coding system of collected data from fieldwork.

The analysis of public participation process context was grounded in the public participation literature and was also made use of the literature in related to participation in water management (Sections 2.2 and 2.3, Chapter 2). Analyzing the learning outcomes in this study was established through transformative learning theory using specific constructs such as instrumental and communicative learning (Section 2.4, Chapter 2). Moreover, the individual suggestions through the lens of research participants as well as researcher’s own experiences were contributed to the

data interpretation and analysis.

3.5 Validity and dissemination

3.5.1 Validity

Validity is a strategy to check the accuracy of research findings (Creswell, 2003). To ensure validity, this research applied the following five approaches.

1. Triangulation of data

Data were collected through multiple sources including document review, interviews, and observation to explore the interrelation between public participation, learning, and sustainable water management through PIM. Such a variety of data collection methods served as a cross-examination tool to confirm the credibility of research findings.

2. Database development

All field jottings, field notes, and verbatim transcripts were clearly specified by date, time, place, and events. The field jottings, field notes, and verbatim transcriptions were first categorized by data collection methods and then organized by coding themes to be efficiently retrieved at some later date.

3. Member-checking

One informal meeting for each case study site provided a forum for verifying my interpretation regarding the collected field data to maintain authenticity.

4. Analytical generalization

I endeavored to analyze the research findings based on the engaged theories, namely public participation and transformative learning. Such theoretical frameworks, according to Yin (2003), intensify the external validity of this research.

5. Clarification of researcher bias

At the outset of this study, the anticipation of researcher bias was recognized under the sub-heading, “Role of researcher” (Section 3.2.3, Chapter 3) as well as approaches for trying to deal with any bias.

3.5.2 *Dissemination*

Two peer-reviewed publications related to the sequential findings from Phase 1 and Phase 2 were used to disseminate the research results. The research findings will also be extracted and presented in Thai by way of a manual guide for succeeding PIM implementation and operation by the RID and relevant parties.

3.6 Ethical considerations

The field research started after getting ethics approval from the Joint-Faculty Research Ethics Board at University of Manitoba. The research ethics protocol and procedures which were appropriate for cross-cultural context in Thai setting were applied. The written or oral consent in Thai was carried out based upon research participants’ preference. The purpose of research was customarily told to research participants prior to conducting field activities. The participants’ rights and concerns was primarily considered in the following ways: (a) all interviews were anonymous; (b) one informal meeting was conducted in each case study in order to share and confirm the research findings among participants; (c) one informal meeting will be arranged in each case study after I resume my job at the RID in order to provide feedback from the RID to the community regarding the redesign PIM; and, (d) the research results will be distributed to related parties in the form of a manual guide for the subsequent PIM implementation and operation.

Chapter 4

Irrigation management in Thailand

4.1 Introduction

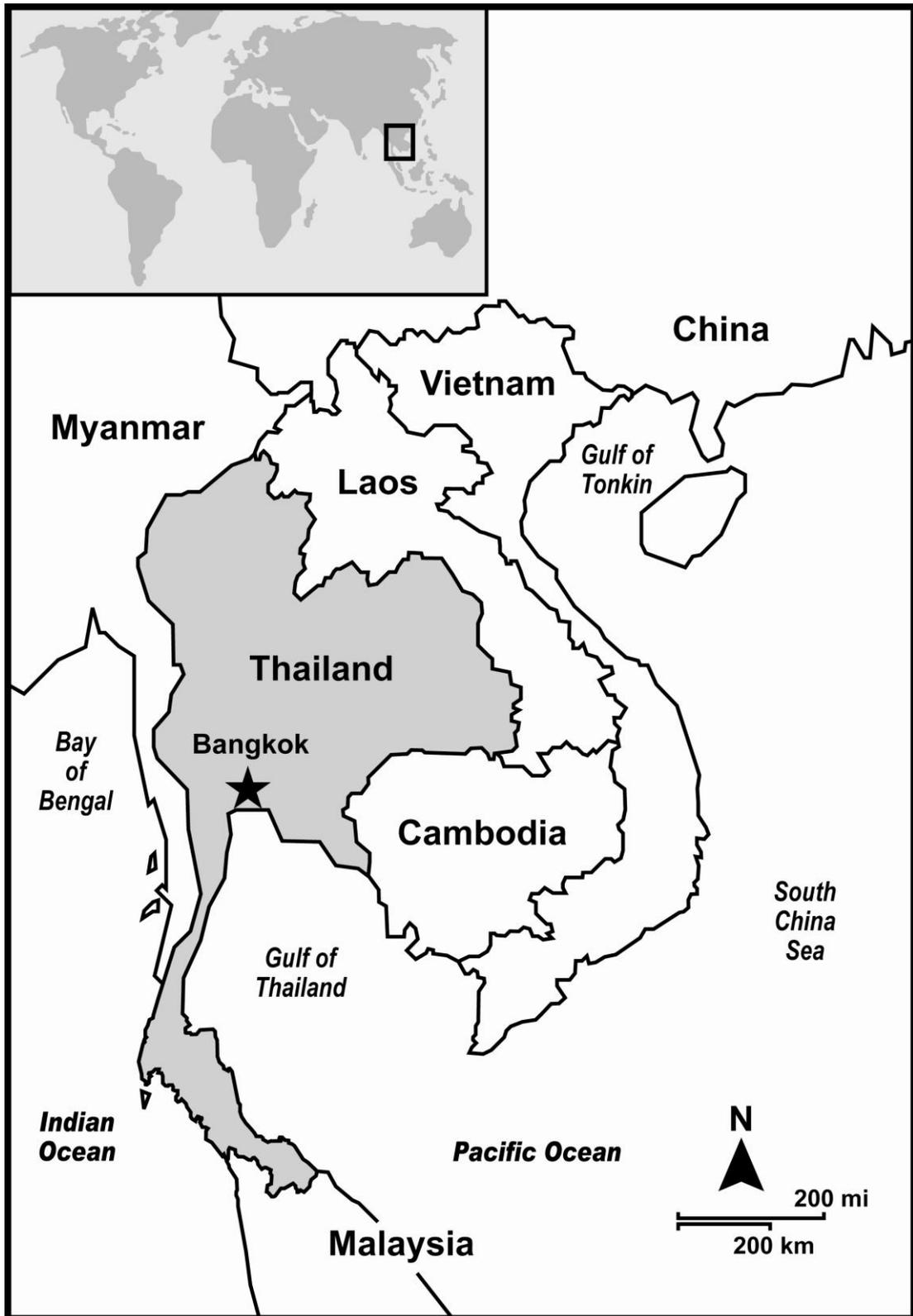
The intent of this chapter is to familiarize readers with irrigation management in Thailand, which is at the core of the study. The chapter first introduces basic aspects of irrigation management. In this regard the country profile, irrigation development, and irrigation management are portrayed. Lastly, the concept and approach of PIM in Thailand is described to round out the chapter.

4.2 Country profile

4.2.1 Geography and land use

Thailand covers an approximate area of 513,000 km² in Southeast Asia. The location of Thailand is shown in Figure 4.1. Thailand consists of 76 provinces, of which Bangkok is the capital city. Geographically, Thailand is roughly divided into six regions such as the north highland, central plain, northeast plateau, east coast, west valley, and south peninsula. The northern region is mountainous with dense forest which is the origin of the countries' major rivers. The central region is a flood plain with thick layers of sediment which is suitable for agriculture. The northeastern region is a dry plateau which contains sandy and saline soil. The eastern region is a coastal plain formed by the accumulation of sediment from brackish water. The western region is a narrow valley between high mountains which border between Thailand and Myanmar. The southern region is a part of the Malay Peninsula. It holds narrow coastal plain which lies between the Gulf of Thailand and the Andaman Sea of the Indian Ocean.

Figure 4.1: Location of Thailand



Source: Author.

The total population is approximately 64 million, of which 22 million, or 34%, are engaged in the agricultural sector based on the latest 2003 Agriculture Census (NSO, 2004). The 2003 land use pattern illustrated in Figure 4.2 shows that the fundamental usages are agriculture, forest, water bodies, and other use (e.g. residential and industrial areas, deserted land, mining, and beaches) (FAO, 2007b). In 2003, agriculture occupied about 183,000 km² or 36% of the country, of which 53% is paddy field, 19% is field crop, 10% is perennial crop, 9% is para rubber, 1% is cash crop, and 8% is other as captured in Figure 4.3 (NSO, 2004).

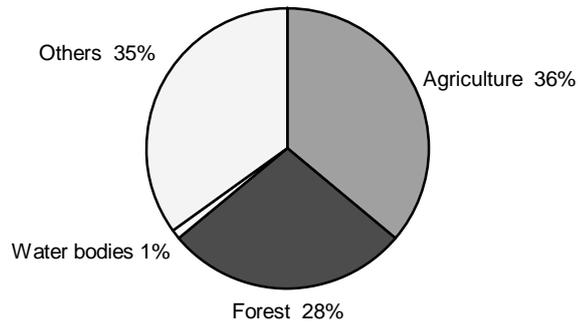
Thailand is the world's largest rice exporter (United States Department of Agriculture, 2010). Other major field crops are cassava, maize, pineapple, sugar cane, and soybean (NSO, 2004). Despite the importance of the agricultural sector it comprises only 9% of Gross Domestic Product (GDP) in the year 2006 (Bank of Thailand [BOT], 2007). The contribution of GDP in 2006 from all sectors including agriculture, manufacturing, wholesale and retail trade, and other services (e.g. financial sector, education, hotel, and restaurant) is depicted in Figure 4.4.

4.2.2 Climate and water resources

Thailand is a warm and rather humid tropical country with monsoonal climate. The average lowest and highest temperatures are 18 and 35 degrees Celsius, respectively. There are three seasons in Thailand, namely dry season (March to May), rainy season (June to October), and cold season (November to February). The average annual rainfall is estimated at 1,580 mm. It ranges from 700 mm in the central region to 4,000 mm in the west coast of the southern peninsula (NSO, 2007).

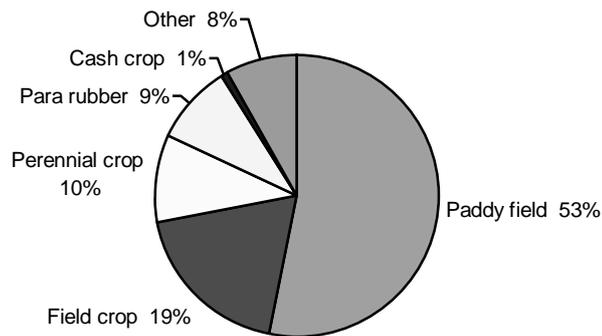
According to the FAO (2007c) the total mean annual precipitation volume is 800,000 million m³, of which 200,000 million m³ remains as surface water in an entire 25 major river basins of the country. Groundwater is primarily recharged by

Figure 4.2: Thailand's land use pattern in 2003



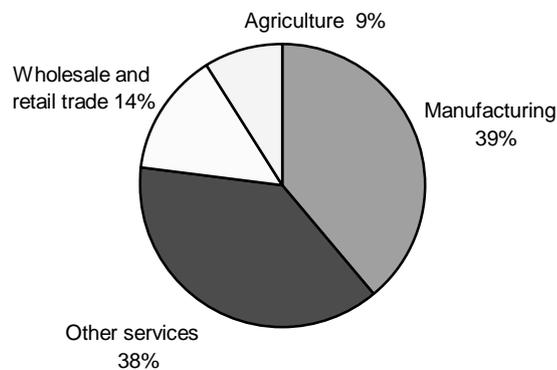
Source: Pie chart is a visual presentation based on information from Food and Agriculture Organization, 2007b.

Figure 4.3: Agricultural land use of Thailand in 2003



Source: Pie chart is a visual presentation based on information from National Statistical Office (Thailand), 2004.

Figure 4.4: Contribution of GDP in 2006



Source: Pie chart is a visual presentation based on information from Bank of Thailand, 2007.

rainfall of about 42,000 million m³/year (5-6% of the total precipitation) and seepage from the rivers. The total internal water resources are estimated at 210,000 million m³/year after deduction of an overlap between surface water and groundwater.

Transboundary rivers including Mekong and Salawin additionally supply 200,000 million m³/year of surface water to the country (FAO, 2007c). In Thailand, surface water serves as a primary source not only for agriculture, but also for piped water for domestic and industrial use in both urban and rural areas. Groundwater and rainwater is used in areas that have no access to surface water or piped water (Provincial Waterworks Authority, 2007).

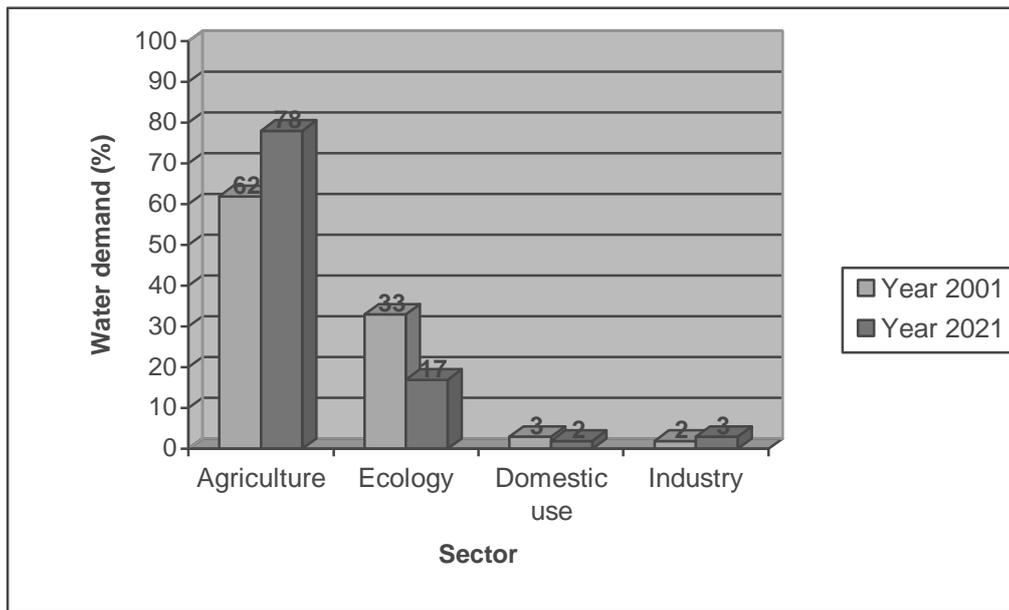
In 2001, the total water withdrawal was 67,233 million m³ and it is expected to reach 126,279 million m³ in 2021 or 32% and 60% of total internal water resources, respectively (NESDB, 2004). Water demand for different sectors such as domestic use, industry, agriculture, and ecological maintenance (e.g. maintain minimum level of dissolved oxygen in waterways and repel saltwater intrusion) in the year 2001 and 2021 can be viewed in Figure 4.5.

4.3 Irrigation development

Given the importance of agriculture and availability of water, irrigation has a long history in Thailand. The first irrigation traces including earth dams and clay pipes were built date back to the reign of King Ramkamhaeng the Great (1275-1317) and found in Northern Thailand. Later in the Ayutthaya Period (1350-1767) and early Rattanakosin Period (1782-present) irrigation was primarily undertaken by excavating new canals to link the main rivers in the Central Plain for household, agriculture, and transportation purposes (RID, 2005b).

Modernized irrigation was introduced in the reign of King Chulalongkorn the

Figure 4.5: Water demand for different sectors in the year 2001 and 2021



Source: Bar chart is a visual presentation based on information from Office of the National Economic and Social Development Board (Thailand), 2004.

Great (1868-1910) to supply water for cultivation of rice, the main export good of the country. King Chulalongkorn the Great established the Canal Department in 1902, which later on was named the Royal Irrigation Department, and appointed a Dutch expert as the first Director General of the Department. The first irrigation project based on civil engineering principles, a large-scale diversion dam with an irrigation area of 230 km² in the Central Plain, was completed in 1924 (RID, 2005b).

Thailand secured the first of a series of loans for irrigation from the World Bank in 1950. The promotion of irrigation systems began with the First National Economic and Social Development Plan (1961-1966) to spur the nation's economy which largely relied on rice cultivation. The financial support from the World Bank played a substantial role in accelerating irrigation development during 1960s to 1970s (Library of Congress, 2007).

However, rain-fed agriculture is still common in Thailand because irrigated

agriculture is only approximate 25% of total agricultural area, or about 47% of the area that can potentially develop irrigation systems. The central region possesses the most irrigated areas, 46%, of the country. An irrigated area yields at least double the production of a rain-fed area and serves as the main agricultural production area of the nation (RID, 2009a).

4.4 Irrigation management

4.4.1 Definition of state irrigation

The latest Thai irrigation act, the State Irrigation Act 1975 (No. 4), defines irrigation as any undertaking carried out by the Royal Irrigation Department to procure water; or to store, control, supply, drain, or allocate water for agriculture, hydropower, public utility, or industry. The Department activities, moreover, include preventing any damage caused by water as well as regulating navigation in an irrigation area (RID, 2007a).

4.4.2 Types of irrigation structures

Three types of irrigation structures such as weir, diversion dam, and storage dam are mainly undertaken in Thailand. The differences of each irrigation structure are expanded below.

1. Weir

Weir is a barrier constructed across a waterway to raise the water level upstream in order to naturally divert the required amount of water into a side canal. The excess water will flow over weir crest (RID, 2007a).

2. Diversion dam

Similar to a weir, a diversion dam is also a barrier built across a waterway to maintain the water level upstream and divert it into a side canal. Unlike a weir, a

diversion dam has a number of gates to enable to control the water discharge (RID, 2007a).

3. Storage dam

It is a barrier constructed across a waterway surrounding by the mountains in order to impound a large amount of water called a reservoir. A dam is normally comprised of its discharging structures. The water is discharged through either an original waterway or an irrigation system (RID, 2007a).

4.4.3 *Types of irrigation projects*

The RID undertakes various irrigation projects as characterized in Table 4.1. An irrigation project that meets either criteria of storage capacity or irrigation area would be acceptable. The following three types of irrigation projects are commonly carried out by the RID based on the project's purposes.

Table 4.1: Characterization of irrigation projects

Type of irrigation project	Criteria	
	Storage capacity (million m ³)	Irrigation area (km ²)
1. Large-scale	100 – 500	> 128
2. Medium-scale	1 – 99	4.8 – 128
3. Small-scale	< 1	< 4.8

Source: Table is a summary based on information from Royal Irrigation Department (Thailand), 2007a.

1. Bordered village projects

The RID develops a small-scale irrigation project in a village near the border to facilitate the local economic and military security plan (RID, 2007a).

2. Electrical pumping projects

This project responds to droughts outside irrigated areas. The RID will establish an electrical pumping station near a waterway that contains water all year round (RID, 2007a).

3. Royal initiatives irrigation projects

Such projects are initiated either by His Majesty the King Bhumibol or Her Majesty the Queen Sirikit. These projects aim to: providing basic needs, i.e. water resources, for domestic use and agriculture in rural areas; or tackling urgent problems including flood prevention, forest conservation, and water quality improvement in any areas. Projects include weir, reservoir, natural water source excavation, and farm pond development (Office of the Royal Development Projects Board [RDPB], 2007; RID, 2007a).

The background of the royal initiatives irrigation projects is captured in the broader rubric of the royal development projects. In the early days of His reign, His Majesty and Her Majesty made constant visits to every region of the country, particularly remote rural areas. Prior to each visit, His Majesty always studied the provided socio-economic information, including the 1: 50,000 scale topographical map and aerial photographs, to locate both existing natural water resources and potential water resource development. During the visits, His Majesty closely interviewed local people and officials himself regarding the socio-economic conditions as well as observing the actual topography. His Majesty successively visited the designated site with concerned public officials to discuss the feasibility of a project. The related government agencies then conduct further study in relation to technical principles and cost-effectiveness and hold the rights to make a final decision whether it is feasible to implement a project (RDPB, 2007).

The royal development projects can be classified into eight categories such as agriculture, water resources, environment, occupational promotion, public health, transportation, public welfare, and other projects. The main philosophy of His Majesty is helping people to help themselves and implementing projects that conform to local socio-economic and cultural conditions. The greatest numbers of royal development projects are water resources and environment, respectively. The first project began in 1951. During the period 1982-2007, there were 4,176 royal development projects implemented under the supervision of the RDPB, of which 35% was water resource development (RDPB, 2007).

The details of water resource development as of 2006 are summarized in Table 4.2 and Figure 4.6. In 2006, the water storage capacity of the country was 74,318 million m³ or about 35% of the available internal water resources and the total irrigated area was 44,781 km² or 24% of agriculture areas (RID, 2007a).

4.4.4 Structure of the RID

The RID is structured into 17 regional irrigation offices (RIO) across the country. Each regional office covers three to eight provinces. The headquarters of the RID is in Bangkok which is responsible for directing main policies, allocating budget to the RIOs on the basis of planned expenditures, implementing large-scale projects, conducting EIA reports for large-scale and medium-scale projects, and supporting the hydrological data via the Regional Hydrology Center to determine project feasibility. The RIO is authorized to construct medium-scale and small-scale projects as well as to supervise operation and maintenance of every project in its area. The provincial irrigation office under the RIO is required to focus on operation and maintenance of small-scale projects and other projects (e.g. natural water source excavation, farm pond development, and flood prevention) in each province. An operation and

Table 4.2: Details of water resource development as of 2006

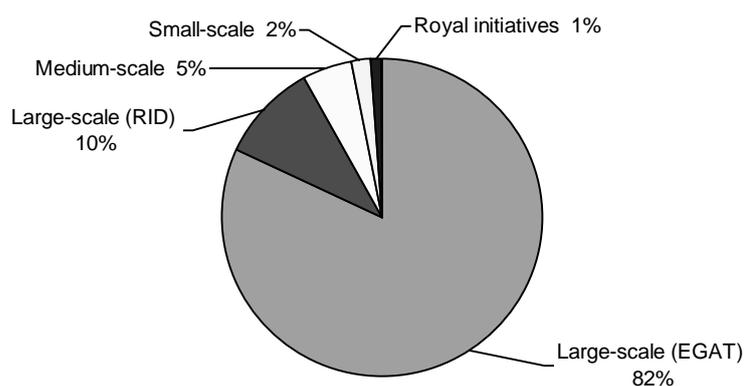
Type of project		No. of projects	Storage capacity (million m ³)	Irrigation area (km ²)
1. Large-scale	by RID	85	7,549	27,352
	by EGAT	10	61,203	0
2. Medium-scale		703	3,893	10,459
3. Small-scale		11,567	1,673	910
4. Bordered village ^a		423	62	378
5. Electrical pumping		2,129	0	6,060
6. Royal initiatives		2,245	501	2,919
Total ^b		14,494	74,318	44,781

Source: Table is a summary based on information from Royal Irrigation Department (Thailand), 2007a.

Notes: ^a Data as of 2004

^b Data is the sum of only large-scale, medium-scale, small-scale, and electrical pumping projects which already include the bordered village and royal initiatives projects.

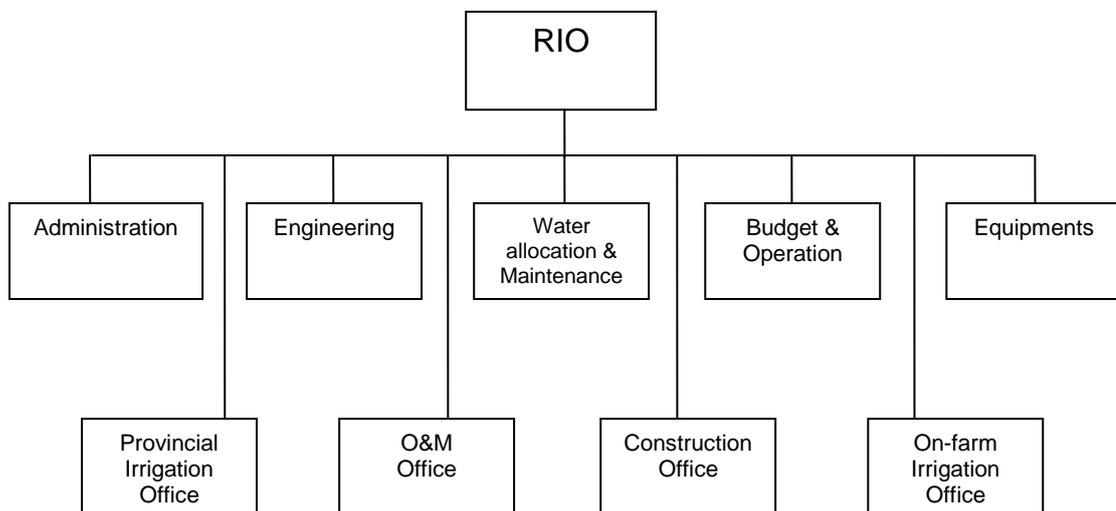
Figure 4.6: Storage capacity from each type of water project as of 2006



Source: Pie chart is a visual presentation based on information from Royal Irrigation Department (Thailand), 2007a.

maintenance (O&M) office is established as necessary to conduct operation and maintenance of specific large-scale or medium-scale projects in the RIO. The on-farm irrigation system office within each RIO promotes water distribution to every plot as well as the drainage of excess water from the plot. The on-farm irrigation system consists of quaternary canal or ditch, drainage channel, regulator, and road on the canal bank. The typical organization structure of the RIO is shown in Figure 4.7.

Figure 4.7: Typical organization structure of the RIO



Source: Organization chart is a visual presentation based on information from Royal Irrigation Department (Thailand), 2007a.

4.4.5 Operation and maintenance

1. Operation

The RID employs the surface irrigation method to operate irrigation water. The water is distributed by simple gravity flow from a reservoir through an irrigation system including irrigation canals, regulators, irrigation structures, and a drainage system. The constructed left and right primary canals carry irrigated water into the

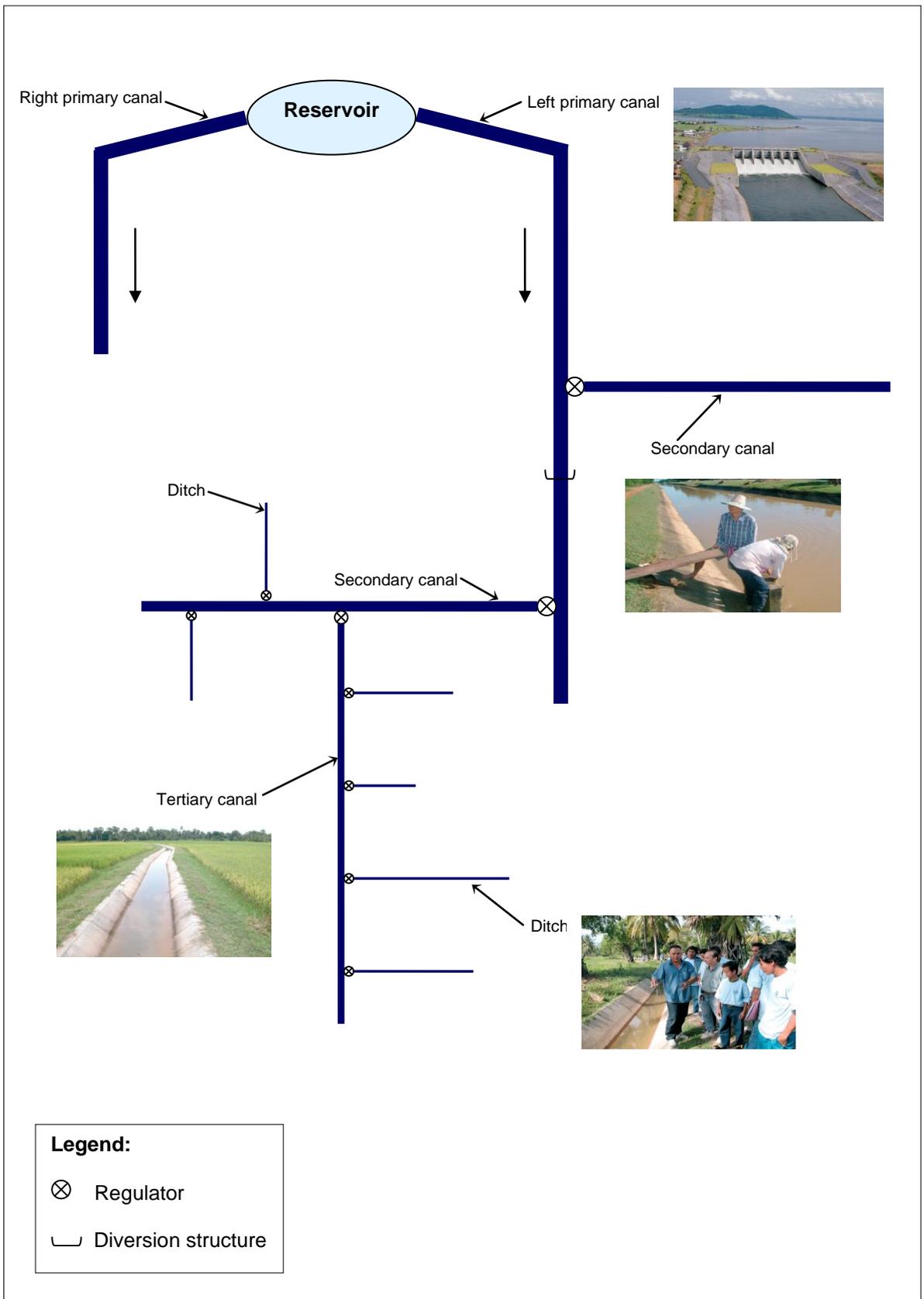
indicated irrigation areas. The secondary canals, which are branched from the primary canals, may deliver water directly to a cultivated field or pass water to the tertiary canals. Similarly, the tertiary canals transfer water to the quaternary canals or directly shift water to the farming areas. The quaternary canals, or so called ditches, that are a part of the on-farm irrigation system finally lead water to the farmers' plots. The customary canals involve either concrete-lined or earth canals. The irrigation efficiency of earth canals is usually low due to water seepage through porous soil. A diagram of a typical irrigation system is drawn in Figure 4.8.

The heart of an operation service is to deliver adequate irrigation water in a timely manner to satisfy crop water requirements. Three basic causes for the poor operation are: (1) lack of technical skills in planning, implementing, and monitoring the system; (2) poor people-management; and, (3) technical deficiencies in the physical system (Sagardoy, Bottrall, & Uittenbogaard, 1982).

2. Maintenance

Three essential types of maintenance are followed, namely routine, special, and deferred maintenance. Routine maintenance includes all work necessary to keep the irrigation system functioning properly and is done regularly by the allocated budget of the RIO. Examples of routine maintenance include aquatic weed control in a reservoir, lubrication of water gates and other mechanical equipments, silt removal from the irrigation canals, weed control in the canals, replacement of damaged concrete slabs of concrete-lined canals, repair of earth canals' bank erosion, and restoration of earth canals' water leakage. Special maintenance refers to repair of damage caused by major disasters such as flood, typhoon, or earthquake. The budget is drawn from an emergency fund in the RIO. Deferred maintenance involves any fundamental work to regain the lost flow capacity in canal, reservoir, and other

Figure 4.8: Diagram of a typical irrigation system



Source: Diagram is a visual presentation based on information from Royal Irrigation Department (Thailand), 2005c.

structures when compared to the original design, or work to modernize the irrigation systems. This activity could be funded by the RIO budget, the RID modernization program, or loans from the international donor agencies.

The maintenance activities help maintain an irrigation system not only to function sufficiently but also to reach the capacity proposed by the initial design. Important reasons for poor maintenance can be insufficient funds to conduct maintenance on a regular basis, lack of interest to collaborating from farmers, and poor organization of the work (Sagardoy et al., 1982).

4.4.6 Difficulties in irrigation management

Despite their best efforts and under detailed and demanding responsibilities, the RID generally struggles to achieve one of its missions, allocating water to every stakeholder in the equitable and sufficient manner. The common problems faced by the RID include: irrigation project developments that do not immediately respond to farmers' needs; irrigation systems that are poorly maintained thus providing low efficiency; and inequitable water allocation resulting in some farmers being left in need (RID, 2006). Moreover, a new large-scale storage dam is nowadays hard to establish due to concerns about the huge loss of forest areas and the relocation of local residents.

The average irrigation efficiency (i.e. amount of water used by crops per amount of water distributed) in Thailand shows a percentage of 47% (RID, 2008). The RID has applied different techniques for better water management decision-making in an attempt to improve irrigation efficiency. These techniques include: installing the telemetering systems at major dams throughout the country to report a real-time water situation; extending the on-farm irrigation systems (i.e. ditch) in the existing irrigation areas to decrease water loss on the way to farmers' plots; applying

a land reform before ditch construction to facilitate efficient water delivery; replacing earth canals and ditches with concrete-lined ones to prevent water seepage through porous soil; modernizing irrigation structures to suit the current use; and, maintaining irrigation systems regularly to keep them functioning properly in order to reach their maximum capacity (RID, 2008, 2009b). As mentioned, two common problems of the RID are poorly maintained irrigation systems thus providing low efficiency and inequitable water allocation. The RID then seeks cooperation from farmers in operation and maintenance to ease difficulties in irrigation management.

4.5 PIM in Thailand

4.5.1 Background

As noted, traditional or informal WUOs have been serving in Northern Thailand for 700 years in order to manage community-built irrigation systems in any villages. The first voluntary non-legal entity WUO of the RID irrigation projects was initiated in 1963 by the RIO staff in the Northeast. The RID headquarters encouraged these voluntary WUOs throughout the country to form WUAs in order to be legitimated by the existing Civil and Commercial Law. In 1979, the RID deferred the establishment of new WUAs due to inefficient administrative structure. The restructured voluntary WUOs, later named WUGs, were introduced for on-farm irrigation systems in 1989 to simplify administration, thus encouraging easier learning by farmers (RID, 2005a).

As outlined, there were a number of issues and priorities that drove the RID to adopt PIM. Not least among these, the agriculture sector is the largest consumer of water, but contributes the smallest proportion of the national GDP, and is therefore being urged by competing water users to practice more effective water use (RID,

2005a). The relevant legislation, including the 1997 Constitution and the 2003 Good Governance Reform Royal Decree, recognize the rights of local communities in participating in local natural resources planning and management and demand more decentralization, transparency, and accountability in service delivery from every public agency. Such driving forces compel the need for change in the RID practices from the quantitative-oriented to qualitative-oriented approach that facilitates irrigation efficiency (RID, 2005a).

The RID obtained a series of loans from the ADB from 2001-2003 to modernize physical structures as well as to challenge institutional reform by introducing PIM in pilot projects. PIM implementation in the pilot projects showed the promising results (S. Saleepattana, personal communication, December 02, 2007), which provided further impetus. Combining all the driving forces and gaining more confidence in PIM approach, the RID then incorporated PIM into the Department's Strategic Plan in 2004.

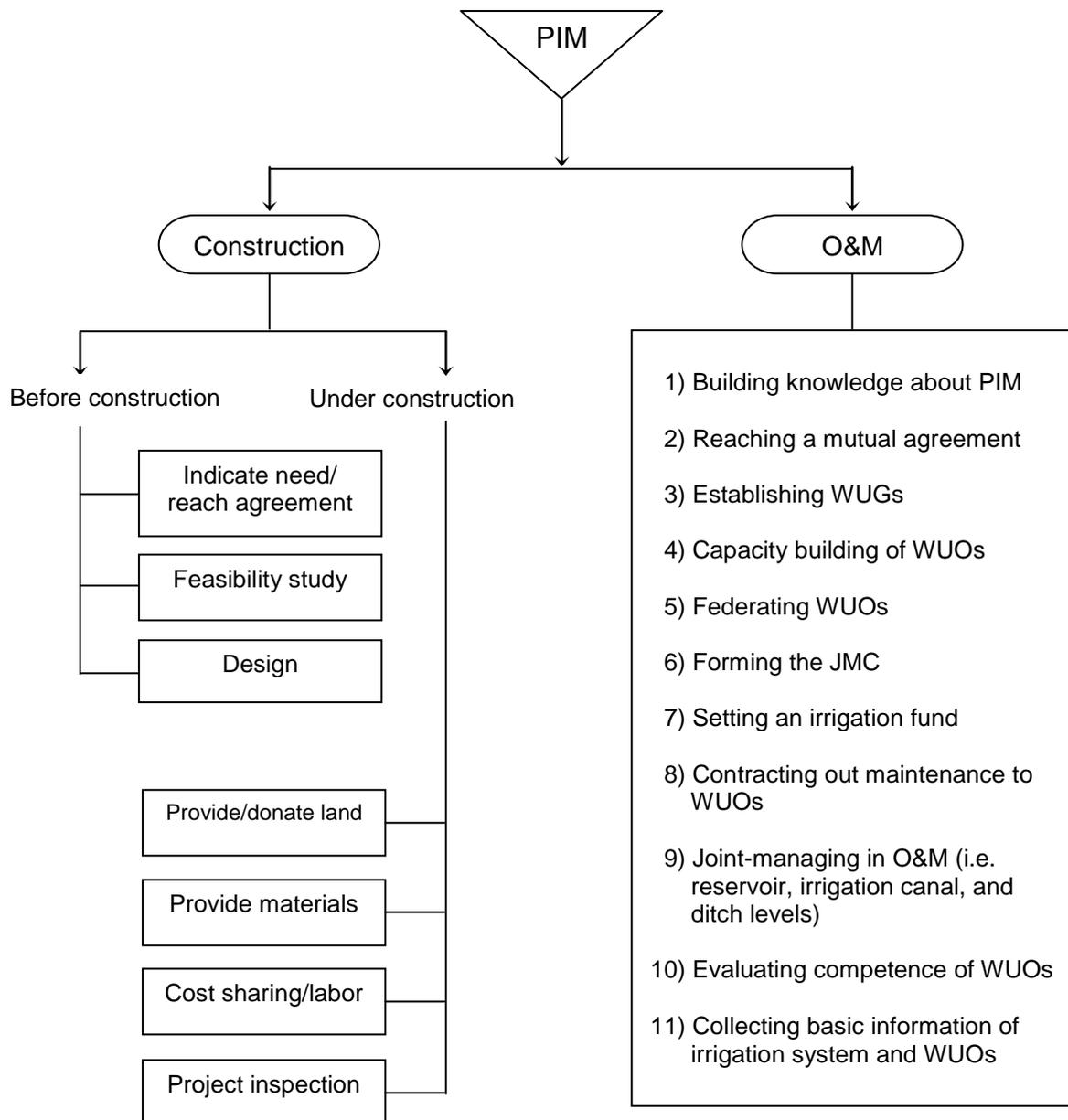
4.5.2 Definition of PIM

The RID characterizes PIM as the involvement of both WUOs and local administrative organizations in making decisions in irrigation management and operation at all levels of an irrigation system including reservoir or water resource, irrigation canals (i.e. primary, secondary, and tertiary canals), and on-farm irrigation system (i.e. ditch). The anticipated irrigation activities comprise construction and O&M (RID, 2005c).

4.5.3 PIM implementation approach

PIM is implemented through both construction and O&M, as outlined in Figure 4.9. PIM implementation in O&M is guided by 11 activities as follows: (1) building knowledge about PIM with relevant parties; (2) reaching a mutual agreement

Figure 4.9: PIM implementation approach



Source: Diagram is a summary based on information from Royal Irrigation Department (Thailand), 2005a.

on how to conduct PIM; (3) establishing WUGs; (4) capacity building of WUOs; (5) federating WUOs; (6) forming the Joint Management Committee for Irrigation or JMC; (7) setting an irrigation fund; (8) contracting out maintenance to WUOs; (9) joint-managing in O&M at all three levels such as reservoir or water resource, irrigation canals (i.e. primary, secondary, and tertiary canals), and on-farm irrigation system (i.e. ditch) (see details in Section 4.5.7, Chapter 4); (10) evaluating competence of WUOs (see details in Section 4.5.9, Chapter 4); and, (11) collecting basic information regarding irrigation system and WUOs. These activities only serve as a guideline and there is no requirement to complete all activities. Any activities can be first undertaken conforming to farmers' readiness and preference as well as topographical, social, and cultural constraints in each area (RID, 2005a, 2005c).

However, the critical criteria of PIM success in relation to either construction or O&M consist of: clear local PIM policy direction; broad participation of farmers who understand the PIM approach; capacity building for all relevant parties; and effective monitoring and evaluation mechanisms (RID, 2005a).

4.5.4 Expected benefits

In terms of benefits, it is considered that conducting PIM activities will instill a sense of ownership in irrigation projects as well as reinforce relationship among farmers and local administrative organizations. It is hoped that these lead to more effective water allocation, maintenance, sustainable water use, and eventual crop production yield increases. The anticipated benefits are: (1) building or modernizing irrigation structures that correspond to farmers' needs; (2) enhancing a sense of ownership in irrigation projects among farmers and local administrative organizations that influences sustainable operation and maintenance; (3) facilitating sufficient and equitable water allocation; (4) promoting better maintenance of an irrigation system;

(5) securing additional income for farmers from crop diversification; (6) reducing conflicts among farmers; (7) lowering conflicts between farmers and government officials; (8) empowering farmers and local administrative organizations; and, (9) achieving the RID ultimate goal of sustainable irrigation through improved water management (RID, 2005c).

4.5.5 Roles and responsibilities of key players

Four critical players involved in PIM implementation are the RID, WUO, Joint Management Committee for Irrigation, and local administrative organization. Each player commonly takes the following responsibilities, as outlined by the RID (RID, 2005c).

The RID is responsible for: procuring the water supply; constructing irrigation canals, drainage channels, and irrigation structures; supervising water distribution from a water resource up to a tertiary canal; and carrying maintenance of dams, irrigation structures, irrigation canals (up to tertiary canals), and drainage channels. In addition, the RID, which exercises its power through the RIO, is a part of an advisory body for WUOs regarding the O&M of an irrigation system.

A water user organization or WUO is an organization of irrigated water users who use the same irrigation canal. The committee is elected from members to direct the WUO activities in accordance with the concord rules. The WUO acts as a coordinator between irrigation users, the RID, local administrative organizations, and other public agencies. The WUO facilitates the equitable water allocation and maintenance at an irrigation canal level. The WUO, moreover, helps solve problems in relation to agriculture.

The Joint Management Committee for Irrigation, or so called JMC is organized from the representatives of WUOs, RIO, local administrative organizations,

and relevant public and private agencies that affect from water allocation. Each irrigation project should have only one JMC which is subsequently certified by a governor. The JMC establishes the criteria for water allocation as well as control measures for water use at a reservoir or water resource level. The JMC is involved in allocating irrigation water in each crop season, scheduling the period of water distribution, and disseminating such agreements to related parties. Furthermore, the JMC participates in considering the modernization and maintenance of an irrigation system.

A local administrative organization (LAO) refers to any provincial administrative organization, district administrative organization, or municipality that an irrigation system is situated within. The LAO is the target agency to be transferred the ownership of an irrigation system from the RID. The main responsibility of LAO in PIM implementation is to manage and allocate budget for maintaining irrigation infrastructures in local areas.

4.5.6 Types of WUOs

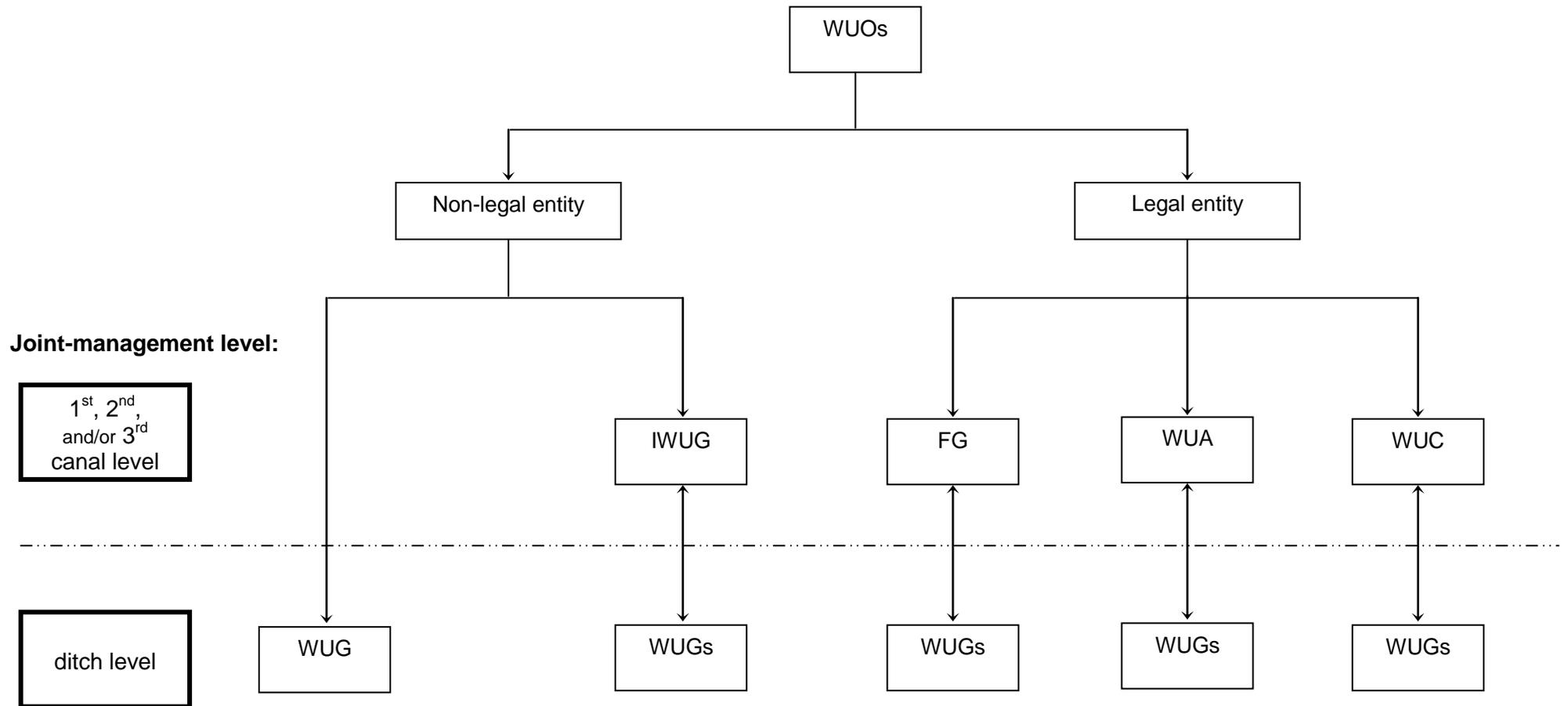
There are two main types of WUOs that find their basis in law. All types of WUOs in Thailand are illustrated in Figure 4.10. The RID generally provides a rule guideline for each type of WUO, but members are able to set their own ground rules based on a mutual agreement model (RID, 2005c).

1. Non-legal entity

1) Water user group (WUG): The coverage area is one ditch, but area covered should be less than 1.6 km². The administrative structure is comprised of one chief, an assistant (as necessary), and members who use the irrigation water from the same ditch. The organization structure of WUG is shown in Figure 4.11.

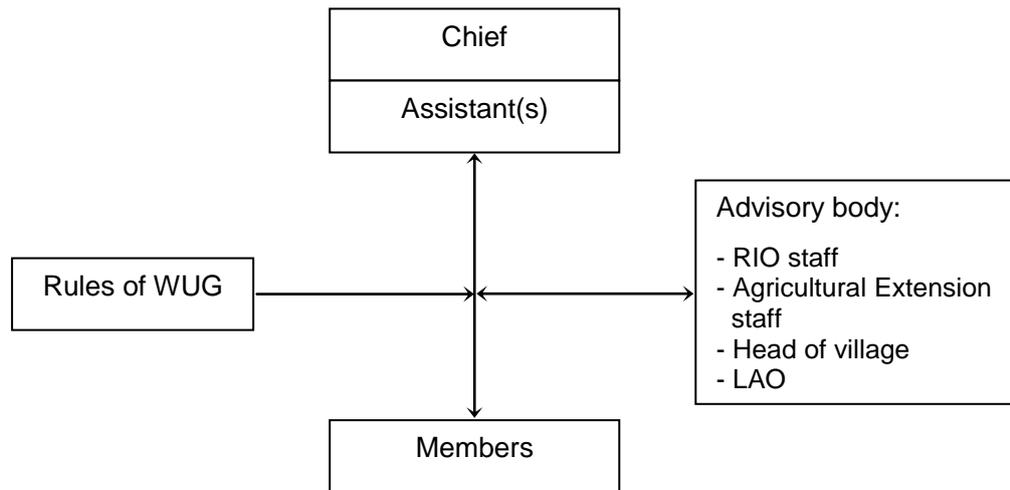
2) Integrated water user group (IWUG): It may take responsibility of a

Figure 4.10: Types of WUOs in Thailand



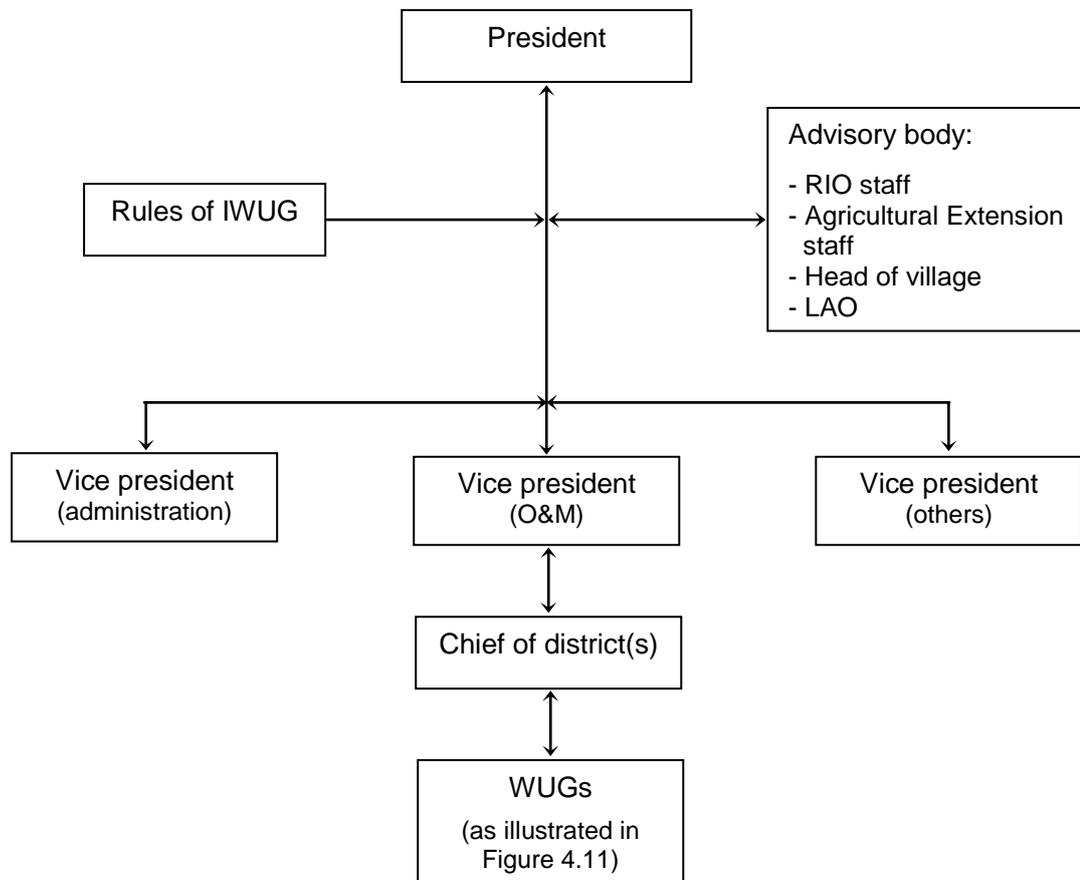
Source: Organization chart is a visual presentation based on information from Royal Irrigation Department (Thailand), 2005c.

Figure 4.11: Organization structure of WUG



Source: Organization chart is a visual presentation based on information from Royal Irrigation Department (Thailand), 2005a.

Figure 4.12: Organization structure of IWUG



Source: Organization chart is a visual presentation based on information from Royal Irrigation Department (Thailand), 2005a.

primary canal, secondary canal, tertiary canal, or even the whole area of an irrigation project. The area should be covered less than 32 km². The IWUG consists of several WUGs that use the same water resource or canal. The administration is in a form of committee, which is elected by major votes from members or representatives of members, to manage irrigated water from a water resource or canal as well as ditches in the area. The organization structure of IWUG can be viewed in Figure 4.12. The diagram of coverage area of WUG and IWUG is depicted in Figure 4.13.

2. Legal entity

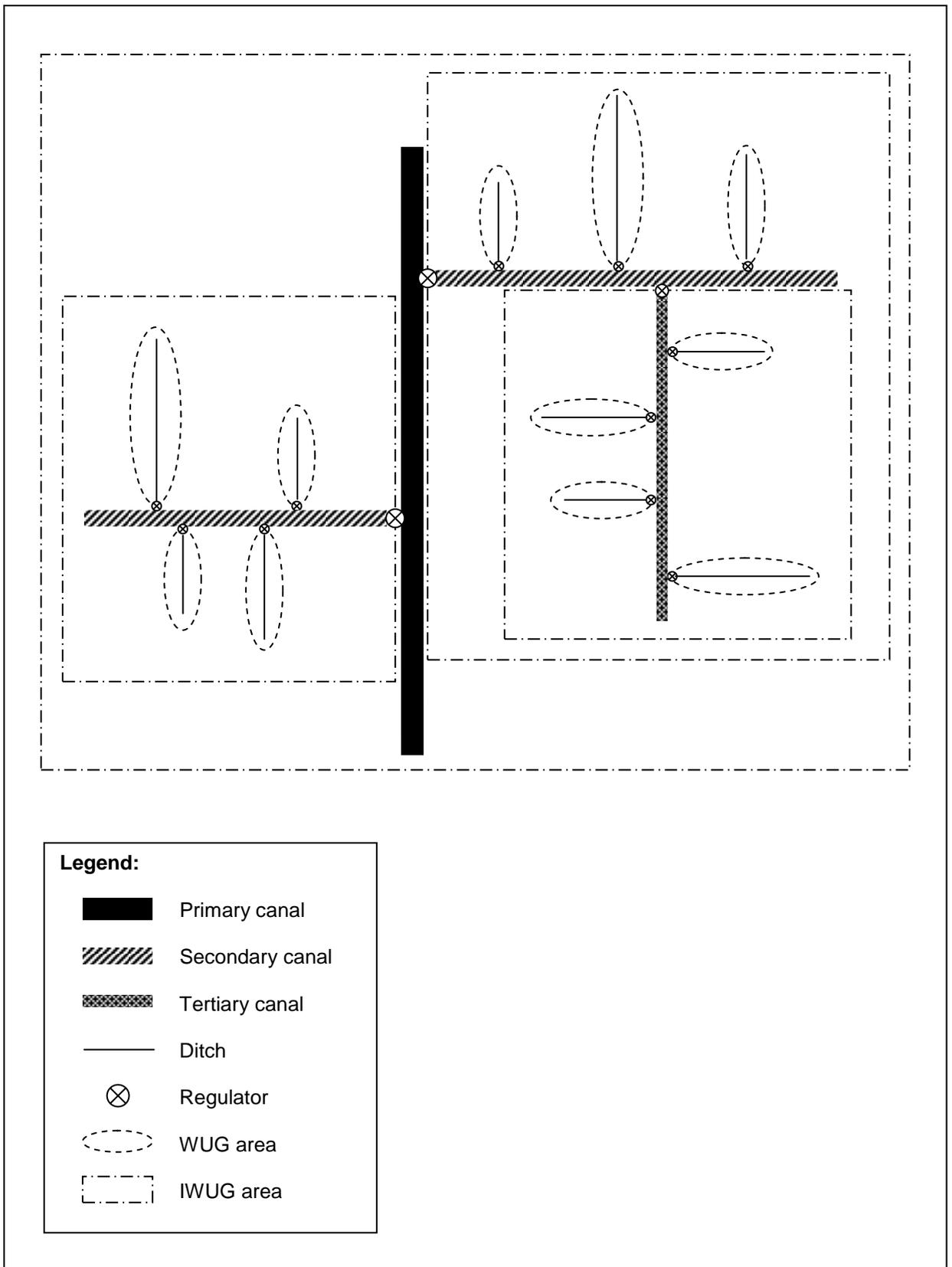
1) Farmer group (FG): The administration is similar to IWUG. FG is recognized by the 2004 Farmer Group Royal Decree and registered at a provincial office of the Department of Agricultural Extension under the Ministry of Agriculture and Cooperatives. The main purpose is to create partnership in conducting agricultural activities. The annual net benefit can be distributed in a form of dividend or bonus to shareholders.

2) Water user association (WUA): The administrative structure is the same as IWUG. WUA becomes legal by way of the 1992 Civil and Commercial Law. It is registered at a provincial office of the Ministry of Interior. The primary objective is to enhance collaboration in a specific activity without concerning about benefit.

3) Water user cooperative (WUC): The administration is similar to IWUG. WUC has its legal foundation in the 1999 Cooperatives Act. It is registered at a provincial office of the Cooperative Promotion Department under the Ministry of Agriculture and Cooperatives. The central goal is to manage irrigation water. The annual net benefit can be allocated among members.

The RID typically encourages farmers to start from the most basic form, WUG, and then federate to become an IWUG or other legal entities depending upon

Figure 4.13: Diagram of coverage area of WUG and IWUG



Source: Diagram is a visual presentation based on information from Royal Irrigation Department (Thailand), 2005a.

farmers' preference. In 2009, there were 38,106 WUGs in large-scale and medium-scale irrigation projects across the nation. The coverage areas of all WUOs are approximately 60% of the potential irrigated areas of large-scale and medium-scale irrigation projects. The number of WUOs in large-scale and medium-scale irrigation projects at each RIO as of 2009 is summarized in Table 4.3.

4.5.7 Joint-management procedures in O&M

One of the ultimate goals of the PIM approach is to encourage greater involvement in O&M at all three levels of operation: reservoir or water resource; irrigation canals (i.e. primary, secondary, and tertiary canals); and on-farm irrigation system (i.e. ditch). The standard procedures of joint-management in O&M consist of 14 steps as presented in Figure 4.14. The details of each level in regards to joint-management are outlined below.

1. Reservoir level

Two key players are the RIO and the JMC. The JMC is responsible for reaching a mutual agreement on water allocation in each major crop season. While the RIO takes care of O&M at the headworks of dam as well as regulators at a primary canal (RID, 2005c).

Before each major crop season, the RIO staff check the amount of water in a reservoir and make a draft plan of water allocation. The WUOs inform the water requirement to the RIO staff by collecting plans of cultivated crops and areas from members. The RIO staff will adjust their plan to conform to the farmers' needs. The JMC meeting is then arranged to seek a consensus on water allocation and set the rules for obtaining irrigation water. The JMC distributes the water allocation agreement, rules, and maintenance notice to relevant parties.

During a major crop season, presidents of WUOs submit the water need to the

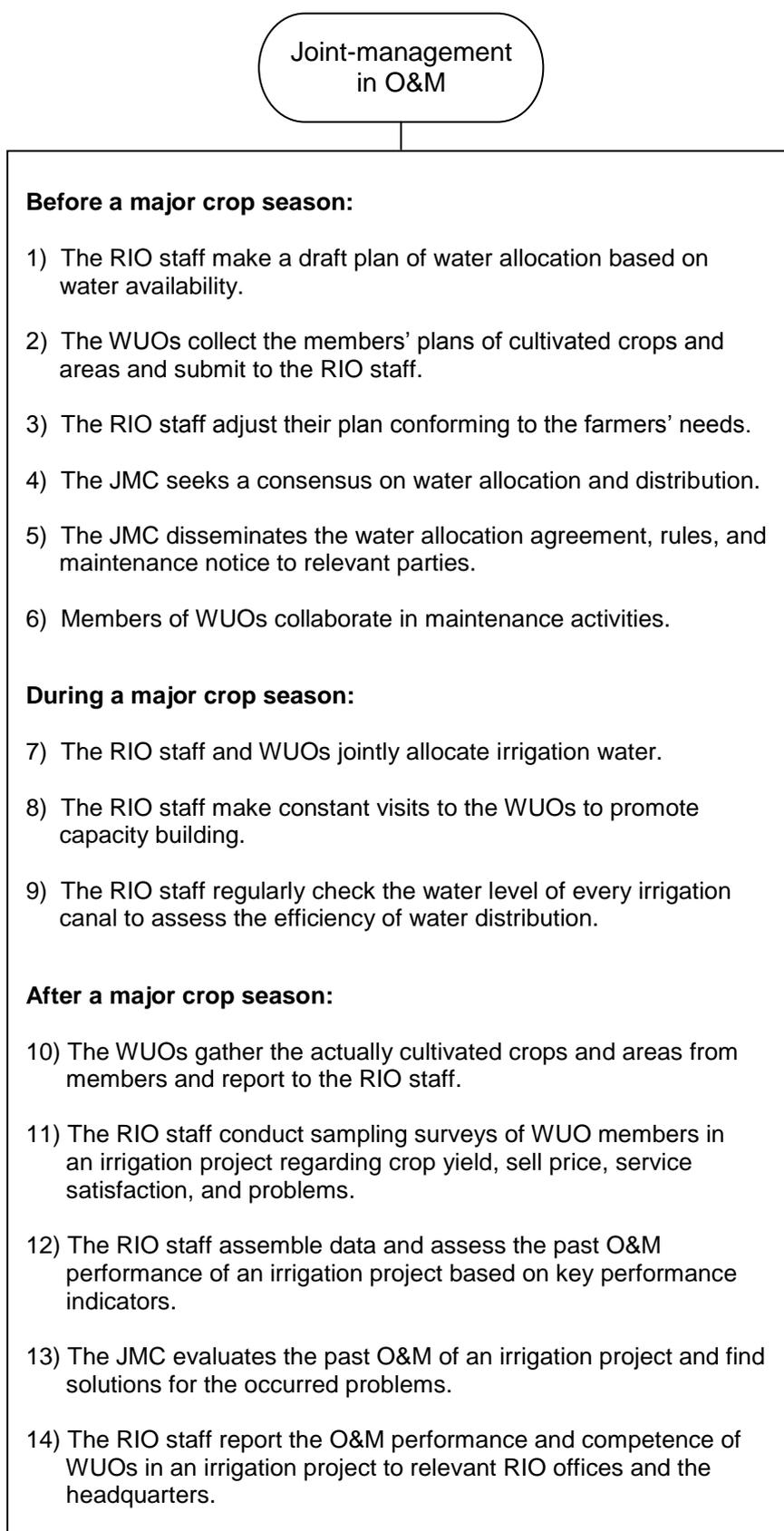
Table 4.3: Number of WUOs in large-scale and medium-scale irrigation projects at each RIO as of 2009

RIO	WUOs														Total WUGs	Areas of all WUOs (km ²)	% of WUO areas ¹
	WUG		IWUG			FG			WUA			WUC					
	No. of WUGs	No. of members	No. of IWUGs	No. of WUGs	No. of members	No. of FGs	No. of WUGs	No. of members	No. of WUAs	No. of WUGs	No. of members	No. of WUCs	No. of WUGs	No. of members			
1	28	4,086	80	914	57,698	0	0	0	0	0	0	0	0	0	942	756.4	87.25
2	360	12,093	79	1,979	49,519	0	0	0	0	0	0	1	53	568	2,392	735.2	74.70
3	865	20,869	75	652	19,026	0	0	0	0	0	0	11	332	7,061	1,849	1,575.8	68.65
4	1,107	28,879	90	798	35,097	0	0	0	0	0	0	2	11	768	1,916	1,820.3	71.82
5	328	7,273	94	2,160	27,846	0	0	0	12	122	2,283	9	0	2,388	2,610	757.7	64.66
6	978	46,134	119	2,430	46,520	0	0	0	13	419	2,934	8	606	5,632	4,433	1,461.7	81.61
7	1,034	7,557	56	1,313	13,953	9	288	1,993	6	71	1,963	0	0	0	2,706	670.2	82.58
8	834	13,192	115	3,038	41,020	0	0	0	2	164	1,237	3	224	1,898	4,260	1,303.9	54.92
9	789	14,552	78	501	9,746	0	0	0	0	0	0	0	0	0	1,290	1,247.0	39.07
10	1,057	20,903	103	1,234	21,754	0	0	0	1	26	417	2	39	1,456	2,356	2,437.1	64.64
11	809	18,261	5	9	949	0	0	0	0	0	0	1	0	75	818	1,355.6	31.45
12	2,050	46,958	135	1,985	41,881	0	0	0	0	0	0	0	0	0	4,035	2,582.0	58.54
13	1,895	49,286	154	2,249	47,263	0	0	0	0	0	0	6	185	5,615	4,329	2,378.0	61.01
14	180	3,587	37	928	25,207	0	0	0	0	0	0	1	0	487	1,108	893.4	82.33
15	413	14,129	40	527	12,411	0	0	0	0	0	0	0	0	0	940	675.6	47.11
16	847	10,557	28	505	18,196	0	0	0	1	2	403	0	0	0	1,354	1,073.3	97.90
17	754	33,131	93	14	19,637	0	0	0	0	0	0	1	0	84	768	587.6	100.00
Total	14,328	351,447	1,381	21,236	487,723	9	288	1,993	35	804	9,237	45	1,450	26,032	38,106	22,310.8	60.95

Source: Table is a summary based on information from Kamnerdmanee, 2010.

Note: ¹ The percentage is calculated from total coverage areas of WUOs per the potential irrigated areas of large and medium-scale irrigation projects.

Figure 4.14: Standard procedures of joint-management in O&M



Source: Diagram is a summary based on information from Royal Irrigation Department (Thailand), 2005c.

RIO. The RIO staff allocate water to each WUO as requested and record the quantity of water allocated. The RIO staff regularly inform each WUO about the remaining and jointly modify the water allocation plan as needed. The JMC schedules the last date of water distribution and announces to related parties.

After a major crop season, the RIO staff and WUOs jointly assess the past operation and identify problems. The JMC meeting is conducted to evaluate the operation and to find solutions for the past problems.

2. Canal level

There are two core parties, namely the RIO and WUOs (i.e. IWUG, FG, WUA, or WUC), to manage irrigated water at primary, secondary, or tertiary canals. The amount of irrigation water is limited and withdrawn from other communities. Setting rules among users who consume water from the same canal is therefore essential to effectively allocate finite water (RID, 2005c).

Before each major crop season, the RIO staff inform an initial allocation plan to the presidents and representatives of all WUOs in a canal. The president of each WUO collects water need information from every chief of WUGs who gathers information from members of WUGs. All presidents of WUOs make an inclusive plan for a canal, report to the RIO, and mutually adjust the final allocation plan with the RIO. Each president calls a meeting between the committee to reach an agreement on water allocation and water request rules as well as preparing for a general meeting with members. The general meeting is held to: present the past work and net benefit (if any) of a WUO; announce the allocation plan, water request rules, maintenance rules, and cost sharing for administration and maintenance; and make a plan for conducting maintenance activities.

During a major crop season, presidents of WUOs compile the water request

forms in a canal from chiefs of WUGs and deliver them to the RIO. The RIO staff regulate the amount of water available at a canal. Presidents of WUOs or chiefs of districts control the water use of members in accordance with the agreement. The committee arranges a meeting with chiefs of WUGs and community leaders to fix the prospective date to stop distributing water.

After a major crop season, presidents of WUOs or chiefs of districts survey and record the number of canals and structures in the areas that need further maintenance. The presidents of WUOs organize a meeting with chiefs of WUGs and community leaders to evaluate the past water allocation, specify problems, and find the respective solutions.

3. Ditch level

The WUGs hold responsibility to manage irrigated water and maintenance in any ditches (RID, 2005c). Before each major crop season, chiefs and members of WUGs are notified of the draft allocation plan from the RIO staff or a president of any other relevant WUO. Chiefs of WUGs accumulate the water needs from members and submit to the committee of WUOs. All members of WUGs are encouraged to attend a general meeting to learn the basic information regarding water allocation as well as giving input to the allocation and maintenance plans. The president of WUO calls a meeting with chiefs of WUGs to inform them of the specific details of water allocation for each WUG. Each chief of WUG then arranges a meeting with members to make a commitment on water allocation and to designate a ditch maintenance date.

During a major crop season, each chief of WUG routinely examines the practical water use of members as well as reports the water condition and planting progress to the president of WUO. Each chief of WUG also surveys the potential last date of water distribution to inform all stakeholders in a meeting with the committee

of WUO. Once the last date of water distribution is scheduled, each chief of WUG needs to inform members in the area immediately.

After a major crop season, each chief of WUG inquires problems and concerns from members and presents in a meeting with the WUO committee. The committee helps seek solutions to improve the efficiency of successive water allocation.

4.5.8 Key performance indicators of joint-management in O&M

The O&M performance of an irrigation project is assessed by the RIO staff. The information is derived from the sampling surveys of WUG members and analysis of regularly checked water level readings of related irrigation canals. The guideline of key indicators include: (1) percentage of cultivated area per irrigation area; (2) percentage of overall irrigation efficiency; (3) percentage of comparative major crops' yield; (4) O&M cost per area; (5) percentage of competence in water allocation of WUOs; (6) percentage of competence in maintenance of WUOs; (7) percentage of problems in water allocation; (8) percentage of satisfaction in water allocation facilitated by WUOs; (9) percentage of satisfaction in water allocation facilitated by the RIO staff; and, (10) percentage of an additional income per O&M cost.

The O&M performance, moreover, addresses the activities that help strengthen the WUOs through considering activities such as: (1) number of WUO visits by the RIO staff and attendance of WUO members in the visits; (2) number of meetings with local communities arranged by the RIO staff and attendance of local people in the meetings; (3) number of new WUO establishment; and, (4) number of WUO training courses or study tours provided by the RIO staff and attendance of WUO members in the training courses or study tours (RID, 2005c).

4.5.9 Evaluating competence of WUOs

An evaluation is undertaken to identify the level of competence of every WUO

(except WUGs) in regard to managing irrigation water, conducting maintenance, and governing organization as well as supporting from the RIO staff to the WUOs. The RIO staff normally distribute an evaluation form to a WUO in September. The evaluation form is usually filled out by the committee of the WUO and rates their opinions (i.e. five levels of satisfaction from the most satisfied one to the least satisfied) to the questions related to four aspects such as irrigated water management, maintenance, WUO administration, and the RIO support. The RIO staff convert the rating opinions into scores and report the evaluation of a WUO to relevant RIO offices and the headquarters. A score of at least 76% in each aspect is generally considered to be high competence. Scores of 45-75% and 0-44% are evaluated as moderate and low competence, respectively. The evaluation helps specify an IWUG that is most likely ready to be federated to be a legal entity. After receiving the WUO evaluation from each RIO, the headquarters further conducts a comprehensive analysis of different levels including the national, RIO, and irrigation project levels. The headquarters passes feedback on strengths, weaknesses, and recommendations to each RIO for job improvement (RID, 2005a).

4.6 Summary and discussion

Similar to other developing countries, the largest user of water in Thailand is agriculture. Conversely, agriculture contributes the smallest proportion of the national GDP, and the sector is consequently forced to be as efficient as possible regarding water use. Enhancing the efficient use of irrigation water requires physical improvements to irrigation structures to allow them to reach their capacity and changes in the way such systems are developed and managed. Seeking sustainability in irrigation management demands, for example, institutional reform to involve

relevant parties into decision-making related to planning, construction, operation, and maintenance.

Thailand has adopted the PIM approach to achieve institutional reform in irrigation management. As outlined above, official documents indicate that the PIM approach promotes stakeholder involvement, helps respond to immediate needs, and sets out ways to jointly find optimum solutions to problems. It is striking that the RID acknowledges in their documentation the importance of both WUO and LAO involvement in PIM implementation and operation. In doing this, the RID recognizes the necessity of instilling a sense of ownership among local residents and sustaining PIM implementation through the budget contribution of LAO in order to balance the roles between government and non-government actors and to provide more access to financial resources to local farmers, all activities supported in the literature (e.g. de Loe, 2007; Helling et al., 2005; UNDP, 2006). The RID, moreover, recognizes in accordance with Rogers & Hall (2003) that each locality is unique, by stating that the eleven activities of the PIM implementation approach and the provided WUO rules are only guidelines. The final implementation rests on farmers' readiness and mutual agreement.

The eleven activities of PIM implementation for O&M as outlined by the RID also conform to the most part with the essential elements of meaningful public participation, i.e. initiation, inclusiveness, information, and influence. The first vital activity acknowledged by the RID is to build knowledge about PIM with two main target groups including RIO staff and relevant local parties (i.e. farmers, LAOs, and public and private agencies). The RID arranges training sessions for RIO staff, each of whom are delegated to be trainers from each RIO. The trainers subsequently organize the training sessions for all field staff in each RIO. The training sessions for

the RIO staff aim to clarify the PIM policy, purpose, and approaches of PIM implementation for O&M. The field staff from related offices of each RIO (e.g. On-farm Irrigation Office, O&M Office, Provincial Irrigation Office) are responsible for introducing the PIM concept, purpose, benefits, and implementation approaches to prospective local parties. The techniques for building an understanding of PIM among local parties as outlined in the RID's guidelines involve: village loudspeaker and community board announcements; brochure distribution; public meetings; and meetings with local leaders, LAO members, and staff from related public and private agencies. The RID's effort to clarify the PIM purpose and approaches to all relevant parties (i.e. RIO staff, farmers, LAOs, and public and private agencies) is consistent with the initiation element of meaningful public participation. As a number of authors such as Sidaway (2005), Stewart & Sinclair (2007), and Wilcox (1994) have indicated, establishing the purpose of participation so that participants are clear about how the outcomes of consultative efforts will be used in decisions is critical to success.

The next essential activity of PIM implementation for O&M recommended by the RID is to reach mutual agreement on how to conduct PIM among stakeholders. The desired level of participation and transferred responsibility should be identified between key players (i.e. RIO staff, farmers or WUOs, and LAOs). Such commitment to determining the level of decision responsibility through PIM reflects a commitment to meaningfully involving farmers in the participation process. The literature (e.g. Sidaway, 2005; Stewart & Sinclair, 2007; Wilcox, 1994) agrees that seeking agreement from all parties at the outset promotes a sense of ownership and willingness to participate from stakeholders. Every party also gains more details of how to jointly achieve the PIM's ultimate goal.

Standard procedures of joint-management in O&M can be found in the RID's guidelines. The guidelines detail the responsible parties and joint-management procedures for the entire irrigation system (i.e. from reservoir to ditch levels). The RID designates the timing of participation and the final decision-maker, which relates to the initiation element. A common understanding of participation procedures among stakeholders helps ensure the public participation success, a concept promoted by the literature (e.g. Sidaway, 2005; Stewart & Sinclair, 2007; Wilcox, 1994).

The JMC, which regulates irrigation water at a reservoir level, shows inclusiveness by being required to engage representatives from all affected parties including RIO, WUOs, LAOs, and relevant public and private agencies to jointly make a decision about control measures for water use, water allocation, water delivery schedule, and maintenance tasks in the irrigation areas for each crop season. The PIM manuals provided by the RID emphasize that each irrigation project should have only one JMC, which is subsequently certified by a governor. The proposed inclusiveness of the JMC can help to ensure that diverse interests and concerns are brought forward and promote the development of joint solutions in the irrigation areas. The benefits of inclusiveness are well supported in the literature (e.g. Creighton, 2005; Innes & Booher, 2004; Kapoor, 2001; Stewart & Sinclair, 2007; Widditsch, 1972).

Three activities of PIM implementation for O&M suggested by the RID, namely WUG establishment, WUO federation, and JMC formation not only create opportunities, but also reinforce the need for collective action to influence water management decision-making at all levels of an irrigation system, i.e. ditch, canal, and reservoir (Helling et al., 2005; World Bank, 2007b). Provisions for the capacity building of WUOs and evaluating competence of WUOs echo the influence element by recognizing the importance of building more relevant knowledge among

stakeholders (Stewart & Sinclair, 2007) and enhancing individual farmers' skills to participate effectively (Helling et al., 2005; Lyons, Smuts, & Stephens, 2001).

The RID identifies costs that will be incurred in O&M activities (e.g. WUO meetings, ditch excavation), so a united WUO is encouraged to set an irrigation fund to facilitate the O&M activities in PIM implementation. The irrigation fund can be contributed to in various ways, including money, labor, and/or agricultural products, based on a consensus reached among farmers as to the best approach. The RID feels that such a contribution to the irrigation fund helps increase a sense of ownership among farmers that nurtures the wellness of the irrigation system. A number of authors indicate that having more access to financial resources contributes to the sustainable reform of irrigation management (Helling et al., 2005; UNDP, 2006) and participating in an agreed activity initiates a sense of ownership among participants (Kapoor, 2001; Mitchell, 2002).

One out of the eleven activities of PIM implementation for O&M promotes that maintenance can be contracted out to a united WUO. The RID wants to stimulate farmer involvement in the maintenance phase by providing opportunities for farmers to address their maintenance needs and to receive a maintenance budget accordingly. This opportunity could provide local farmers with enhanced opportunities to influence decisions, an important element of meaningful public participation due to the recognition of ongoing participation, and an approach encouraged by a number of authors (e.g. Creighton, 2005; Kapoor, 2001; Sinclair & Diduck, 2005; Stewart & Sinclair, 2007; Widditsch, 1972). Contracting out maintenance to a united WUO also procures additional funding for local farmers. The literature (e.g. Helling et al., 2005; UN-Water, 2005) encourages financial empowerment as fundamental to the sustainable reform of irrigation management.

As yet, the information element regarding adequate and accessible information by all interested parties (Kapoor, 2001; Stewart & Sinclair, 2007; Widditsch, 1972) is not discussed clearly in the PIM implementation approaches provided by the RID. However, the weakest point of PIM policy is the lack of farmer involvement in the project planning phase, which serves as the key consideration to sustain the project development (Sinclair & Diduck, 2005; WBI, 1998). The next chapter goes on to consider how PIM is actually being implemented on the ground.

Chapter 5

PIM implementation in Thailand

5.1 Introduction

This chapter presents findings from the fieldwork related to the implementation and operation of PIM nationally. Data is provided at the outset regarding the things contributed to PIM implementation difficulties in the past. It goes on to establish the level of farmer involvement in water management and decision making, and the lessons learned by both government officials and farmers through the implementation of PIM in Thailand to date.

5.2 Early implementation difficulties

From initiation of the first voluntary WUO in 1963, the formation and operation of WUOs has been adversely affected by policy interruptions, non-allocated budgets, and uncooperative public irrigation officials (Informant No. 2, personal communication, February 13, 2008). Several factors have contributed to policy and organizational frustration. Initially, the sense of ownership of the irrigation system among farmers was low since the RIOs failed to encourage public participation in every process of reservoir development, that is, planning, design, operation, maintenance, and monitoring (Ounvichit & Satoh, 2002). The RIOs also disregarded the existing traditional WUOs in the irrigation areas (Ounvichit & Satoh, 2002) and dictated the establishment of WUAs (Hoynck & Rieser, 2002). This served to place the RIOs in a position of superiority over the less-educated local people (Molle, Ngerprasertsri, & Sudsawasd, 2002). The RIO staff customarily held decision-making power on water allocation and distribution and maintenance needs (Ounvichit

& Satoh, 2002) and did not provide opportunities for farmers to share in the decision making. As well, the organizational structure, rules, and fee collection for system operation were prescribed. This resulted in weak WUAs because farmers had little motivation to participate (Hoyneck & Rieser, 2002). Farmers perceived the establishment of WUOs as state-initiated and state-oriented without the benefit of providing better access to water (Molle et al., 2002) since upstream farmers usually got surplus irrigation water, resulting in downstream farmers being left in need (Ounvichit & Satoh, 2002). RIO staff were simply unable to provide irrigated water in a sufficient and timely manner creating further frustration (Molle et al., 2002). The diversification of farmers' interest beyond agricultural activities, moreover, distracted them from participating in a founded WUO (Molle et al., 2002).

5.3 The evolving place of traditional WUOs in Thailand

A traditional WUO has managed a community-built irrigation system in the village of Muang Chiang Mai in northern Thailand for 700 years. This community-built irrigation system, typical of many others, is a small weir made of local materials (e.g. bamboo, log, and stone) across a natural canal or river along with the excavated network of ditches to farmers' plots. The traditional WUO managing this is a group of farmers who are served by the community-built irrigation system. The administration of the traditional organization is divided into two levels, weir and ditch, each having a chief elected by majority vote from farmers. A weir chief is responsible for seeking a common agreement from farmers on the organization's rules, water allocation and distribution, maintenance, and solving conflicts of the entire system. A ditch chief helps oversee water allocation and distribution at the excavated ditch level (RID, 2005a; Shivakoti, 2000).

Since 1946, agricultural transformation in Thailand has gradually eroded these traditional WUOs (Shivakoti, 2000). Export-based agricultural growth has caused the government to develop new large and medium-scale irrigation systems throughout the nation. All traditional WUOs situated in new government-built irrigation system areas are merged into new institutional settings launched by the RID (RID, 2005a). As of 2007, about seventy percent of irrigation areas in the north of Thailand have established new WUOs (Wathayu, 2008), implying that seventy percent of traditional WUOs have been replaced by the new RID's institutional approach. At present, however, a number of traditional WUOs do still operate in northern Thailand located outside the irrigation areas of the government-built systems (Informant No. 5, personal communication, March 20, 2008; Shivakoti & Bastakoti, 2006).

5.4 WUO structure

The most recent statistics indicated that as of 2009 WUOs and JMCs across the nation included 38,106 WUGs (35,564 non-legal entity and 2,542 legal entity WUGs), 1,381 IWUGs, 9 FGs, 35 WUAs, 45 WUCs, and 18 JMCs. The WUOs established thus far cover approximately 60% of the potential irrigated areas of the country associated with 876,432 members. The most coverage area of founded WUOs, 48%, is present in the central region (Kamnerdmanee, 2010).

The founding step for a WUO was well described by the RID official:

Readiness of farmers is the first criterion . . . the second criterion is evidence of water conflicts in an area. RIO staff uses these conflicts as igniters to assemble farmers. When farmers compete for water in the same ditch, RIO staff first tries to establish a WUG to solve the problem. And when farmers fight over irrigation water between several ditches, RIO staff then encourages farmers to unite several WUGs into an IWUG, which holds a non-legal entity, to facilitate more interaction and communication among farmers. . . . If the IWUGs need more financial support, they may consider scaling up to be a legal entity, that is, one of FG, WUA, or WUC based on their preference. (Informant No. 1, personal communication, February 12, 2008)

So far, the time it has taken to federate from a WUG to an IWUG may be as little as a year or take many years depending on the level of support from RIOs, the degree of cooperation among farmers, and the leadership skills farmers hold.

There were 13 ditches in our area and thirteen WUGs were then established in 1995 by the RIOs encouragement. . . . We [farmers] just united to be an IWUG in 2005 because we could not reach a consensus from members earlier. . . . Scaling up to be a legal entity WUO is great, but some WUG chiefs may not be ready for that . . . they need more time to practice their leadership skills because a number of members still do not follow the rules. (Informant No. 34, personal communication, February 29, 2008)

It may take even longer to unite from a WUG to a legal entity WUO, i.e. FG, WUA, and WUC, because farmers find it hard to coordinate in a larger area and to follow the mandated procedures of a legal entity such as document preparation for registration and details of a business plan for share collection from members (Informant No. 9, personal communication, February 26, 2008).

A chief, who is elected for two years by farmers using the same ditch, supervises a WUG. The united WUOs, including IWUGs, FGs, WUAs, and WUCs are administered by voluntary committees, normally elected biennially among members served by the same canal.

The RIO staff provide guidelines for the formation of a WUO, but the WUO chief/president and every farmer in that ditch/canal are responsible for setting their own rules based on topographical, economic, and social constraints in each area. The number of members can vary from five in a WUG up to more than 30,000 in a WUA or WUC. The coverage area of a WUO ranges from less than 1.6 km² to more than 192 km². A water fee to cover expenses of O&M and WUO administration is optional for the WUO, but if such a fee is to be charged it must be based on mutual agreement of members. Three out of sixteen interviewed WUOs collect no water fee; four WUOs set a one-time membership fee from US\$0.60-6.00 per member. Some WUOs acquire

rice (around 4,375 kg/km²/year) from members as a water fee. Many participants comment on water fees:

My WUG does not impose a water fee because I [WUG chief] volunteer to facilitate irrigated water in a ditch and it does not cost me a cent to do so. If we need money for maintenance purposes, we then share among members on a case-by-case basis. It works out just fine this way. (Informant No. 32, personal communication, March 17, 2008)

Our IWUG covers five districts with an approximate area of 192 km². It is divided into four zones and 16 WUGs, which serve about 30,000 members by a gravity flow. . . . We collect water fees of US\$284 per km²/year, then we return US\$189 to all WUGs for their O&M. The rest of the fees, US\$76 and US\$19, are kept by the IWUG committee for zone and IWUG administration, respectively. (Informant No. 22, personal communication, March 1, 2008)

5.5 PIM implementation through construction

The RID appointed a cross functional team, which included field staff with experience in the different processes of water resource development, namely planning, survey, design, construction, and transferring finished projects, to develop guidelines for public participation for each stage of the process. According to the RID (2007b) public participation at a planning stage should ensure local people that their comments and concerns will be heard and taken into consideration before development occurs.

At present, there is little evidence of common agreement between the RID and local people prior to reservoir construction or major modification, regarding either construction or the approach to meaningful participation. The RID thus far conducts passive public participation by merely informing local residents of an anticipated project.

The most active public participation process is usually seen before ditch construction, since a voluntary contribution of private land is needed for the ditch. Permission from the land-owner is thus a prerequisite. When a RIO receives a budget

for ditch construction, a series of meetings with prospective farmers is scheduled to introduce the benefit of on-farm irrigation systems, to inquire about farmers' needs and concerns, to generate a collective plan for the on-farm irrigation system, and, eventually, to sign a joint agreement on land sharing. A subsequent field visit determines an agreed-to ditch line. To help facilitate farmer participation, revised RID regulations were made to allow changes in a ditch design to be made on site instead of requesting written approval from headquarters (Informant No. 11, personal communication, March 12, 2008). During construction, RIO staff encourages farmers to form a basic group, a WUG, and vote for a WUG chief who delivers any further concerns from farmers to RIO staff during ditch construction. The RID, according to some participants, expects that sound public participation approaches in ditch construction will increase a sense of ownership and preparedness for joint O&M among farmers.

5.6 PIM implementation through operations

The goal of PIM implementation in operations is to conduct co-management between farmers and the RIO staff at all three levels: reservoirs or water sources, irrigation canals, and on-farm irrigation systems. WUG meetings facilitate O&M in an area. Working together, individual farmers can make a joint decision on water allocation, water distribution, and maintenance in a ditch and canal with a WUG chief who typically serves as a committee member of a united WUG (RID, 2005a).

Committee meetings of united WUGs and invited RIO staff are held about once a month or are arranged to settle any urgent issues. According to participants average attendance at committee meetings is 70%. Announcements on village loudspeakers and notification by WUG chiefs invite all WUG members to general

meetings before the major and second crop seasons. These meetings notify farmers of the water allocation, water distribution, and canal maintenance plans agreed-to by the JMC; assess the past water allocation and distribution and problems arising; and allow for their further input and discussion regarding these decisions. For a legal entity WUO, a general meeting also provides a chance to report the past performance of the organization, and allots dividends to members. Attendance at annual general meetings is normally about 60%. At the beginning of WUO establishment, committee meetings and general meetings were as frequent as twice a week (Informant No. 31, personal communication, March 18, 2008; Informant No. 33, personal communication, March 12, 2008).

The JMC at the Krasiew Reservoir, Suphanburi Province, for example, was set in 2003 as one site of five large-scale pilot projects under the ADB loan and is now the most active JMC (Informant No. 1, personal communication, February 12, 2008). The irrigation areas of the Krasiew Reservoir, covering 177 km², consist of one JMC, nine IWUGs, and 278 WUGs: 6,740 members.

The JMC at the Krasiew Reservoir consists of 51 committee members, with 29 representatives from IWUGs, four representatives from the RIO, 11 representatives from LAOs, and seven representatives from relevant public and private agencies including a district waterworks authority, four district agricultural offices, and two factories. The JMC president is elected from the representatives of IWUGs for a four-year term. This JMC reserves absolute power in making decisions about water allocation and distribution at the Reservoir; representatives of the RIO provide technical information only (Informant No. 33, personal communication, March 12, 2008; Integrated Water User Group [IWUG] 2L-1R, 2002).

Since rice and sugar cane are the major crops in the irrigation areas, the major

crop season is July to December, and the second crop season is February to June. Water requirements for agriculture, domestic and industrial uses are estimated by each sector and brought to a JMC meeting in mid-June. This requires WUG chiefs to report their needs at IWUG committee meetings so that decisions about allocation and use can be made at this level and passed to the JMC. The priority for water allocation is usually domestic use first, followed by agriculture and then industry. A rotational water allocation within the agricultural sector is agreed to in order to save water. All problems and concerns from each IWUG as well as from relevant parties are also brought to the JMC meeting in hopes of finding mutually acceptable solutions. The RIO staff distributes irrigated water in the amount and time needed as determined by the JMC's consensus (Informant No. 33, personal communication, March 12, 2008; IWUG 2L-1R, 2002).

The JMC notifies the relevant parties by official letter of the water allocation and distribution agreement, rules to obtain water, and maintenance notice. Presidents of all IWUGs pass the information to IWUG members in a general meeting held after the JMC meeting. WUG chiefs also help to announce the JMC agreement to individual farmers.

In an irrigation area that has not yet established a united WUO (i.e. one of IWUGs, FGs, WUAs, or WUCs), the final decision making of an inclusive water allocation plan of all ditches in a canal is normally influenced by the RIO staff, whereas the WUG chiefs only supplement the needed information. However, WUG chiefs and every farmer hold full power to manage water allocation and distribution in their own ditches. In an irrigation area that has established a united WUO, the committee members of these united organizations have influence or hold full power in making decisions on water allocation and distribution in their canals and ditches

(RID, 2005a).

The following interviews of WUO members illustrate the ongoing water operation at canal and ditch levels.

Due to the large coverage areas our IWUG is separated into four water districts which serve various sectors including domestic use, agriculture, and industry. A representative from each water district and each secondary canal constitutes our IWUG committee of 28 persons. . . . In the last IWUG committee meeting, we [IWUG committee] came up with an allocation plan based on the current water needed in each water district . . . Each water district is challenged to sufficiently manage the allotted water by working closely with all secondary canals in the district. . . . Our IWUG committee assists by collecting all water allocation plans in every district, preparing and distributing the allocation newsletters to all representatives of secondary canals. (Informant No. 22, personal communication, March 1, 2008)

RIO staff gives all keys of water gates in the area to our IWUG committee in order to effectively control the amount of water we [IWUG committee] need. We completely manage water allocation in a canal by ourselves. . . . Each ditch has its own allocation routine and adjusts it as necessary based on a mutual agreement among farmers in the ditch. . . . In case our canal needs more or less water, RIO staff takes a water request via a phone call from me [IWUG president] only and provides water as per my request. If members in a ditch seek more or less water, they have to inform their WUG chief. The WUG chief verifies that request and then passes it to me. The RIO corporation absolutely helps me develop the discipline among members. (Informant No. 34, personal communication, February 29, 2008)

The achievement of WUO operation is rooted in strong WUOs (Informant No. 2, personal communication, February 13, 2008). Barriers to successful operation according to the RIO staff and WUO members interviewed included: lack of knowledge about PIM and water allocation issues among WUO members; low farmer attendance at the meetings of WUO establishment; poor leadership skills among chiefs or presidents of WUOs; lack of motivation to be a chief or president of a WUO; insecure WUO funds; lack of storage dams in an area; minimal participation from farmland tenants (who account for up to 40% of farmers in some irrigated areas); and inadequate support from government agencies regarding agriculture development initiatives.

On the other hand, the likelihood of successful WUO operation was identified as being assisted by: dedicated WUO chiefs and committee members; respect for rules and the elected committee of WUO members; learning through PIM experiences of related personnel; individual farmers' competence and financial security; farmers' enthusiasm to learn new things; high social capital in an area; learning from past WUO failures; monetary aid (a loan or an allocated budget) to a legal entity WUO; and assistance from LAOs and RIOs.

PIM implementation through operation undoubtedly has created a great number of lessons for all related parties including the RID, RIOs, and WUOs.

The impact of PIM implementation may not be obvious and immediate. . . . If we [RID/RIOs] keep attentive to details, we could find that complaints and protests in PIM areas significantly decrease. Problem handling is easier because PIM provides us an opportunity to work closely with farmers and become acquainted. (Informant No. 1, personal communication, February 12, 2008)

[T]he strengthened WUOs are the organizations that previously bore water conflicts or limited water resources. Farmers have experienced fighting for water and making every effort to allocate water. . . . On the other hand, farmers in the areas of surplus water are less likely to participate in activities of WUOs because they could certainly get water any time they want. Additionally, they may get less water if they join a WUO. (Informant No. 1, personal communication, February 12, 2008)

RIO staff also acknowledge that public officers need to emphasize the finiteness of water resources and the value of water to human life to encourage farmers to incorporate PIM practices (Informant No. 4, personal communication, February 29, 2008). The RIO staff state that frequent visits assist in building trust and comfort between farmers and RIO staff, enabling farmers to feel more comfortable to consult with RIO staff, "Now we [IWUG committee] and the RIO staff work together as a team. I [IWUG president] can call the RIO staff any time, even at night, to ask for advice" (Informant No. 25, personal communication, March 17, 2008). It is evident

that some farmers have applied their full potential to managing irrigation water allowing the RIO staff to step back and act as technical advisors.

We [RIO staff] have never thought that farmers would cooperate with us. In the past, we had to operate the water completely. After a WUO establishment, the farmers are competent to manage water by themselves. Now we just serve as technical advisors. (Informant No. 15, personal communication, March 11, 2008)

We [RIO staff] encourage farmers to make an allocation plan. We would not command farmers, but would rather let them make a decision by themselves. . . . Our responsibility is only to provide water for farmers, but not an allocation plan. We urge farmers to work together in order to help strengthen a WUO. (Informant No. 13, personal communication, March 12, 2008)

The lessons learned by WUO members are fruitful. Most confirmed that exercising the PIM approach resulted in an active forum for farmers to work closely, get more acquainted, exchange ideas through conversations, raise shared concerns, and eventually strengthen communal relationships as illustrated by the following statements.

In the past, individual farmers strived to get water for their own plots without caring for the needs of fellow farmers. That consistently caused rough relationships among farmers. The IWUG establishment has created an opportunity to exchange problems or concerns thus building empathy and team spirit among farmers. The empathy encourages us [IWUG members] to allocate water cooperatively to benefit us all. (Informant No.34, personal communication, February 29, 2008)

I [IWUG president] can guarantee that establishing the IWUG is great. Previously, we [farmers] had never known about the total amount of water or participated in allocating water. . . . Now we have all information that facilitates us to effectively plan our cropping pattern. . . . Our committee gathers all water needs from members and determines a final allocation plan. I inform the plan to the RIO staff who distributes water accordingly. (Informant No. 31, personal communication, March 18, 2008)

5.7 PIM implementation through maintenance

Annual maintenance to help an irrigation system function properly involves silt removal, weed control, replacement of damaged concrete slabs in a concrete-lined

canal, or lubrication of water gates and other mechanical equipment. In general, the RIOs take care of maintaining the reservoir headworks, a primary canal, and a drainage system. United WUOs including IWUGs, FGs, WUAs, or WUCs are responsible for maintenance of secondary canals, tertiary canals, or both canals while ditches are maintained by WUGs.

Canal and ditch maintenance is usually scheduled before water distribution in each crop season. The RIOs normally provide materials and every farmer is obligated to join the maintenance. Seventy-five percent of interviewed WUOs levy a fine of US\$3-6 per each day of maintenance on members who do not participate; the remaining WUOs do not impose a fine, but try to appeal to their members' consciences to help with O&M. Two out of sixteen WUO interviews indicated directly, however, that their income from collecting the water fee hardly covered the O&M expenses.

In some years we [WUA committee] had to replace stolen water gates. . . . The more committee meetings we arrange, the more expenses we need to cover. The money spent on meetings includes document preparation, transportation allowances for committee members, and food and beverage. (Informant No. 29, personal communication, March 13, 2008)

Until recently, major maintenance tasks have been tendered through private company bids submitted to the RIO. In 2006, the RID launched the "One project, one million Baht" (about US\$30,000) program for every irrigation project to contract immediate maintenance to a united WUO (up to US\$3,000 per contract) instead of to a private company. The maintenance tasks must be identified by farmers at a community or WUO meeting. The RID anticipates that the program will encourage mutual planning and decision making for irrigation maintenance and help create a sense of ownership among farmers. As indicated by a member of RIO staff, "[T]his budget would restore farmers' faith in the RID. It absolutely shows concrete support

from the RID. . . . Labor sharing from farmers in maintenance also promotes a sense of ownership in an irrigation structure” (Informant No. 13, personal communication, March 12, 2008).

5.8 WUO conflict resolution mechanisms

Many respondents noted conflicts within the WUOs, especially at the beginning of their establishment, regarding a lack of sense of water sharing between neighbors, opening a water gate without permission, taking water beyond one’s allocation, or blocking a waterway for personal benefit. As one WUO member captured:

I [IWUG president] have engaged in every kind of work. I would confirm that nothing is as tough as water administration because it is totally spirit management . . . how to care and share with others. . . . In the past, there were severe outcomes including 18 incidents of stab wounds or cut a throat because of water fighting. When the IWUG is founded, farmers at the beginning and the end of canals become known each other. . . .eat and work closely. . . . All problems are put together and we jointly find solutions. (Informant No. 31, personal communication, March 18, 2008)

So, participants indicated that effective conflict resolution is key to successful PIM implementation, and the RID views PIM as the best way to resolve conflicts.

According to our participants, a WUG chief typically handles any struggles in a ditch. For conflicts between several ditches, a president of an IWUG committee investigates and mediates a joint resolution. Police and legal procedures are pursued if a member is still dissatisfied with the resolution. However, a conflict in an IWUG or other legal entity WUO has not been brought to the police so far. Means of resolution include allocation plan implementation, referring to the WUO rules, discussion, or mediation (Informant No. 33, personal communication, March 12, 2008). A WUO meeting often serves as a forum to resolve a conflict.

What chaos! At the first year of IWUG establishment I [IWUG president] had to call for either a committee meeting or a general meeting as often as twice a week to seek a joint solution. Most members did not follow the agreed rules of a rotational allocation plan. It took a couple years to establish water sharing among farmers. (Informant No. 31, personal communication, March 18, 2008)

Participants indicated that developing a mutual water allocation plan is the best way to prevent water difficulties and conflicts between different sectors. Many felt that all problems could be solved through talking, not violence, and community spirit.

When water was scarce, water stealing usually occurred. We [IWUG committee] first give a warning to a thief. . . . According to IWUG rules the highest punishment would be no water delivery for a certain period to that plot, but we have never done that so far. . . . Our key practice is to arrange a talk with a thief and explain why we need to apply a rotational allocation plan. Once the thief understands a situation, he/she never steals water again. (Informant No. 30, personal communication, March 1, 2008)

5.9 PIM capacity building

The RID and farmers established that PIM capacity building is critical since understanding the approach of PIM and obtaining skills to facilitate public participation ensure the success of PIM implementation. The RID responded to that need by establishing its newest office, Office of Public Participation, in June of 2008 to formulate public participation standard procedures in planning, construction, and O&M of irrigation projects and to organize training sessions on public participation skills among government officials.

The RID introduced steps for capacity building among government officials beginning in 2004. In that year, Mr. Sujin Limtoprasert, serving as a chief of an on-farm irrigation office at RIO 3 (later transferring to join RID central office), initiated capacity building regarding public participation for government officials at the RID. In 2006, he also introduced community-based research (CBR) designated by the

Thailand Research Fund as a new tool to facilitate local empowerment. He coordinated with a non-government organization, Semsikkhalai, to arrange a series of training sessions in order to create a new spirit in serving local people within the RID and RIO staff, as he explained:

This is a series of training sessions to prepare government officials in incorporating PIM and CBR approaches into practice. . . . If you bear a soul of a conventional public officer, you definitely could not achieve this challenge. The training mainly deals with soul transforming of a government official to serve the public with a holistic view. . . . It is a time consuming process, but I believe it is worth trying. (Mr. Sujin Limtoprasert, personal communication, February 14, 2008)

The capacity building program lasts three years, with a goal of seeking out RIO staff members who complete all training sessions and who are willing to incorporate a CBR into their responsible areas. The first group of 15 participants finished training in 2006; the second group of 15 trainees accomplished the three-year program in 2007; and, the third and fourth groups of 12 and 21 participants completed all training sessions in 2008 and 2009, respectively (Mr. Sujin Limtoprasert, personal communication, April 19, 2010).

CBR is a project in which WUO members and local people act as the main researchers to seek joint solutions for their own community questions or concerns. The preferred solution should be attached to local wisdom and natural resources rather than depending upon outer agencies or resources, as indicated by the Thailand Research Fund. The CBR underscores “a working process” more than “an outcome.” The utmost purpose of CBR according to the Thailand Research Fund is to strengthen local people to direct their lives by their own ways. The CBR consists of three general steps; developing a collective question, finding a resolution plan, and implementing the plan.

It is hoped that a graduate participant of the capacity building program would

volunteer to host a CBR project. Four voluntary RIO staff recently committed to apply CBR in their responsible areas. The first project in Pichit Province, funded by the Thailand Research Fund, started in 2006 and has entered the last stage of plan implementation. The second project in Rayong Province, supported by the RID, began in 2007. It completed the first step of developing a collective concern. Now it is under the process of formulating a solution plan. The third project in Samutprakarn Province, funded by the RID, set in 2008 and has proceeded to implement a resolution plan. The fourth project in Rayong Province, funded by the RID, starts in 2010. It is currently in the process of developing a mutual concern (RID, 2009a; Mr. Sujin Limtoprasert, personal communication, April 19, 2010).

Most interviewed RID and RIO staff asserted that the current courses of PIM capacity building that are taken as part of the three year program are outstanding. A meaningful lesson for government officials is to learn to “listen” instead of talk (Informant No. 2, personal communication, February 13, 2008). The courses introduce a systematic way of thinking and active listening. The courses, moreover, provide insights into human nature and instill an understanding of the need to be more patient and sympathetic to farmers, as affirmed by government officials who completed all three years of training:

After I [RID staff at a central office] had joined the second year training at Semsikkhalai, I realized that my current behavior was unpleasant. The more courses I attended, the greater motivation to change myself. . . . I used to be a self-centered and inconsiderate person. Now I have turned to be a good listener. I have become more empathetic and patient. . . . Transferring to work with PIM and WUOs has made my life more valuable than my former job. (Informant No. 38, personal communication, February 14, 2008)

This guy was arrogant. Nothing has ever been good enough in his [RIO staff] view. After he had participated a couple courses at Semsikkhalai, his boss called me “Hey! What have you done with him? He is much better. He is calmer and more thoughtful. It is amazing.” (Informant No. 3, personal communication, February 14, 2008)

A RIO staff member expressed his views in relation to hosting a CBR project as:

Farmers always undermine their potential to solve a problem because they believe they have low educational background. . . . Moreover, they get used to receiving aids from a public agency. . . . The CBR project helps boost confidence in farmers' own potential of solving a problem. . . . It [CBR project] makes them turn back to have more discussion, problem share, and listen to fellow farmers. (Informant No. 39, personal communication, March 14, 2008)

It was also established that the RIO engages in capacity building with farmers through meetings, training, study tours, and Future Search Conference (RID, 2005a). Such capacity building was viewed as being imperative to strengthen WUOs and to help ensure the success of PIM implementation. Training or study tours can be requested by farmers, or provided by RIO staff. Most WUO interviewees stated that there were one or two training sessions per year provided by RIO staff, dealing with water allocation, technical skills in irrigation, administrative skills, and organic farming. Additionally, thirty-eight percent of the interviewed WUOs had become the location of study tours for other WUOs. However, the Future Search Conference had rarely been organized by the RIO staff due to lacking of facilitating skills and time consuming.

The lessons learned by farmers who joined RIO capacity building workshops and CBR were also favorable. Farmers noted that they gained more knowledge on technical and administrative skills from training, study tours, and fieldwork experiences.

The training involves administrative skills, irrigation management, and organic farming. The priority trainees are WUA committee members and WUG chiefs. A study tour and the past experiences are also the great sources of learning. I [WUA president] can apply all knowledge to improve water management for members. (Informant No. 29, personal communication, March 13, 2008)

Farmers recognized that the past problems in their community occurred because they

had never shared their problems and thoughts. Each person tried to find his/her own way to ease themselves. The CBR offered both an opportunity and a forum for local people to contribute their opinions and concerns in any common interests of a community. Farmers who participated in the CBR team reflected his lessons:

Since the ditch construction 20 years ago farmers have never had a mutual discussion about water disputes. Individual farmers sought their own solutions to a [water] problem. Now we [farmers] get a chance to talk because of participating in the CBR project. . . . I [IWUG president] used to think that our canal's dispute definitely could not be solved in this life. (Informant No. 24, personal communication, March 19, 2008)

I [local farmer] become a good listener and calmer. I learn to have a sense of giving and obtain more confidence in my own potential. It is clear that local people are competent to solve their own problems by using local resources. The only way to do so is to start talking, exchange a problem, have a joint discussion, find a mutual solution, and finally co-implement the solution. (Informant No. 40, personal communication, March 14, 2008)

5.10 Summary and discussion

The failure of PIM implementation in Thailand was caused by discontinuity in PIM policy, non-allocated budgets, and uncooperative public irrigation officials. Learning from past failures can best describe how PIM is currently being conducted by the RID. The organizational structure, rules, and fees are now suggested only as guidelines for a WUO. The final decision as to how PIM is implemented depends on the common agreement of members based on their topographical, economic, and social constraints in each area (Kummerdpet & Sinclair, 2010). Key lessons from PIM implementation in relation to public participation and empowerment are highlighted in Tables 5.1 and 5.2 respectively. The conditions noted in these Tables are drawn from summary of literature completed in Chapter 2.

The findings summarized in Tables 5.1 and 5.2, concur in many ways with the findings of PIM research in other countries, but also provide conflicting evidence,

Table 5.1: Conditions that facilitate public participation and empowerment in PIM implementation in Thailand

Conditions	Provided
Facilitating public participation	
1. National policy support.	√
2. Legal support (e.g. clear roles and responsibilities of related agencies).	X
3. Adequate guidance.	√
4. Local cost sharing.	√
Facilitating empowerment	
1. WUOs can set their own rules.	√
2. Budget for infrastructure rehabilitation and new equipment supply from government.	√
3. Initial training for related agencies.	√
4. On-going training for related agencies.	√

Table 5.2: Needs for enhancing PIM sustainability in Thailand

Needs	Yes/No
Enhancing public participation	
1. Clarify the priority of rights among competing water users at basin, district, and sub-district levels.	√
2. Disseminate the benefits of PIM through various channels (e.g. meetings, workshops, and brochures).	√
3. Provide more PIM information to small landholding farmers.	√
4. Simplify registration process of WUOs.	X
5. Promote crop diversification to increase farmer's income.	√
6. Allocate the irrigation service fee within the same irrigation system.	X
7. Provide training for government officials to effectively facilitate public participation.	√
Enhancing empowerment	
1. Provide financial support mechanisms for WUOs.	√
2. Arrange on-going technical training for WUOs.	√
3. Require more training on computer skills, database management, financial management, cultivating techniques, post-harvesting technology, and marketing for WUOs.	√
4. Provide training on institutional building for government officials.	√
5. Enable to modify rules in conformity with local circumstances and constraints.	X

which may lend support to the approach the RID is taking in Thailand (Kummerdpet & Sinclair, 2010). For example, individual farmers in Turkey are not active participants in PIM since system operation and maintenance has been transferred to the existing local government structures rather than occurring through a coalition of farmers' organizations (Svendsen, 2001; Svendsen & Nott, 2000; Tortajada et al., 2006). Numerous constraints have also emerged in the Indonesian case. The registration process of a water user association requires a substantial number of meetings and significant amount of paperwork without providing incentives for farmers' contributions. The suggested adoption of a standard model for a water user association provides little adjustment to fit local circumstances and regularly excludes traditional leaders from leadership positions of the association. Little information is provided to prospective farmers regarding what difference the program has made in irrigation performance (e.g. water delivery, crop yields, and farmer's income) and how the collected service fee has been allocated. The Indonesian program puts more emphasis on collecting fees, than promoting farmer participation in planning, operation, maintenance, and evaluation (Bruns & Helmi, 1996; FAO, 2007).

Like Thailand, one of the main barriers to effective PIM participation in countries like Turkey, Indonesia, Mexico, and India is legal and relates to the priority of rights of competing water users at basin, district, and sub-district levels (Kummerdpet & Sinclair, 2010). A key success shared by basically every country implementing PIM is the continuous capacity building of public officials and farmers through a huge amount of training that helps sustain the program and often results in more efficient water use (Bruns & Helmi, 1996; FAO, 2007; Palacios, 2000; Svendsen, 2001; Svendsen & Nott, 2000; Tortajada et al., 2006).

The data show that once formed, the WUG is eligible to manage water at the

ditch level. The joint water management decision-making between the RIO staff and local farmers normally starts when farmers establish a united WUO (i.e. IWUG, FG, WUA, or WUC). Most committee respondents of the united WUOs worked cooperatively with the RIO staff on behalf of individual farmers and influenced the decision-making at the canal level in profound ways. At the reservoir level, one example of this can be found in the workings of the JMC at the Krasiew Reservoir. The JMC, which is made up of local people, and IWUG representatives in particular, make decisions about water allocation and distribution before each crop season, a decision previously exercised by the RIO staff. Eighteen JMCs have been founded throughout the country to date. This could bode well for what is happening in the other 17 JMCs, which seem to have a similar make-up structure and authority over water allocation and distribution.

The ongoing implementation of PIM also recognizes, for the most part, the key components of meaningful public participation, namely initiation, inclusiveness, information, and influence. The RID acknowledged the necessity of PIM capacity building, especially for public irrigation personnel, by establishing the Office of Public Participation in order to take responsibility for training related RID and RIO staff. The ultimate goal of PIM capacity building (i.e. developing a holistic view to serving local people and a deep commitment to PIM implementation) applied by the Office of Public Participation is impressive as it is a direct response to one of the past PIM failures - uncooperative public irrigation officials. The current PIM capacity building programs received positive reviews from attending government officials that they were inspired to apply new working cultures in the field. Participation in the initial session of the first year of the capacity building program allowed first-hand observation of how engaged staff were in the capacity building efforts. Stewart &

Sinclair (2007) consider that the sincerity of a lead agency in conducting public participation is essential to success. In addition, the readiness of a lead agency to engage the public is noted in the literature (Hildyard et al., 2001), giving the highest priority to first readjusting organizational values and cultures. The organizational cultures that discourage the patience, receptivity, flexibility, curiosity, open-mindedness, and human touch characteristics of related staff are detrimental to the successful implementation of public participation and PIM.

The initiation component was exemplified when the RIO staff, who attended the first year program of PIM capacity building, took part in establishing new WUGs before ditch construction. A couple of meetings were arranged to introduce the PIM concept to prospective farmers. The RIO staff found that the maximum attendance that could be managed in maintaining a thorough discussion was about 50 farmers. In the morning of the first meeting, the RIO staff spent time getting acquainted with local farmers and learning about water situation in the area. The RIO staff then introduced the benefits of irrigation systems and the concept of PIM by using a video presentation. In the afternoon, farmers were divided into small groups based on the anticipated usage of the same ditch. Small group discussions were used to build rapport among farmers and to facilitate an understanding of the PIM purpose and approach of farmer involvement at the ditch level. A video presentation regarding WUG formation was presented to farmers after the small group discussions. The RIO staff ended the first meeting by distributing PIM brochures and booklets to farmers for self-study. The prospective date of the next meeting was jointly set up to provide further discussion about PIM and WUG establishment. The final decision of WUG formation, however, depended on a shared agreement among farmers. The significance of clarifying the purpose and procedure for public participation at the

start of a project is recognized by a number of authors (e.g. Sidaway, 2005; Stewart & Sinclair, 2007; Wilcox, 1994) because it lays foundation for the success of the coming participation activities.

The inclusiveness component of meaningful participation within the PIM process was apparent when farmer respondents indicated that their comments regarding a draft of WUO rules in a general meeting were taken into consideration, which subsequently led to a majority approval in the meeting. This enhanced a sense of ownership and willingness to participate among WUO members according to participants. The inclusiveness component was additionally observed through an attempt to adopt a participatory approach to meetings by the RIO staff. A number of interviewed RIO staff pointed out the necessity of participatory meetings, which paid more attention to listening to farmers' opinions than focusing on presentations by the RIO staff, as conventional RIO meetings tend to do. The engagement of opinions from all affected parties in the participatory meeting provided insights into the current water management situation, thus creating healthy discussions for developing joint solutions. Many authors (e.g. Creighton, 2005; Innes & Booher, 2004; Kapoor, 2001; Stewart & Sinclair, 2007; Widditsch, 1972) regard the importance of engaging all interested and affected parties for such involvement as central to meaningful public participation. The mutual learning arising from the inclusiveness in the participatory meeting is also recognized by many scholars (e.g. Innes & Booher, 2004; Mitchell, 2002; Sinclair & Diduck, 2005).

The findings regarding the provision of relevant water information to farmers and the response to farmers' concerns over water were related to the information component of meaningful public participation. As noted above, most farmers had high regard for the information they were getting from the RIO staff and a number of

farmers also mentioned that they could even consult the RIO staff at any time. Findings also showed that the RIO staff generally helped in taking notes and distributing a meeting resolution to all stakeholders, in order to equally share updated information. The prominence of adequate and accessible information in public participation is noted by Kapoor (2001), Stewart & Sinclair (2007), and Widditsch (1972).

Most of the interviewed farmers from united WUOs revealed that they cooperatively made decisions with the RIO staff regarding water allocation and distribution at the canal level. Farmers indicated that their opinions played a decisive role in the present allocation and distribution patterns, and this was an improvement from when RIO staff simply limited their roles to technical advisors. A number of farmers also specified that their united WUOs were endorsed to fully control the water gates of their secondary canals, an authorization formerly controlled by the RIO staff. These changes support the influence component by showing a shift of water management decision-making from public irrigation officials to local farmers, a delegation of authority in decision-making that serves as a cornerstone of meaningful public participation (Sidaway, 2005).

The data showed that the RID also annually allocated budgets for arranging training sessions and study tours for farmers. Most of the interviewed farmers stated that there were one or two training sessions per year (dealing with water allocation, technical skills in irrigation, administrative skills, and organic farming) provided by RIO staff. Training and study tours could also be requested by farmers. These capacity building efforts also underscore the influence component of meaningful public participation. Gaining new knowledge and skills from training sessions and study tours helps local farmers to participate purposefully and to effectively debate in

the participation process, both of which are seen as positive actions in the literature (Stewart & Sinclair, 2007).

Financial empowerment has become an important part of the sustainable reform of irrigation management, according to the literature (e.g. Helling et al., 2005; UNDP, 2006) and international experiences (Bruns & Helmi, 1996; FAO, 2007a; Garces-Restrepo, 2001; Palacios, 2000; Svendsen, 2001; Svendsen & Nott, 2000; Tortajada et al., 2006). All respondents made some comment about financial management. While the perception was varied among WUO members in Thailand, there was agreement that some fee from members is needed to make the PIM system work. Some felt that optimal financing for a WUO could be achieved by collecting a minimal water fee to cover administrative expenses and sharing the maintenance costs among related WUO members on a case-by-case basis. As most interviewed WUO committee members were volunteers, they did not receive any allowances (Kummerdpet & Sinclair, 2010). However, the president of an active IWUG provided a constructive comment regarding water fee collection:

Don't start running a WUO by focusing on money collection. Members will keep questioning the sincerity of the WUO committee. Money is a sensitive issue in every agency. Show your dedication to members first. Once the members trust you [WUO committee] the amount of collected money will not matter (Informant No. 33, personal communication, March 12, 2008).

The data also showed that there was a certain level of empowerment among local farmers because they had more power to make decisions about irrigation water through PIM incorporation. Their voices and concerns were also heard through participation in WUO meetings (see also World Bank, 2007a). The farmers that participated in this research felt that they had control of decisions about when water would be allocated and how much they would get, decisions which in the past were typically made by the RIO staff. Participants felt that they had better control of

operation and maintenance activities (Kummerdpet & Sinclair, 2010). They also indicated that they received more water information from the RIO staff, as well as technical and administrative skills through training, study tours, and fieldwork experiences. These experiences acknowledge some of the empowerment literature regarding the recognition of creating opportunities (Helling et al., 2005) and enhancing the capability of marginalized people to participate effectively (Helling et al., 2005; Lyons et al., 2001; World Bank, 2007b).

Most farmers, however, did not feel empowered in terms of new infrastructure planning, construction, and monitoring. Clearly, there is much work still to be done for PIM implementation in these phases. As well, it was noted that the RIO staff tended to establish a WUG or an IWUG hurriedly to meet key performance indicators of the Department (i.e. numbers of new WUGs and IWUGs in an area), resulting in insufficient governance structures at the local level. A fragmented agreement on WUG establishment among farmers will eventually erode the sustainability of the organization (Kummerdpet & Sinclair, 2010).

A critical lesson learned through PIM as mentioned by public irrigation staff was to listen to farmers. A valuable lesson identified by farmers was the benefit of talking about and finding joint solutions to conflicts in a community. Farmers who participated in a CBR project encouraged by the RID said that they gained more confidence in their own potential and community spirit, and felt they could solve any problems within the community instead of waiting for help from the outside. The self-confidence and community spirit were increased through the working process of the CBR project, including jointly developing a collective question, finding a resolution plan, and implementing the plan. It is evident that farmers possess the full potential to manage irrigation water, but they need opportunities and support from government

officials to be effective. Full implementation of PIM in Thailand may be still too distant to claim absolute success but, at the very least, the RID has lately shown a promising effort to accept the challenge (Kumnerdpet & Sinclair, 2010).

Chapter 6

Public participation and learning through PIM

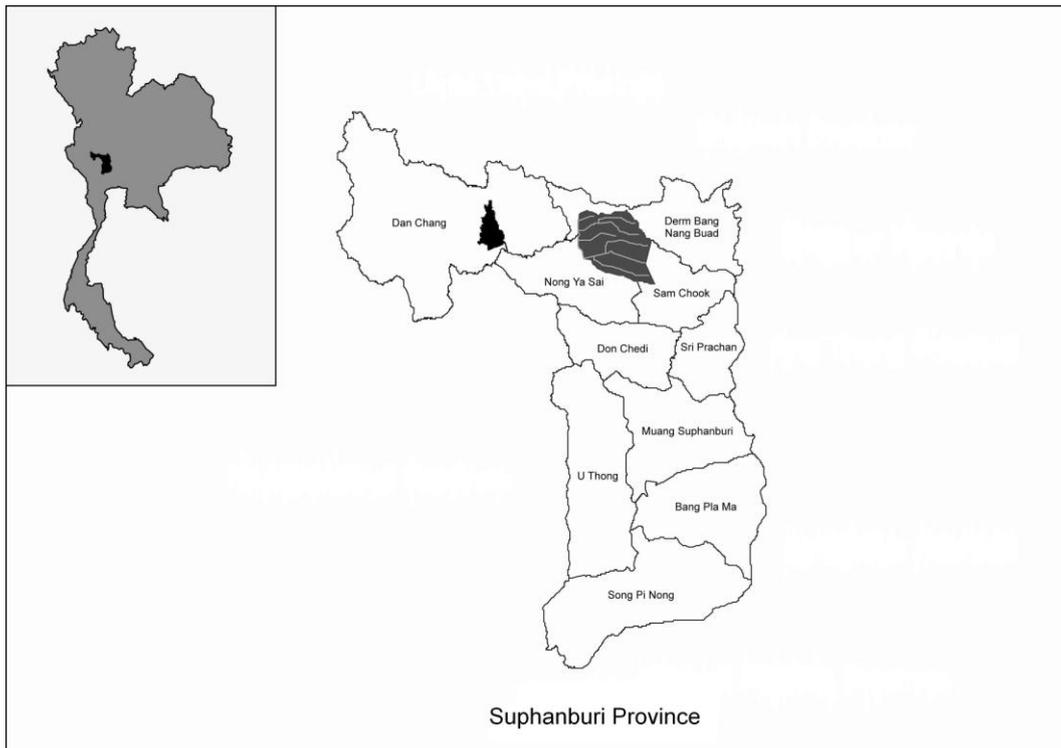
6.1 Introduction

This chapter describes the participatory nature of community involvement in WUO workings and the individual learning occurring through PIM according to the findings of the two case studies conducted. The case study settings and details are first illustrated. Second, the relationship between the target case studies and other organizations as well as the self-administration of each case study is noted. Next, the individual learning of local participants associated with PIM implementation and operation at a community level is outlined. Further, social action regarding more sustainable water practices is specified. Lastly, a discussion of how the findings relate to such theories as public participation and transformative learning is provided.

6.2 Case study settings

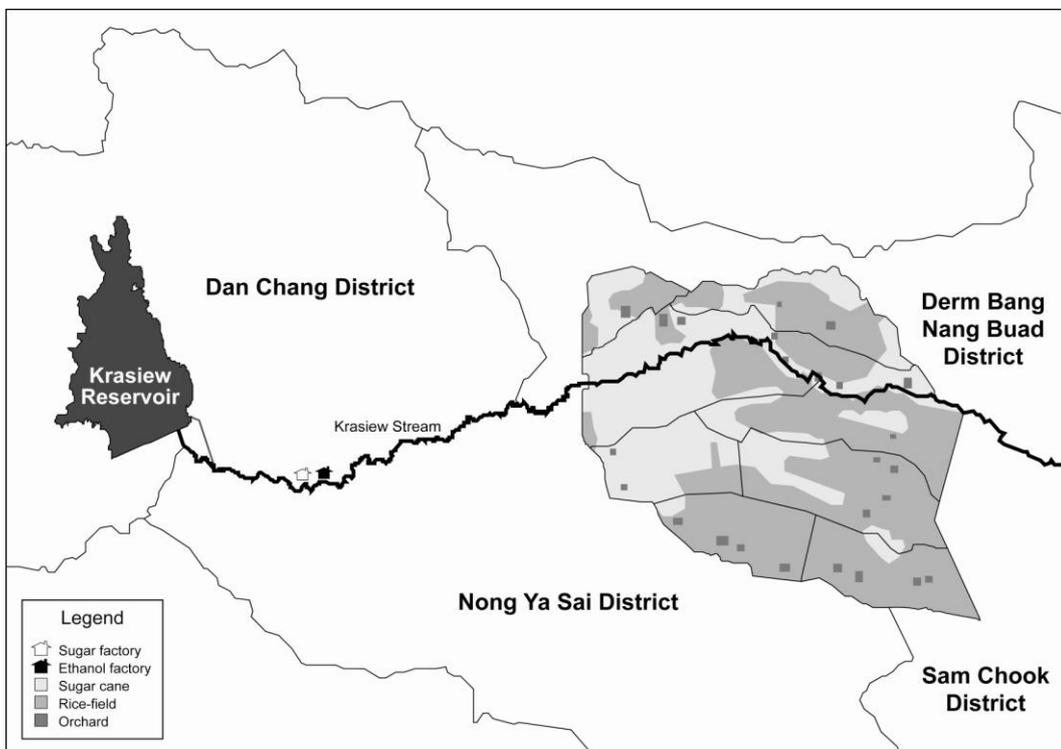
Two detailed case studies were conducted at the Krasiew Reservoir, Dan Chang District, Suphanburi Province. The Reservoir is a large-scale storage dam in the central region of Thailand with an average storage capacity of 240 million m³, of which usage water is 200 million m³. Gravity flow is used to supply water for irrigation of a 177 km² area covering three districts, 11 sub-districts, and 50 villages. The location of the case study site is depicted in Figure 6.1. The main crops in the irrigation areas are rice, sugar cane, and orchard, which account for 60%, 39%, and 1%, respectively. The cropping pattern of the Krasiew Reservoir is illustrated in Figure 6.2. The average annual water demand for different sectors of the Krasiew Reservoir is as follows: agriculture is 160 million m³ or 80% of usage water in the

Figure 6.1: Location of case study site



Source: Author.

Figure 6.2: Cropping pattern of the Krasiew Reservoir



Source: Author.

second crop season (February to June) and 120 million m³ or 60% in a major crop season (July to December); industry is 3 million m³ or 1.5%; and domestic use is 1 million m³ or 0.5%. The irrigation efficiency in the area is 50% (Krasiew O&M Office, 2009).

The Krasiew Reservoir exemplifies complete PIM implementation at all three levels, that is, reservoir, canal, and ditch levels. The Reservoir encompasses one JMC, nine IWUGs, and 278 WUGs, totaling 6,740 members. Two out of nine IWUGs, namely IWUG 2L-1R and IWUG Ruamjai Patthana, were chosen as case studies (see details in Section 3.2.2, Chapter 3). The location of case study settings and the characteristics of all IWUGs in the irrigation areas are shown in Figures 6.3 and 6.4 respectively.

6.3 Organizational relationship and administration

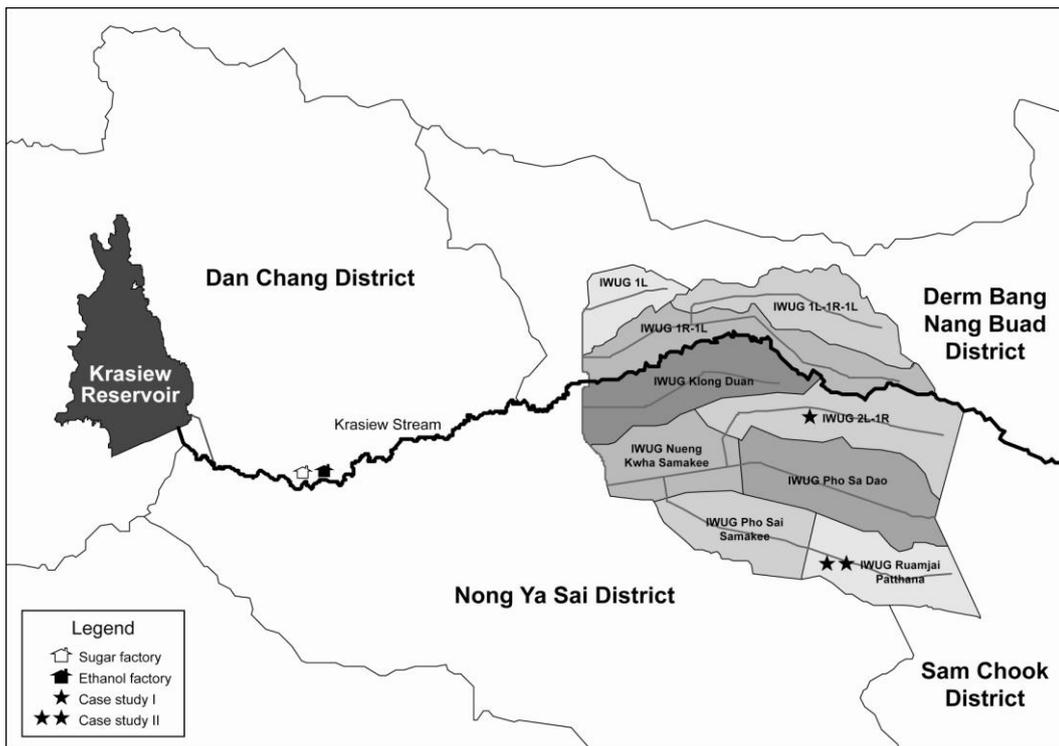
6.3.1 Organizational relationship

1. IWUG and the Krasiew O&M Office

All WUGs in the irrigation areas of the Krasiew Reservoir were formed in 1981 by staff from the On-farm Irrigation Office following the completion of ditch construction. The On-farm Irrigation Office then transferred both ditches and established WUGs to the Krasiew O&M Office. Local farmers who were WUG members were never advised of their duties and responsibilities or of how to run WUGs effectively. The delivery of irrigation water was totally managed by the Krasiew O&M Office.

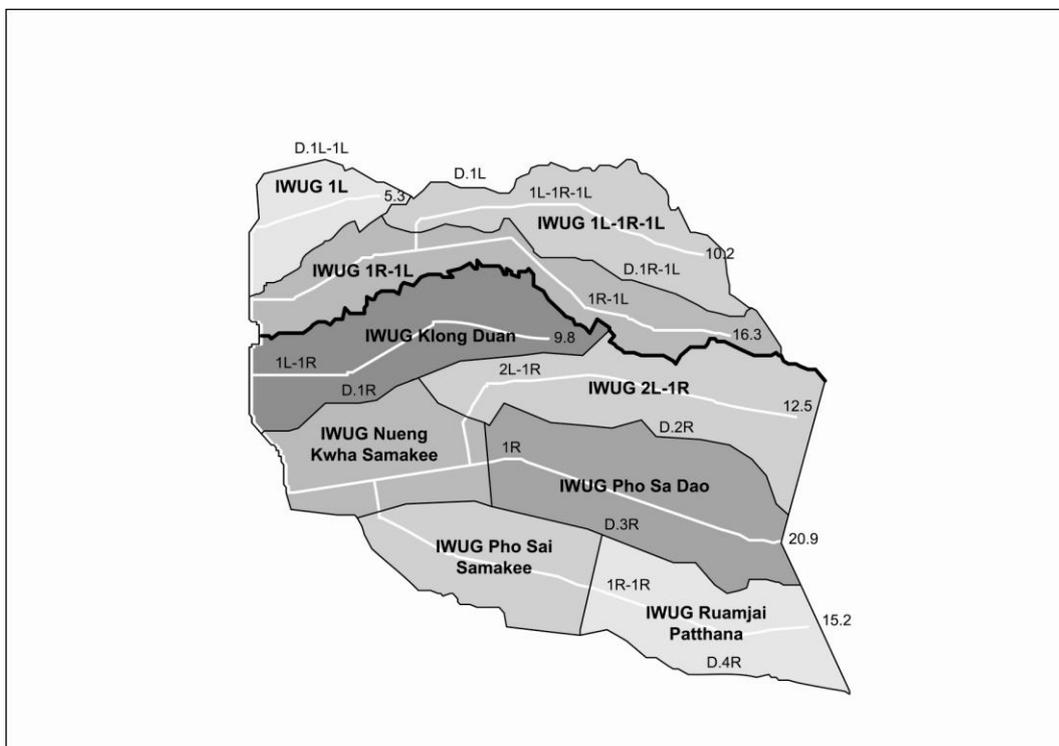
During the year 2001-2003, the Krasiew Reservoir was one of five large-scale pilot projects for PIM implementation supported by the ADB. The Krasiew O&M Office first reestablished all WUGs by hiring temporary staff known as 'Irrigation

Figure 6.3: Location of case study settings



Source: Author.

Figure 6.4: Characteristics of all IWUGs in the irrigation areas



Source: Author.

Community Organizers', who were young local residents with bachelor degrees in Social Sciences, to introduce PIM concepts and update member information in each WUG. All IWUGs and JMC were subsequently established in 2001 and 2003 with the encouragement of the Krasiew O&M Office.

At the beginning of PIM implementation, farmers found it difficult to believe that the Krasiew O&M Office would devolve decision-making power to farmers.

The image of staff at the Krasiew O&M Office has been terrible during the past 20 years. The zonemen always ordered us [farmers] to follow water rules and schedules set by public irrigation staff without solving any problems for farmers. They [zonemen] came to an area to check the water level in a canal but never had a conversation with us. They merely relied on their technical knowledge and did not listen to farmers' concerns. We knew that some farmers bribed a zoneman in order to receive water. We and staff at the Krasiew O&M Office have long been enemies because of water conflicts. (Informant No. 57, personal communication, November 25, 2008)

However, the findings show that the relationship between every WUO in the irrigation areas (i.e. WUGs, IWUGs, and JMC) and the Krasiew O&M Office has turned out to be excellent co-management due to the determination of public irrigation staff. The interviewed Krasiew staff stated that at the beginning of PIM implementation it was critical to build a mutual understanding between public irrigation staff and IWUG executive committee members regarding the PIM concept and irrigation system (Informant No. 96, personal communication, January 22, 2009). Staff at the Krasiew O&M Office now act as technical advisors by providing relevant water information in IWUG committee meetings, IWUG general meetings, and JMC meetings so that decisions can be made by these groups. After the water allocation and delivery schedule are designated by the JMC members, the final water delivery pattern (i.e. rotational or continual water delivery) at each canal is made by a majority vote among IWUG members in an IWUG general meeting. Staff at the Krasiew O&M Office help distribute the meeting notice and resolution of both IWUG general

meetings and JMC meetings via official letters and village loudspeaker announcement. The staff additionally use various means to update water information to relevant parties.

We [staff at the Krasiew O&M Office] distribute a biweekly newsletter to WUG chiefs and local leaders so they can update the water situation via personal communication and village loudspeaker announcement. We also have our own air time (i.e. one hour/three times a week) on three different local radio stations. (Informant No. 96, personal communication, January 22, 2009)

The success of PIM implementation is a tribute to the dedication of middle-level field staff from the O&M Section and Water Allocation Section at the Krasiew O&M Office as impressed by farmers,

The first couple of years of IWUG administration were very tough. I [president of IWUG 2L-1R] went through those hard times nicely by coordinating with staff at the Krasiew O&M Office, especially my zoneman. They [staff at the Krasiew O&M Office] have truly handed down water decision-making power to farmers and stepped back to be technical advisors. We are now a good team. (Informant No. 45, personal communication, November 26, 2008)

In the previous time, public irrigation staff typically made a decision about water allocation and delivery schedule without consulting us [farmers]. Now they let us decide when we need water and they help provide water accordingly. Water conflicts in this area have significantly decreased because we ourselves manage water by a joint-discussion among farmers. (Informant No. 52, personal communication, December 16, 2008)

2. IWUG and WUG

A farming plot in the irrigation areas is small so each ditch or WUG serves approximately 25 farmers. According to Asian agricultural-based society, everyone knows each other and makes frequent visits to a neighbor. Informal conversation acts as a means of communication among WUG members. An individual farmer passes on his/her needs and concerns through a WUG chief who gets a major vote from fellow farmers in the same ditch and represents them as a committee member of IWUG. An IWUG executive member is usually a person who is highly respected by farmers in

the same canal and is capable of negotiating the optimal benefit for farmers in the areas.

Early in the IWUG establishment, IWUG committee meetings were held as often as a couple of times a month due to the need to jointly draft IWUG guidelines and solving a problem proposed by a WUG chief. The draft IWUG guidelines were presented at an IWUG general meeting to get approval from IWUG members. At present, an IWUG committee meeting as well as a general meeting is arranged at least twice a year before the major and second crop seasons, or upon request in regard to an urgent issue. An IWUG committee meeting also helps distribute information to individual farmers through WUG chiefs. Other effective means of information dissemination is an announcement via village loudspeakers and local radio stations: “It becomes our [IWUG 2L-1R member] habit to listen to a village loudspeaker every day. There is local news and national news in the morning. An announcement could be any time depending on how urgent an issue is” (Informant No. 58, personal communication, December 2, 2008); and, “Our IWUG president has just become a part-time radio announcer. His station deals with agricultural issues and country music daily. If I [IWUG 2L-1R member] am curious about irrigated water, I definitely obtain information from his station” (Informant No. 62, personal communication, December 3, 2008).

An IWUG general meeting is a venue for individual farmers to meet and directly exercise their rights through voting on a certain issue (e.g. pattern and schedule of water delivery, and IWUG executive member and JMC representative nomination), posing a question, or addressing a problem. During the water delivery period individual farmers usually contact either the WUG chief or IWUG executive members in case they need more days of water delivery.

I [WUG member] live at the tail-end of a canal. If I need extra days of water delivery, I myself will call an IWUG president because my WUG chief does not have a phone. The IWUG president then contacts our zoneman to provide water accordingly. (Informant No. 51, personal communication, December 2, 2008)

An IWUG is the primary connection between the lowest level of an irrigation system, i.e. ditch, and the highest level one, i.e. reservoir. Individual farmers can also pass their concerns to the JMC members:

I [WUG member] know the date of JMC meeting from an announcement via village loudspeakers. If I have any concerns about irrigation water, I will call my IWUG president and ask him to address them in the JMC meeting. Later, the IWUG president reports the results of JMC meeting via village loudspeakers. If I am willing to join the JMC meeting, I can do so and share an opinion by myself because the JMC meeting is open to the public. I think this is a good water management system because my concerns are literally heard from ditch to reservoir levels. (Informant No. 50, personal communication, December 2, 2008)

An IWUG also links individual farmers with relating public and private agencies. The relationship between IWUG and WUG members could suitably be described as:

In the past farmers limited their concerns to a village or sub-district area. After being IWUG members and cooperating in O&M procedures, we [IWUG 2L-1R members] have changed our focus to share benefits among canal members. We now feel like we are relatives. I [WUG chief] am personally proud to be a part of IWUG committee to propel that change. (Informant No. 52, personal communication, December 16, 2008)

3. IWUG and JMC

The JMC at the Krasiew Reservoir totaling 51 committee members is comprised of 29 representatives from IWUGs, four representatives from the Krasiew O&M Office, 11 representatives from LAOs, and seven representatives from relevant public and private agencies, including four district agricultural offices, a district waterworks authority, and two factories. Twenty-nine IWUG representatives consist of three members, including an IWUG president and two nominated IWUG members,

from each IWUG and two members of non-WUG farmers called the 10th Group.

The JMC president is elected from IWUG representatives for a four-year term. The JMC meeting is organized at least twice a year before the major and second crop seasons. Final decision-making regarding water allocation and distribution at the Reservoir is based on a consensus among IWUG representatives while RIO representatives only provide technical information to JMC members. The JMC meeting is therefore a platform for individual farmers to execute their rights, through IWUG representatives, for water management decision-making at the Reservoir level. It is obvious that the JMC is mainly made up of IWUG representatives and run by an elected IWUG representative as the JMC president, and final decisions are based on a consensus among IWUG representatives:

My job [JMC president] is to facilitate a JMC meeting. I start with an open discussion with respect to a meeting agenda. Every member can freely raise a concern. If any related parties have not said a word, I then ask them to share their opinions. An argument is usual at a JMC meeting. However, all members respect a consensus among IWUG representatives at the end of the meeting.... This province is extremely influenced by local politicians. Following a resolution from JMC meetings allows me to gracefully decline a water request from local politicians and suggest them to pose the water request in a JMC meeting. . . . Meeting attendance is more than 80% because every representative does not want to miss a chance to express concerns or share opinions for a final decision. (Informant No. 82, personal communication, November 25, 2008)

Three representatives from our [IWUG Ruamjai Patthana] IWUG regularly attend the JMC meeting held before each crop season to jointly discuss the water allocation and delivery plan of the Krasiew's irrigation areas. The main discussion is normally about the water plan of agricultural sector. Representatives from each IWUG and other related parties bring their concerns to the table and mutually find a resolution. The final decisions of the water plan of agricultural sector are usually based on a consensus among IWUG representatives while JMC members from other sectors reserve their rights not to vote. Representatives from the Krasiew O&M Office help provide relevant water information and act as a secretary of the meeting. . . . Our representatives help distribute the water plan to IWUG members by personal communication and village loudspeaker announcement. (Informant No. 66, personal communication, January 13, 2009)

4. IWUG and IWUG

Every IWUG in the irrigation areas has a great opportunity to present facts and problems, exchange ideas, and update information at a JMC meeting. All obstacles and concerns in the irrigation areas are brought to the JMC meeting to mutually find a resolution or precaution. Engaging two-way communication, the JMC meeting creates understanding and a common vision among IWUGs as well as related parties. Understanding the circumstances of other parties leads to compromise to achieve the communal benefit.

The New Year's party in the irrigation areas was launched by the JMC in 2006 in order to promote companionship and unity among IWUG members. Each IWUG member voluntarily buys a ticket, US\$6, for the party. There were 1,100 participants at the 2008 party. The New Year's party at the Krasiew Reservoir is the only party of irrigated water users in Thailand (Informant No. 96, personal communication, January 22, 2009). The Krasiew O&M Office, moreover, assists IWUG members to become acquainted by arranging an annual training session or study tour for a number of representatives from every IWUG:

We [staff at the Krasiew O&M Office] believe that an ice breaker is essential for success in PIM implementation. We try to encourage them, especially a key person of an IWUG, to get acquainted by attending activities, having meals, or traveling together. Once an acquaintance is initiated, the fellowship helps pave the way to collaborate on resolving problems. (Informant No. 86, personal communication, January 29, 2009)

5. IWUG and non-WUG

Water is essential for an agricultural activity. Farmers residing outside of the irrigation areas, so called non-WUG farmers, depend solely on rainfall while farmers who stay close enough to an irrigated canal, ditch, or drainage channel usually pump water to their plots without permission. The higher cost of farming inputs, including

chemical fertilizers, pesticides, and insecticides, has spurred intense water demands among farmers. Water conflicts are common in the areas between WUG and non-WUG farmers. At the 2006 JMC meeting, JMC members requested the non-WUG farmers to officially form a group, later named the 10th Group, and delegated two representatives as JMC committee members. The 10th Group roughly covers 112 km² located adjacent to the south irrigation areas. However, the 10th Group is under the supervision of the Provincial Irrigation Office, not the Krasiew O&M Office, because it is located outside the irrigation areas of the Krasiew Reservoir. The JMC members agree to supply water for the 10th Group through natural canals for agriculture and domestic use during the wet season, while water is provided only for domestic use during the dry season.

In the past, we [non-WUG farmers] applied every possible tactic including water stealing, local political influence, and mob/gun threatening to get water from WUG farmers. Those tactics never yielded permanent results. We did get water but our relationship was definitely torn apart because of confrontation. I [president of the 10th Group] found that a sustainable approach was to arrange a compassionate communication between WUG and non-WUG farmers. . . . The JMC meeting serves as an optimal forum to exchange problems, constraints, or opinions and then jointly seek a solution. (Informant No. 84, personal communication, January 15, 2009)

6. IWUG and private agencies

Farmers firmly believed that the biggest water consumers in the areas were the sugar and ethanol factories. It was rumored that the factories bribed a director of the Krasiew O&M Office to get water, especially during a drought year. All rumors and false beliefs were substantiated by referred parties with proof of water consumption records and receipts at a JMC meeting. IWUG representatives helped disperse information by word of mouth, IWUG committee meetings, and IWUG general meetings. Now farmers know that an agricultural sector is the highest water user and that the Krasiew O&M Office sells water based on the RID's regulations,

US\$0.015/m³, to private agencies in the areas including a sugar factory, an ethanol factory, and a district waterworks authority. Farmers no longer have doubts about the transparency of the Krasiew O&M Office and private parties. The relationship between IWUG and private agencies could be best described by:

Having been accused of being one of the top water consumers for a long time, we [sugar factory] have a chance to present the facts of water utilization to farmers' representatives. . . . We can also update our annual sugar cane cutting and crushing plans in the JMC meeting. Organizing the JMC is critical to promoting a better understanding in the areas. (Informant No. 89, personal communication, February 2, 2009)

We [ethanol factory] see the JMC meeting as a medium for two-way communication which builds trust and transparency among water users. The JMC president always asks for our comments on an issue. We have never missed a JMC meeting so far. It is important to keep apprised of occurring events in the areas. (Informant No. 90, personal communication, February 6, 2009)

The JMC meeting is a great opportunity for information sharing between water supplier and water users. We [district waterworks authority] are aware of water constraints in each area. We then adjust our own water plan properly. We let IWUG representatives vote for scheduling water for agriculture. When it becomes a collective problem, the JMC members jointly find a feasible approach. . . . The JMC meeting is relaxed since we all know one another from spending an overnight together on a study tour. It is pleasant to meet a number of acquaintances at the meeting. (Informant No. 88, personal communication, January 26, 2009)

6.3.2 Organizational administration

1. Case study I, IWUG 2L-1R

IWUG 2L-1R operates irrigation water for the 12.5 km long 2L-1R secondary canal which covers an irrigated area of 21.5 km². IWUG 2L-1R also maintains every ditch in the area which consists of 31 ditches or 31 WUGs with 885 members. IWUG committee members totaling 38 individuals consist of seven IWUG executive members and 31 WUG chiefs. The IWUG executive members, including a president, two vice presidents, a secretary, a treasurer, a registrar, and a receptionist are elected

for a six-year term, but a WUG chief is a lifelong position unless prohibited by poor health. Nonetheless IWUG 2L-1R's rules allow at least five individual farmers from the same ditch to propose the dismissal of their WUG chief at an IWUG general meeting. The dismissal proposal is decided by IWUG executive members based on reasons and evidence from both sides.

The IWUG executive members are intentionally nominated from different locations throughout the coverage areas. This allows the IWUG executive members to have insight about problems over the entire area. The president of IWUG 2L-1R devolves water decision-making in a ditch to a WUG chief, however, the president promptly steps in when requested by a WUG chief. To reinforce the power of WUG chiefs, the president of IWUG 2L-1R clearly stated in the first IWUG general meeting that he would consider a problem or concern which was reported anytime by a WUG chief or by an individual farmer at an IWUG general meeting. The importance of a general meeting is, furthermore, emphasized by indicating that majority decisions at a general meeting are agreed to be final.

In the beginning of IWUG 2L-1R establishment, problems in the responsible areas were numerous because of little attention from staff at the Krasiew O&M Office. The president of IWUG 2L-1R commented on the IWUG administration:

The critical task after forming IWUG 2L-1R is to solve problems for fellow farmers. . . . The first IWUG general meeting was packed by WUG members who needed help. Our zoneman and I [president of IWUG 2L-1R] wrote down all problems and started solving problems together ditch by ditch. The support from every IWUG executive member and WUG chief who knew the areas well contributed to our success. We went to a field to see a real situation, firstly asked for resolution from a problem owner, and then discussed a practical way to resolve the problem. Many problems could not be solved by farmers alone. We sought coordination with a local leader, LAO, the Krasiew O&M Office, or other related agencies. Some problems had to wait several months for a budget to proceed. However, we always provided feedback to a problem owner. . . . It took me about three years to promote discipline among IWUG members. . . . Money is not the main issue in running an IWUG, on the other hand, money brings skepticism on financial transparency. The key

approach is dedication of IWUG committee members and public irrigation staff. (Informant No. 45, personal communication, November 26, 2008)

Staff at the Krasiew O&M Office keep their word on allowing farmers to self-manage irrigated water. At a canal level, discussion at an IWUG committee meeting results in a water allocation strategy. The IWUG committee members agree to deliver water on a rotational basis between the upper and lower parts of the canal, since the amount of available water is not sufficient for everyone. The IWUG committee members also designate how many days each part can receive water. If water is agreed to rotate on a seven-day basis, an IWUG executive member who resides at the upper canal will lead farmers from the upper areas to block water at the middle of the canal. On the eighth day, an IWUG executive member who lives at the lower canal then brings farmers from the lower areas to lift the block from the canal. The period of water delivery in each part is specified, however, farmers can extend the water delivery based upon a mutual agreement.

At a ditch level, the water allocation plan and pattern as well as maintenance tasks depend on a consensus between a WUG chief and WUG members of that ditch.

We [WUG members] jointly set a ditch rule specifying that head-end farmers shall get water first but they should sow rice seeds about the same time as tail-end farmers do. If head-end farmers want to start sowing rice seeds immediately, they themselves have to prevent water leaking into their plots without blocking water to tail-end farmers (Informant No. 58, personal communication, December 2, 2008).

After the JMC meeting, every WUG chief will receive an official letter regarding water allocation and delivery plan from staff at the Krasiew O&M Office. I [WUG chief] also know about the water plan from village loudspeaker announcement. I then arrange a meeting with every farmer in my ditch to jointly discuss about maintenance need and how to fix it. Cost sharing on a case-by-case basis is an agreed approach in the ditch. (Informant No. 57, personal communication, November 25, 2008).

In general, farmers at the head-end of a ditch get water first for plot preparation and

then let water pass to the tail-end areas. Head-end farmers usually wait until the tail-end plots receive enough water before starting to sow their rice seeds. Early sowed rice seeds can be easily damaged by water leaking from a ditch into a plot. Farmers shared their opinions about the establishment of IWUG 2L-1R and agreed that it has resulted in many improvements:

Water management has been much more efficient since the IWUG establishment. It is clear who the responsible persons for canal 2L-1R and every ditch in the canal are. An IWUG general meeting is a forum to share problems among farmers. Farmers at the head-end canal have an insight into constraints of the tail-end farmers. It creates a better understanding between the head-end and tail-end farmers, thus jointly seeking a solution to maintain mutual benefits. (Informant No. 52, personal communication, December 16, 2008)

After the IWUG establishment, irrigated water has been managed more systematically. PIM helps identify farmer representatives for every level, from ditch to reservoir. We [farmers] know how to allocate water instead of fighting for water. We have more opportunities to exchange problems among farmers through WUG meetings, IWUG general meetings, and JMC meetings. (Informant No. 61, personal communication, November 25, 2008)

The Krasiew O&M Office maintains the irrigation structures and 2L-1R canal. WUG chiefs and WUG members look after their own ditches. Farmers who cannot participate in biannual maintenance (e.g. weed control or ditch excavation) before water delivery have to pay a penalty of US\$6 per maintenance day to a WUG chief. If additional funds are required for maintenance, each WUG chief will collect money on a case by case basis from related farmers or submit a budget request to LAOs in the areas.

2. Case study II, IWUG Ruamjai Patthana

IWUG Ruamjai Patthana manages irrigation water at the lower-end (about 7 km long) of 15.2 km long 1R-1R secondary canal which serves an irrigation area for 16.6 km² as well as maintaining all ditches in the areas. This IWUG comprises 30 ditches or 30 WUGs with a total of 566 members. IWUG committee membership is

37 and is made up of seven IWUG executive members and 30 WUG chiefs. The IWUG executive membership is the same as IWUG 2L-1R but an election is for a four-year term. The position of WUG chief is a long-standing position, unless he/she is in poor health. At an IWUG general meeting, IWUG Ruamjai Patthana's rules also allow a proposal for a WUG chief's discharge from at least five individual farmers from the same ditch. The proposal outcome is made by IWUG executive members following a review of reasons and evidence from both sides.

The IWUG executive members are nominated from different locations throughout the areas to provide equal representation of problems. The president of IWUG Ruamjai Patthana delegates water decision-making in a ditch to a WUG chief, however, the president is ready to provide support when a WUG chief demands assistance, "My [president of IWUG Ruamjai Patthana] IWUG conduct is to govern like a father teaches a son. I prefer to give farmers a warning rather than a punishment" (Informant No. 64, personal communication, January 13, 2009).

Located at the lower half of 1R-1R canal, IWUG Ruamjai Patthana and another IWUG at the upper half of the canal have to share a main water gate. Consequently it takes at least two days to decrease the water level at the tail-end of IWUG Ruamjai Patthana because the main water gate is controlled by a zoneman at the upper IWUG. Presidents from both IWUGs arrange an informal meeting to jointly schedule water delivery. The upper IWUG generally takes water first for about seven days and then lets water flow through a sub-water gate, which is also situated in the upper IWUG areas, to IWUG Ruamjai Patthana for 10 days. Every ditch under IWUG Ruamjai Patthana receives water simultaneously.

Our [IWUG Ruamjai Patthana] IWUG president acts on water delivery information from the JMC meeting by discussing with the president of the upper IWUG about water allocation at 1R-1R secondary canal. We let the upper IWUG take water first. We request to have a couple more days to

receiving water because water takes more time to flow to our IWUG. . . . I [vice president of IWUG Ruamjai Patthana] would say the water situation after IWUG formation is much better because farmers now turn to talk to find a joint solution about water issues rather than applying violence to get water like the previous time. (Informant No. 65, personal communication, January 13, 2009)

IWUG Ruamjai Patthana applies practices similar to IWUG 2L-1R regarding water management at a ditch level and maintenance. WUG chiefs and WUG members are responsible for designing their own water allocation pattern and schedule for ditches. Head-end farmers in a ditch normally get water first to prepare their plots and wait to sow rice seeds at the same time as tail-end farmers. A fine of US\$6 per maintenance day is imposed for a farmer who does not participate in the biannual maintenance.

At the beginning of WUG formation, I [WUG chief] called a meeting with every farmer in the ditch. We [farmers] jointly discussed the possible ways to allocate water in our ditch. We came to a conclusion by using a consensus among WUG members. The agreed water allocation method was to let farmers at the head-end of the ditch take water first, but they needed to sow rice seeds about the same time as farmers at the tail-end did. We have followed this practice since then. (Informant No. 77, personal communication, January 13, 2009)

I [WUG chief] arrange a meeting with every farmer in the ditch to brainstorm about maintenance tasks before each crop season. Everyone can share their opinions freely. We [farmers] mutually prioritize the maintenance need and consider how we will do it. Some maintenance tasks just need labor sharing while some tasks need cost sharing. My WUG members are well-cooperative for both labor and cost sharing. (Informant No. 81, personal communication, January 14, 2009)

Many problems do exist in the areas. The location of IWUG Ruamjai Patthana creates disadvantages on the amount and timely water receiving due to water dependence on the upper IWUG. The amount of water at the sub-water gate for distribution to IWUG Ruamjai Patthana rarely meets an ideal flow of $1.7 \text{ m}^3/\text{s}$. Furthermore, irrigation water is drawn from a drainage channel in the upper IWUG

for use outside of the Krasiew's irrigation areas:

I [zoneman at IWUG Ruamjai Patthana] have worked for this IWUG for five years. A zoneman of the upper IWUG has never contacted me to cooperatively allocate water. I am always the one who tries to reach him. He usually turns his cell phone off and disappears. It makes me very upset and makes it difficult to solve problems in my responsible areas. (Informant No. 97, personal communication, January 20, 2009)

From the interviews, a number of WUG chiefs demonstrated a lack of enthusiasm and did not notify WUG members of the last IWUG general meeting. A farmer did not know his rights as a WUG member. An IWUG executive member took advantage of fellow WUG members to obtain surplus water for his own benefit.

I [WUG member] missed the last meeting because the field work ended so I did not have a chance to meet my WUG chief at the field. If we meet at the rice field, he usually informs me of some news. And my house is too far to hear an announcement from the village loudspeakers. . . . I have never known that I can discharge my WUG chief by collecting five WUG members to propose a case in an IWUG general meeting. (Informant No. 68, personal communication, January 15, 2009)

My [WUG member] house is at the tail-end of a ditch. The secretary of IWUG Ruamjai Patthana executive members, also being a village headman, lives at the head-end of this ditch. He always blocks irrigated water after he gets enough water and is ready to sow rice seeds. He does not care about other farmers in the same ditch. . . . Even a president of IWUG Ruamjai Patthana would not dare to complain to him about his behavior. (Informant No. 80, personal communication, January 14, 2009)

6.4 Learning through PIM implementation and operation

The data show that implementing PIM in a local farming community fosters learning through a core PIM activity - public participation. Individual learning by local participants associated with PIM implementation and operation was examined in the two case study regions through considering two domains of learning - instrumental and communicative. The analytical framework was based on the primary categories of instrumental and communicative learning as derived from

transformative learning theory. Secondary, theory-based subcategories were used, following Diduck & Mitchell (2003) and Sims (2008), these were subdivided into tertiary, grounded themes found within the data as outlined below.

6.4.1 Instrumental learning

Instrumental learning is learning to control and manipulate the environment or other people through empirical testing. It involves acquiring new skills, information, or scientific advice to achieve technical success. It includes using methods such as political, legal, economic, social, or administrative procedures, as well as determining the cause-effect relationships to improve task-oriented performance (Mezirow, 2000). The four subcategories of instrumental learning used were: (1) obtaining skills and information; (2) using political, legal, economic, social, or administrative procedures; (3) determining the cause-effect relationships; and, (4) task-oriented problem solving. Instrumental learning outcomes through PIM implementation and operation from the findings of two case studies are summarized in Table 6.1.

1. Obtaining skills and information

The RID incorporated PIM into the Department's Strategic Plan in 2004. PIM was a new concept to government officials so the RID needed to build understanding of the PIM concept among government officials for successful implementation, "PIM was a new concept. Related public irrigation staff were the first target group to be trained regarding PIM concept and implementation" (Informant No. 96, personal communication, January 22, 2009).

Sharing basic knowledge of irrigation systems and providing updated water information is fundamental in irrigation management. Every farmer indicated that they received new and updated information pertaining to irrigation water through IWUG general meetings, JMC meetings, newsletters, village loudspeakers, local radio

Table 6.1: Instrumental learning outcomes through PIM implementation and operation of two case studies

Primary category	Secondary category	Grounded themes
Instrumental learning	Obtaining skills and information	<ul style="list-style-type: none"> - PIM concept - Water information - Crop information - Water and cultivated management at a ditch level - Ditch drainage technique - Canal delivery technique - Ditch excavation - Water management at canal level - Teamwork skills - On-farm water management
	Using political, legal, economic, social, or administrative procedures	<ul style="list-style-type: none"> - Social norms - Equal information - Conflict resolution - Power balance - Acknowledgement of a meeting resolution - Devolution - Water management by groups and cost sharing
	Determining the cause-effect relationships	<ul style="list-style-type: none"> - Having faith in local leaders - Water saving - Pesticide saving - Ditch layout design - Uncooperative water management - Loss of trust
	Task-oriented problem solving	<ul style="list-style-type: none"> - Water leakage into a plot - Problem solving in an IWUG - Water drawn to outside irrigation areas - Building acquaintanceship - Information distribution - Water delivery checks - Two IWUGs in one canal - Seeking water supply - Problem solving outside irrigation areas - Water allocation approach outside irrigation areas

stations, or personal communication.

Now I [WUG chief] have more knowledge of how public irrigation staff manage water, how much water is left in the reservoir, and how much water is needed to serve paddy fields per crop season. Staff at the Krasiew O&M Office always provide this information at an IWUG general meeting. (Informant No. 55, personal communication, November 19, 2008)

I [WUG chief] receive a newsletter from our [IWUG Ruamjai Patthana] zoneman every two week. The newsletter updates water situation at the Krasiew Reservoir. I usually meet my WUG members at the field so I have updated water information to inform them regularly. Our zoneman also announces the water information via village loudspeakers. (Informant No. 72, personal communication, January 14, 2009)

A JMC meeting was also a venue to exchange agricultural information between JMC members, “I [JMC member/IWUG representative] have more information regarding crop trends, paddy guarantee price, and sugar cane price from a district agricultural officer at a JMC meeting. I can pass this information on to my IWUG members” (Informant No. 82, personal communication, November 25, 2008).

Some farmers were profound observers regarding the optimal water delivery and drainage and planting patterns. A number of farmers utilized the same method for water and cultivated management at a ditch level, “We [WUG members] agree that head-end farmers will get water first to prepare their plots but they have to wait to sow rice seeds until tail-end farmers complete taking water for plot preparation. This approach helps us live in harmony” (Informant No. 50, personal communication, December 2, 2008). Another farmer commented on ditch drainage technique, “We [WUG members] just drain water from our plots into a ditch. But we need to maintain a high water level in the ditch to facilitate the next water delivery” (Informant No. 61, personal communication, November 25, 2008). As well, a farmer observed that:

If we [WUG members] want tail-end farmers of a canal to get water quicker, we have to deliver water to reach the maximum level of the canal. Head-end farmers then cannot block water because it will cause flooding in their plots. Water should be delivered at the highest flow for two weeks and decreased the

flow latterly. (Informant No. 73, personal communication, January 14, 2009)

Zonemen also applied empirical study of ditch excavation and water management at the canal level in PIM operation: “Farmers often think that the deeper a ditch is, the better water flows. From my [zoneman] fieldwork experiences, that concept is wrong. If a ditch is too deep, it may cause turbulence and impede water flow” (Informant No. 99, personal communication, November 18, 2008).

When I [zoneman] started working with this IWUG I applied water delivery tests by myself. I wanted to know how far water can go and how long tail-end farmers would get water under a certain flow rate. I finally got an idea of the optimal flow rate of my canal. (Informant No. 99, personal communication, November 18, 2008)

A number of farmers and public irrigation staff identified that they had a chance to practice teamwork skills through PIM operation: “I [IWUG president] listen to ideas of my zoneman and he listens to mine as well. We each share and update information. It is fun to solve problems together to accomplish the same ultimate goal of effective water management” (Informant No. 45, personal communication, November 26, 2008). A non-WUG member also experienced instrumental learning via his on-farm water management:

I [non-WUG member] tried so many methods to get a reliable water supply because I could not access irrigated water. I found that the best way was to follow the King Bhumipol’s New Agricultural Theory by digging a farm pond. I have a number of farm ponds, which are all connected by ditches throughout the cultivated areas of 1 km². I also dug four groundwater wells as spare water supply. . . . Learning by doing and seeking knowledge are my core practices of water management. (Informant No. 91, personal communication, November 22, 2008)

2. Using political, legal, economic, social, or administrative procedures

Social procedure generally occurs between fellow farmers since agricultural communities, especially in an oriental setting, embrace high social capital. Therefore

social norms still play an important role among farmers in Thailand, “Farmers who used to care only for their own benefits have gradually changed to be more attentive use of water in accordance with fellow farmers. Criticism from fellow farmers has certain impact for living in rural areas” (Informant No. 61, personal communication, November 25, 2008).

Diverse administrative procedures (i.e. equal information, conflict resolution, power balance, acknowledgement of a meeting resolution, and devolution) were mentioned by higher levels of PIM participants including IWUG executive members, JMC members, and public irrigation officers. In terms of equal information, respondents said things like: “My [staff at the Krasiew O&M Office] principle is that everyone has to get equal information. I always inform and update water information to farmers and other stakeholders. This helps maintain transparency among relevant parties” (Informant No. 96, personal communication, January 22, 2009). In terms of conflict resolution they noted: “I [IWUG president] learn how to collaborate with related parties and how to mediate disputes between IWUG members. Some problems cannot be solved over night. I have to be patient and teach others to be patient as well” (Informant No. 64, personal communication, January 13, 2009). And, in relation to power balance they said things like:

Farmers hardly respect their fellow farmers. I [IWUG president] intensify the importance of the WUG chiefs by recognizing any water request or problems reported by a WUG chief. At the same time, the IWUG rules allow at least five individual farmers to discharge their WUG chief. This is a way of balancing power and promoting justice. (Informant No. 45, personal communication, November 26, 2008)

Acknowledgement of a meeting resolution and devolution reinforced the robust water administration as specified by most executive participants:

My [IWUG president] technique to motivate IWUG members to attend an IWUG general meeting is that I clearly state that a meeting resolution is

consented to be final. If they want to reserve their rights in an issue, they will attend the general meeting. (Informant No. 45, personal communication, November 26, 2008)

In a JMC meeting, I [JMC president] take every opinion into account and find a consensus accordingly. The meeting resolution is agreed to be final. My job is to facilitate the meeting. I have no pressure because the resolution comes from a group discussion, not my decision. (Informant No. 82, personal communication, November 25, 2008)

We [staff at the Krasiew O&M Office] usually get a water request from local politicians or other public agencies for a specific purpose outside the irrigation areas. We have a hard time denying the request. Now we easily claim that any water requests have to be approved by JMC. (Informant No. 96, personal communication, January 22, 2009)

Furthermore, a JMC representative from the sugar factory intended to apply the administrative and economic procedures learned from PIM to the factory's project of pumping station and pipe irrigation system for sugar cane growers outside irrigation areas:

Learning from PIM experiences makes me aware of what sound water management looks like. I [JMC member/sugar factory representative] plan to set a pumping station and pipe irrigation system for sugar cane growers outside irrigation areas. WUOs at the Krasiew Reservoir will serve as blueprint groups to manage the pumping station and pipe system. However, the sugar cane growers have to contribute about 10 percent of the system cost and pay water fees once the system operates. (Informant No. 89, personal communication, February 2, 2009)

3. Determining the cause-effect relationships

This instrumental learning outcome was experienced by a number of farmers and public irrigation staff. The cause-effect relationships most often learned by local farmers included having faith in local leaders, water saving, and pesticide saving, as the following exemplify:

I [IWUG vice president] used to be a village headman and now I am a vice president of LAO. Farmers know me and respect me. It helps a lot when I have to deal with farmers regarding water. (Informant No. 46, personal communication, December 3, 2008)

Attending an IWUG general meeting makes me [WUG chief] realize that the Krasiew Reservoir is a limited water source like storing water in a bucket. If we do not help save water, we may not be capable of doing second crop season. (Informant No. 56, personal communication, November 19, 2008)

If water is fertile, farmers will save money on pesticide. After rice seeds are budded for two weeks, a paddy field needs to be filled with a certain amount of water to protect other weeds. If water is too low, other weeds can grow and farmers have to apply stronger pesticide, which is more expensive. (Informant No. 57, personal communication, November 25, 2008)

Staff at the Krasiew O &M Office also learned to determine the cause-effect relationships, relating to ditch layout design, uncooperative water management participants, and loss of trust. The following capture comments made by the staff on each issue:

[Design] Irrigation areas here were not leveled before constructing ditches. This causes poor water delivery in many areas. (Informant No. 99, personal communication, November 18, 2008)

[Cooperation] Canal 1R-1R consists of two IWUGs. Water is significantly drawn to outside irrigation areas via a drainage channel of the upper IWUG. The lower IWUG, i.e. IWUG Ruamjai Patthana, has scarcely got enough water on a timely need. (Informant No. 97, personal communication, January 20, 2009)

[Trust] The main problem at the beginning of PIM implementation was building trust between farmers and public irrigation staff. Farmers had gone through bad experiences with the staff. We [staff at the Krasiew O&M Office] had to work hard by continuing our field visits and meetings. It took us 3-4 years to build such trust. (Informant No. 96, personal communication, January 22, 2009)

4. Task-oriented problem solving

A number of farmers from both case studies applied task-oriented problem solving in relation to water leakage into a plot and problem solving in an IWUG:

There were some head-end farmers that hurried to sow rice seeds before tail-end farmers completely got water. Water leaked into the plots and head-end farmers had to pump water out of their plots. Later the head-end farmers started sowing rice seeds about the same time as tail-end farmers did. (Informant No. 66, personal communication, January 13, 2009)

When somebody addresses a problem, I [IWUG president] always ask that person for a solution approach based on his/her problem insights. I subsequently go to the field, seek more information, and jointly make a decision with related parties. (Informant No. 45, personal communication, November 26, 2008)

As well, JMC members solved the problem of water drawn to outside irrigation areas by; “We [JMC members] found that water was drawn to outside irrigation areas. So we encouraged non-WUG farmers to form the 10th Group and had two representatives on JMC members to mutually reach an agreement of water allocation” (Informant No. 82, personal communication, November 25, 2008).

Public irrigation staff also learned about problem solving related to building acquaintanceship, information distribution, and water delivery checks. The staff said about building acquaintanceship; “Acquaintanceship was crucial for Thai co-workers. We [staff at the Krasiew O&M Office] then arranged an overnight study tour for the JMC members. The overnight study tour provided chances for the JMC members to do many activities together, thus getting acquainted” (Informant No. 86, personal communication, January 29, 2009). Staff at the Krasiew O&M Office increased a channel of communication by disseminating a biweekly newsletter and having their own air time three times a week on three different local radio stations (Informant No. 96, personal communication, January 22, 2009). To check water delivery in responsible areas, a zoneman explained that:

Working closely with farmers in the field, I [zoneman] have observed which plots in my responsible areas barely get water. Whenever I want to examine water delivery, I just go to the field and check those plots. If those plots can get water, it means the rest are fine. (Informant No. 99, personal communication, November 18, 2008)

The zoneman further recommended a solution to achieve better water management in case of having two IWUGs in one canal:

Two IWUGs of Canal 1R-1R have to coordinate to nurture optimal water supply for both groups. Zoneman of the upper IWUG has focused on the benefit of his own group. The lower IWUG [IWUG Ruamjai Patthana] has been left to strive for its water supply. One solution is that to assign only one zoneman and an assistant to take care of both IWUGs. (Informant No. 99, personal communication, November 18, 2008)

Farmers living outside irrigation areas, so called non-WUG members, revealed task-oriented problem solving with regard to seeking water supply, “Living outside irrigation areas is tough for farmers. I [non-WUG member] solved this problem by digging my own groundwater well. The well supplies sufficient water for both major and second crop seasons” (Informant No. 95, personal communication, January 16, 2009). They also problem solved outside irrigation areas; “To solve water fights among farmers living outside irrigation areas, local leaders should relay relevant facts to farmers. The facts include how much the water supply is, how big the areas water can serve, and how we [farmers] share water” (Informant No. 92, personal communication, January 16, 2009). The suggestion from a non-WUG farmer regarding water allocation approach outside irrigation areas was:

I am a member of the 10th Group which manages water outside irrigation areas. We have struggled to allocate water efficiently since a period of water delivery in an area depends on the authority of each local leader. The best approach is to allocate water based on cultivated areas. (Informant No. 92, personal communication, January 16, 2009)

Interestingly, thirty percent of interviewed farmers from Case study II, IWUG Ruamjai Patthana pointed out that they struggled for water supply while only six percent of interviewed farmers from Case study I, IWUG 2L-1R noted the same problem. Farmers from Case study II expressed that:

I [WUG member] live at the tail-end of the ditch. I rarely take water from the ditch because there is not sufficient water or its timing is not appropriate. I normally pump water from a drainage channel if there is water. (Informant No. 68, personal communication, January 15, 2009)

I [WUG member] live at the tail-end of the Canal 1R-1R. Water hardly comes to this ditch. I have to pump water from another natural canal even though it is costly. I have no choice. (Informant No. 79, personal communication, January 14, 2009)

On average local farmers from Case study I, IWUG 2L-1R, reflected more learning outcomes than farmers from Case study II, IWUG Ruamjai Patthana, except for task-oriented problem solving with regard to seeking water supply. This implied, and in the end the data showed, that farmers at IWUG Ruamjai Patthana encountered water shortages, thus they were forced to seek their own water supply. Likewise, the zoneman of IWUG 2L-1R showed a higher number of instrumental learning outcomes than the zoneman of IWUG Ruamjai Patthana as supported by Cranton (1997) that ability to transform experiences is totally based on personal characteristics and backgrounds.

Non-WUG members also shared some learning outcomes on every secondary category of instrumental learning, except those that related to using political, legal, economic, social, or administrative procedures to improve performance because they lacked a chance to work as a group. The greatest numbers of their learning outcomes contributed to the task-oriented problem solving in regard to seeking water supply. As well, this indicated that they strived for their own water supply. The grounded themes of instrumental learning learned by non-WUG members, i.e. on-farm water management, pesticide saving, seeking water supply, problem solving outside irrigation areas, and water allocation approach outside irrigation areas, were generally based on individual farming practices, skills, experiences, and intelligence. It became apparent that rumors about water were often spread among non-WUG members due to lack of access to reliable water information.

6.4.2 *Communicative learning*

Communicative learning is to learn what others mean when they communicate through rational discourse. It usually deals with feelings, intentions, values, and moral issues to make a tentative best judgment. It relates to coming to an understanding of the issues at hand as well as being able to negotiate for one's own values, feelings, purposes, and meanings (Habermas, 1984; Hart, 1990b; Mezirow, 2000). Five subcategories of communicative learning included: (1) understanding an issue at hand; (2) gaining a more critical understanding of themselves or situations; (3) insight into the interests of others; (4) communication strategies and methods; and, (5) comparative reflection. Communicative learning outcomes through PIM implementation and operation of the two case studies are detailed in Table 6.2.

1. Understanding an issue at hand

It was clear that an IWUG general meetings, JMC meetings, or personal talk were all good venues to exchange information and problems, thus facilitating the learning about water information and problems in the area, fellow farmers' situations, water sharing, finite water resources, water delivery techniques, and water delivery pattern. A number of farmers indicated that they learned about water information and problems in the area from JMC meetings, "JMC meetings are significant forums for exchanging information and problems regarding irrigated water. The meetings help broaden my knowledge [JMC member/LAO representative] about the water situation of every stakeholder" (Informant No. 85, personal communication, February 12, 2009). IWUG general meetings helped farmers realize the situation of fellow farmers, "Farmers have never had a chance to know the constraints of fellow farmers. They are then concerned with only their own problems. Participating in an IWUG general meeting helps them understand the situations of others and initiates empathy among

Table 6.2: Communicative learning outcomes through PIM implementation and operation of two case studies

Primary category	Secondary category	Grounded themes
Communicative learning	Understanding an issue at hand	<ul style="list-style-type: none"> - Water information and problems in the area - Fellow farmers' situations - Water sharing - Finite water resources - Water delivery techniques - Water delivery pattern
	Gaining a more critical understanding of themselves or situations	<ul style="list-style-type: none"> - Superior attitude - Poor information distribution to farmers - Lack of information sharing among RID staff - Past PIM failure - Current PIM success - Irrigated water management - Rural society - Community learning - Water crisis
	Insight into the interests of others	<ul style="list-style-type: none"> - Human nature - Farmers' behavior - Expectation from fellow farmers - Water taking practices - Caring response
	Communication strategies and methods	<ul style="list-style-type: none"> - Benefit sharing - Value sharing - Attending meetings - Fact explanation - Negotiation on water delivery - Every opinion welcome - Seeking a mutual agreement - Compassionate communication - Using different communication methods with different groups - Building rapport - Greet first
	Comparative reflection	<ul style="list-style-type: none"> - Public irrigation staff - Water service - Theoretical-based water management - Study tour benefit - Sustainable water conflict solving

farmers” (Informant No. 45, personal communication, November 26, 2008).

Attending a meeting helped a WUG member understand how water is shared in her canal, “I [WUG member] joined a meeting between the upper and lower IWUGs of Canal 1R- 1R. It was good to experience a discussion and made me understand about water sharing and period of water delivery” (Informant No. 80, personal communication, January 14, 2009). Reservoirs as finite water resources were also recognized by farmers:

In the past farmers had never been informed about the total amount of water. After IWUG establishment we [farmers] continuously learn about water from staff at the Krasiew O&M Office in an IWUG general meeting. Now we understand that the Krasiew Reservoir is a finite water source. (Informant No. 57, personal communication, November 25, 2008)

Personal conversations also provided a new water delivery technique to a zoneman, “A couple of sugar cane growers who have lots of experience suggested to me [zoneman] how to properly deliver water to sugar cane fields. I listened and applied accordingly” (Informant No. 97, personal communication, January 20, 2009). A number of farmers as well as zonemen understood a reason for current water delivery pattern in the irrigation areas:

Major crops in the irrigation areas are rice and sugar cane. The Krasiew Reservoir therefore needs to stop delivering water to facilitate sugar cane cutting. JMC members jointly schedule water delivery in a JMC meeting to ensure optimal benefit for every stakeholder. (Informant No. 99, personal communication, November 18, 2008)

2. Gaining a more critical understanding of themselves or situations

Staff at the Krasiew O&M Office and zonemen gained a more critical understanding of their weaknesses, i.e. superior attitude, poor information distribution to farmers, lack of information sharing among RID staff, and reasons for the past PIM failure, as well as their strength, i.e. current PIM success.

The staff shared the following thoughts about their weaknesses:

[Superior attitude] In the past, farmers were likely to be intimidated by irrigation field staff, especially senior staff, who held a superior attitude to farmers. Incorporating PIM requires a new attitude of public irrigation officers. (Informant No. 96, personal communication, January 22, 2009)

[Poor information] We [public irrigation staff] usually think alone and act promptly. We rarely inform related parties about what, when, how, and why we will do that. (Informant No. 99, personal communication, November 18, 2008)

[Poor information sharing at the RID] The RID uses different staff members for survey, design, construction, and operation. These staff members have never shared problems or concerns encountered in an area. (Informant No. 99, personal communication, November 18, 2008)

[Past PIM failure] WUGs were formed by the On-farm Irrigation Office once ditch construction was completed. The staff from On-farm Irrigation Office then moved to work in other places. However, farmers were not informed what their responsibilities were or how to run the WUGs. The established WUGs finally collapsed due to lack of group activities. (Informant No. 96, personal communication, January 22, 2009)

Public irrigation staff also shared their opinions about the current PIM success, “PIM success at the Krasiew Reservoir is based on participatory planning, implementing, and receiving benefit” (Informant No. 86, personal communication, January 29, 2009).

A number of farmers and staff at the Krasiew O&M Office realized that PIM was a sustainable approach to managing irrigated water:

PIM is an approach to achieve sustainable water management. Farmers who hold the highest stake for irrigated water have a chance to solve shared problems from the lowest level (i.e. ditch). This helps prevent problems occurring at the higher level (i.e. canal and reservoir). Public irrigation officers absolutely have incomparable insights in an area as farmers do. (Informant No. 83, personal communication, November 14, 2008)

As well, a number of farmers and a zoneman recognized issues around the workings of rural society, “Residents in rural communities mostly know each other. We feel

like brothers and sisters. Courtesy is the norm in our community” (Informant No. 57, personal communication, November 25, 2008) and community learning opportunities, “Community learning rests on living together and seeing the success of neighbors, not merely on listening to advice from public officers” (Informant No. 99, personal communication, November 18, 2008). A water crisis also fostered learning as recognized by a zoneman and some farmers, “A water crisis makes people save water and makes WUOs stronger because farmers strive to survive” (Informant No. 99, personal communication, November 18, 2008).

3. Insight into the interests of others

Water management is tough because farmers are challenged to share water with others. Participating in PIM activities consequently provided insight into others’ interests. A number of farmers and a zoneman had an insight into the primitive reaction of humans with respect to survival and fulfilling one’s own needs which caused unpleasant behavior, “I [WUG member] understand human nature. If farmers who live at the head-end ditch are sure to get water, they are not as enthusiastic as tail-end farmers to assist in ditch excavation” (Informant No. 62, personal communication, December 3, 2008).

Also, a number of farmers, who served as either WUG chiefs or IWUG executive members and lived in the same area, offered the following insights that they had learned:

[Farmers’ behavior] I [WUG chief] am familiar with fellow farmers’ behavior. They only show up when they want to complain or seek help. (Informant No. 60, personal communication, November 25, 2008)

[Expectation from fellow farmers] At the beginning of IWUG establishment, fee collection is not the heart of governing. Rather it causes distrust regarding financial transparency. I [IWUG president] must demonstrate better water management to members first. (Informant No. 45, personal communication, November 26, 2008)

[Water taking practices] The former head of O&M Section at the Krasiew O&M Office encouraged farmers to follow theoretical water delivery by letting tail-end farmers get water first. I [IWUG registrar] promptly responded that it was impossible to do that because nobody would allow water to pass his/her plot without taking water. . . . In our canal we agree to let head-end farmers take water first for seven days and then pass water to tail-end farmers. It has worked out very well for us. (Informant No. 47, personal communication, December 3, 2008)

Staff at the Krasiew O&M Office who worked closely with farmers learned that offering a caring response, like being attentive inquiries about farmers' problems was more crucial than the successful solution, "Sometimes farmers do not expect an immediate solution from public irrigation staff. They, however, do need a caring response of attentive inquiries from the staff" (Informant No. 96, personal communication, January 22, 2009).

4. Communication strategies and methods

Allocating water demands a mutual discussion, negotiation, or mediation between stakeholders. Most farmers, especially farmers who were WUG chiefs, IWUG executive members, and JMC members, learned to pursue effective interpersonal communication to achieve their ultimate goals. Different communication strategies were identified and used by participants, such as:

[Benefit sharing] Whenever my WUG members fight for water, I [WUG chief] act as a mediator to maintain benefit for both sides. (Informant No. 52, personal communication, December 16, 2008)

[Value sharing] I [WUG chief] create water collaboration by addressing a shared value (e.g. same hometown, school, or teacher) between me and a fellow farmer. It did turn an opponent into a friend of mine. (Informant No. 78, personal communication, January 13, 2009)

[Attending meetings] If it is an important issue, each stakeholder should receive equal information. Attending a meeting is the key to receiving equal information and to facilitating a joint discussion. If we [farmers] do not talk, we definitely cannot solve a problem. (Informant No. 45, personal communication, November 26, 2008)

[Fact explanation] A group of farmers outside irrigation areas together with a local politician attended an IWUG general meeting to force me [IWUG president] to let water go to outside irrigation areas via a drainage channel. I did not deny their request but I calmly explained the facts of water supply. I compared the amount of water supply to a plate of rice and asked them to ponder how many people we could feed by that plate. Finally they understood that water was limited and left peacefully. (Informant No. 64, personal communication, January 13, 2009)

Fact explanation was also adopted as a strategy by public irrigation staff to facilitate water management in the irrigation areas, “Our [staff at the Krasiew O&M Office] projected water supply and demand for each sector is based on statistics. It serves as basic information for JMC members to jointly allocate water in a JMC meeting” (Informant No. 86, personal communication, January 29, 2009). Negotiation on water delivery was another method used by few farmers:

I [WUG chief] used to argue with the former head of O&M Section at the Krasiew O&M Office about storing water in a drainage channel. He told me that a drainage channel was not a delivery canal so it was supposed to drain water from an area. I replied that it did not matter as long as it supplied water for tail-end farmers. It took me at least four days to get water from a ditch while I got water right away from a drainage channel. (Informant No. 60, personal communication, November 25, 2008)

However, the top three strategies mentioned by most farmers were: every opinion welcome, “In an IWUG general meeting, everybody can freely give a comment or concern at the end of the meeting. The IWUG president then finds a majority vote if it is a common issue” (Informant No. 50, personal communication, December 2, 2008); seeking a mutual agreement, “If water is not sufficient for the entire IWUG, I [IWUG president] will compromise by arranging water zones and seeking a mutual agreement on how long each zone will get water on a rotational basis” (Informant No. 64, personal communication, January 13, 2009); and compassionate communication:

I [WUG chief] believe talking is the key to live peacefully together. Once you

start talking compassionately, it makes you open your heart to listen to the interests of others and then understand the situations of fellow farmers. Every problem can be solved cooperatively. (Informant No. 57, personal communication, November 25, 2008)

A non-WUG member also applied compassionate communication to convince JMC members to share water with farmers outside irrigation areas:

Getting permission from all IWUG representatives in a JMC meeting to share water with the 10th Group was not easy. Previous local leaders employed both violence and political power to get water continuously and they totally failed. I [the 10th Group president] contrastingly provided the facts of water shortage in my areas. Then I humbly asked for sympathy from every IWUG representative in a JMC meeting. It worked!! (Informant No. 84, personal communication, January 15, 2009)

The following strategies were mainly exercised by public irrigation staff to enhance communication: using different communication methods with different groups, “Water discussion among public irrigation staff should be based on reasons and water principles, while the discussion with farmers should simplify all technical terms” (Informant No. 99, personal communication, November 18, 2008); building rapport, “General greeting is a great way to start a conversation with farmers. I [zoneman] can talk to farmers about any issues. A frequent visit is another key to building rapport with farmers” (Informant No. 99, personal communication, November 18, 2008); and greet first, “Whenever I [staff at the Krasiew O&M Office] go to a field, I always greet and pay respect to farmers first. Farmers feel more relaxed because I give them a warm welcome” (Informant No. 96, personal communication, January 22, 2009).

5. Comparative reflection

Incorporating PIM into a local farming community provided first-hand experiences for farmers to make a comparison between before and after PIM implementation. All local farmers associated with PIM received great satisfaction

from more friendly and helpful public irrigation staff, “In the past, public irrigation field staff were so arrogant. They rarely talked to farmers. The current staff are excellent. They are friendly and helpful” (Informant No. 51, personal communication, December 2, 2008). Almost all interviewed farmers as well as public irrigation staff confirmed that water service delivery in the irrigation areas was much better:

I [IWUG vice president] am very satisfied with the present water management. In the past, final water management decision-making totally depended on public irrigation staff. This was troublesome because water delivery rarely met the amount and timely needs of farmers. Now farmers have power to schedule and allocate water delivery. (Informant No. 46, personal communication, December 3, 2008)

Staff at the Krasiew O&M Office affirmed that, “Farmers have greater insights of problems in an area than a zoneman. They, moreover, know how to deal with their fellow farmers” (Informant No. 96, personal communication, January 22, 2009).

Few farmers criticized public irrigation staff for following only water management theory, and thus lacking a sense of the need for modifying the theory to suit the reality of a farming community. On the contrary, farmers were fully equipped with area insights and farming experiences. Farmers therefore favored managing water on a practical basis, “Public irrigation staff normally utilize only theory to manage water. They lack a sense of modification to a real situation, while farmers are based on practical water management” (Informant No. 45, personal communication, November 26, 2008).

A number of farmers who participated in a study tour showed critical reflection based on experiences from visiting different places and were better able to prepare a feasible application:

A study tour held by staff at the Krasiew O&M Office was beneficial. I [IWUG registrar] observed everything from distinctive topography and culture to the study tour’s objectives. I always compared my areas to study tour areas. Visiting a successful site provided farmers a chance to exchange experiences

first hand. I later modified the most suitable approach to myself and my community. (Informant No. 47, personal communication, December 3, 2008)

Additionally, most interviewed participants from both local farmers and public irrigation staff agreed that holding joint discussions among stakeholders was a sustainable way of solving water conflicts, “Having a joint discussion is a sustainable approach to solving water conflicts. Applying violence only solves a problem at a time and potentially intensifies the conflicts” (Informant No. 63, personal communication, January 6, 2009).

In conclusion, local farmers from Case study I, IWUG 2L-1R, showed more learning outcomes than farmers from Case study II, IWUG Ruamjai Patthana. The zoneman of IWUG 2L-1R, again, expressed more communicative learning outcomes than the zoneman of IWUG Ruamjai Patthana. Personal characteristics and backgrounds of each zoneman definitely play an important role in critical reflection of their experiences (Cranton, 1997).

Non-WUG members or the 10th Group revealed only two grounded themes of communicative learning, i.e. gaining a more critical understanding with regard to water crisis and communication strategies and methods in relation to compassionate communication, of which pertained to personal experiences. This may be caused by lack of a strong communicative pattern like WUG establishment, WUG meetings, or IWUG general meetings to initiate a valuable discussion among non-WUG members. The lacking communicative pattern mainly results from the 10th Group has not been closely guided by a responsible RIO, the Provincial Irrigation Office.

6.5 Sustainable water practices

One area of particular interest to this research is the connection between

participation and learning through PIM and sustainable water practice outcomes. It was apparent that local farmers who participated in PIM activities, e.g. IWUG general meetings or JMC meetings, obtained both basic and updated water information including: the total amount of water in the Krasiew Reservoir; how much water could be used; how much water would be needed for agricultural sector per crop season as well as other relevant sectors; and how much water could be saved if the agricultural sector applied water delivery on a rotational basis as mentioned by farmers:

Staff at the Krasiew O&M Office always inform us [farmers] in an IWUG general meeting about the total amount of water, how much water we will use for one crop season, and how much water will be left for the next crop season. If we do not save water now, we may not have enough water for the coming plot preparation. (Informant No. 45, personal communication, November 26, 2008)

This information developed an understanding of a reservoir as a finite water resource through a complete picture of water supply and demand. Accordingly water saving awareness was created among farmers in order to protect their own benefit of maintaining water supply for both crop seasons, “Water saving starts from learning in IWUG general meetings that water in the Reservoir is limited. We [farmers] know the amount of water supply and water needed for agriculture. We then cooperatively save water for the next crop season” (Informant No. 50, personal communication, December 2, 2008). Sustainable water practices done by farmers in the irrigation areas, i.e. head-end farmers getting water first, storing water in a drainage channel, embracing a sense of water saving, applying water delivery on a rotational basis, taking good care of one’s own plot dikes, and phoning public irrigation staff immediately when water is surplus, are portrayed as the followings:

Staff at the Krasiew O&M Office try to convince us [farmers] that tail-end farmers at a ditch should get water first based on a water delivery theory. We insist that taking water like that definitely uses more water than usual for growing rice because we apply a sowing pattern in this area. After finishing

plot preparation, water must be completely drained. We then start sowing rice seeds and wait until rice plants grow enough before re-inundating our plots. If tail-end farmers get water first, water that needs to be drained will go directly to a drainage channel at the end of a ditch. We totally waste water. If head-end farmers take water first, water from the upper plots will drain into a ditch, add to the water amount in the ditch, and then flow through the lower plots. This practice helps save a lot of water and we continue doing it. (Informant No. 57, personal communication, November 25, 2008)

I [president of IWUG Ruamjai Patthana] had to contact so many RID offices including the Krasiew O&M Office, the RIO 12, and the RID headquarters to get permission to build a water gate to store water at this drainage channel. The RID was reluctant to allow me to proceed because a drainage channel was supposed to drain water, not store water. It was worth investing since water stored by this drainage channel has served cultivated areas of more than 3 km². If we did not store water in the drainage channel, water would flow wastefully into a river. (Informant No. 64, personal communication, January 13, 2009)

Forming an IWUG promotes water saving among farmers. I [president of IWUG 2L-1R] would say farmers become more serious about wasteful water than public irrigation staff do. If the tail-end of the canal gets surplus water, either a WUG chief or a WUG member who resides in that area will immediately call me in order to submit a decrease or stop request to our zoneman. . . . Farmers now feel bad to see water wasted. They would prefer to save water for their future farming. (Informant No. 45, personal communication, November 26, 2008)

Farmers are informed by staff at the Krasiew O&M Office in an IWUG general meeting that applying a rotational method, which involves stopping water delivery intermittently, can save about 15 million m³ of water per crop season. As a result, farmers always have a mutual agreement on taking water on a rotational basis in the IWUG general meeting held before each crop season. (Informant No. 66, personal communication, January 13, 2009)

It becomes our [WUG members] habit to clear weeds from a plot dike. Thus, we can easily see whether water leaks from our plots and be able to fix leaks promptly. We try our best to save water for the sequential cultivation. This ditch is about 1.5 km long which serves roughly 30-40 farmers. Even though I live at the tail-end of the ditch, I can get water at about the same time as head-end farmers. (Informant No. 58, personal communication, December 2, 2008)

I [assistant of WUG chief] live at the tail-end of the ditch. If it rains at night in the area, I always check water level of the ditch in the morning. If the ditch is overflowed, I will immediately call staff at the Krasiew O&M Office to report the situation and ask them to lower a water gate. Nobody asks me to do this. I just feel doing it myself. . . . I regularly call staff at the Krasiew O&M Office to inquire about water information. We [staff at the Krasiew O&M Office and I] are good friends. (Informant No. 73, personal communication, January 14,

2009)

It should be mentioned that the 2005 water crisis in the irrigation areas was another factor that triggered recognition of the need for water saving among farmers. That year no farmer could plant the second crop due to insufficient water supplies. First-hand experiences of water shortage played a decisive role in changing farmers' behavior. Further discussion about how participation and learning through PIM leads to more sustainable water practice outcomes in the irrigation areas of the Krasiew Reservoir can be found in Section 6.6.4.

The sustainable water practices implemented by farmers in the irrigation areas of the Krasiew Reservoir helped the Reservoir save water at least 15 million m³ per crop season, or 30 million m³ per year, as the result of the application of a rotational water delivery pattern. Storing and using water in a drainage channel for farming was another way that irrigated water was used effectively before returning water to a natural waterway. These practices indicated that the Reservoir would finally draw less water from the Krasiew stream in the catchment area. The steady water saving in the irrigation areas also made the JMC confident about the notion of sharing more water beyond a mandated flow with farmers outside irrigation areas that covered some 112 km². In addition, the unpredictability of the current weather patterns placed a strong impact on farming practices which may in turn put more stress on the water available in the reservoir, making sustainable and efficient use all the more important, as realized by a number of farmers:

When I [WUG chief] was a kid it rained regularly and the rainfall was decent for growing rice. During the past decade the rain has been more scattered and unpredictable. The rainfall has scarcely been sufficient for farming. If we [farmers] do not have the reservoir, we are certainly in a big trouble. (Informant No. 57, personal communication, November 25, 2008)

At this point in time, however, neither the JMC nor RID has fully considered options for restoring ecological services with the water savings.

6.6 Discussion

The findings from two case studies conducted in Thailand reveal a number of interesting outcomes in relation to meaningful public participation, empowerment, and transformative learning. A discussion of the findings is structured around these three aspects of the literature and theory reviewed. Consideration of critical transformative learning, as noted in Section 2.4.2, Chapter 2, provides the link between the findings and the gaps established in transformative learning, including application of the theory in a cross-cultural context, considering marginalized voices, rationality of the learning process, and social action contributions.

6.6.1 Meaningful public participation

The success of PIM implementation and operation at the Krasiew Reservoir reflects for the most part the essential elements of meaningful public participation, namely initiation, inclusiveness, information, and influence as mentioned in Section 2.2.2, Chapter 2. The initiation element involves the sincerity and perseverance of the lead agency and the purposes of public participation. Learning from past PIM failures during the years 1963-2000, as well as from the ADB's pilot projects during the years 2001-2003 by the RID has remarkably influenced PIM modification and current implementation approaches. PIM implementation introduced by the RID in 2004 offered a clear policy to achieve an ultimate goal - the WUO and LAO involvement in irrigation management decision-making for the entire irrigation system, from a reservoir or water resource to on-farm irrigation or ditches (RID, 2005c). Current PIM guidance in the RIO staff manual, the farmers' manual, a cartoon-style booklet,

DVDs, brochures, and guided WUO rules, are more responsive to the local constraints and different targets of PIM participants. The PIM guidelines, moreover, provide a step-by-step optional implementation approach to reach the ultimate goal. The clear PIM purpose and identification of the desired level and timing of participation and identification of the final decision-maker assisted in specifying the common target and direction between key players to mutually achieve successful public participation. This methodology is highly supported in the literature (e.g. Sidaway, 2005; Stewart & Sinclair, 2007; Wilcox, 1994).

However, a sound PIM policy from RID headquarters could not be implemented without dedicated action. Staff at the Krasiew O&M Office, specifically middle management field staff, should be applauded for their commitment to PIM implementation. From the outset, field staff - supported by an explicit policy and timeline from the RID - tirelessly worked with farmers to form the potential WUGs, IWUGs, and JMC in the irrigation areas. Modified techniques and strategies, such as hiring Irrigation Community Organizers, initiating an ice-breaking study tour, hosting a New Year's party, and learning by doing, were used to increase PIM knowledge and harmony among local farmers. A field staff member who was extremely involved in PIM implementation and operation indicated that,

I [staff at the Krasiew O&M Office] think PIM is a great concept. . . . I feel like PIM is my child which I have raised since the beginning. . . . I am sure that if I work here, PIM will not fail because I will make every effort to nurture PIM activities even though lacking budget. (Informant No. 96, personal communication, January 22, 2009)

Patience and perseverance of the lead agency staff served as a driving force to turning the policy into practice. The importance of these traits in carrying out a good public participation process is recognized by Mitchell (2002).

Inclusiveness considers the way that all stakeholders are engaged and whether

authentic dialogue among related parties is created. Staff at the Krasiew O&M Office first hired Irrigation Community Organizers to restore all established WUGs that took care of ditches and to introduce the PIM concept to individual farmers. The staff then convinced farmers to form IWUGs and a JMC to manage water at canal and reservoir levels, respectively. The JMC members included representation by all who related to water usage from the Krasiew Reservoir, such as farmers from every irrigation canal, LAO from every sub-district under the irrigation areas, a district waterworks authority, a sugar factory, an ethanol factory, district agricultural offices, and staff at the Krasiew O&M Office. The JMC members later encouraged farmers outside irrigation areas to organize the 10th Group and delegated two representatives to be JMC members in order to more effectively share water between farmers inside and outside of irrigation areas. Engagement of all affected parties in the irrigation areas provides a better opportunity to collect problems and opinions from every stakeholder, which can lead to discussion and jointly finding mutual solutions. The importance of meaningful engagement is echoed by several authors (e.g. Creighton, 2005; Innes & Booher, 2004; Kapoor, 2001; Stewart & Sinclair, 2007; Widditsch, 1972) and it is the heart of the public participation process.

Meeting dates and locations are determined by a consensus between relevant parties. Members are reminded about one week before the meeting date by various means, including an official letter, a village loudspeaker announcement, the local radio station, and word of mouth. Meetings held at a time and place convenient to all participants (Widditsch, 1972) and fair notice (Stewart & Sinclair, 2007) are considered by scholars to enhance the possibility of including all interested and affected parties in a meeting.

The unlimited-time open discussion at the end of IWUG general meetings and

JMC meetings makes members feel they are being recognized and treated equally. Seeking to address the interests of all participants and treating participants equally are both encouraged by a number of authors (e.g. Innes & Booher, 2004; Mitchell, 2002; Webler et al., 2001), as these techniques promote inclusiveness, the identification of diverse concerns and a sense of belonging. A president of the JMC who seeks an opinion from every stakeholder in a JMC meeting demonstrates the technique of meeting engagement among members. In addition, staff at the Krasiew O&M Office help build rapport between JMC members and public irrigation staff by arranging an overnight study tour. Making acquaintances between stakeholders is a key ingredient in promoting successful PIM implementation and operation in the irrigation areas. The multiple and appropriate techniques used to engage all interested parties conform to the literature (e.g. Creighton, 2005; Stewart & Sinclair, 2007).

Authentic dialogue, which is an essential part of the inclusiveness element, was noted in the JMC meeting and IWUG general meeting attended. Every JMC member can freely bring their opinions to the table while others listen respectfully. Later, the JMC members collaboratively seek a solution to every concern. All interviewed JMC members said that arguments are common at a JMC meeting. However, at the end of the meeting, every JMC member has high regard for a resolution that comes from a consensus among JMC members. Likewise, the IWUG president, specifically IWUG 2L-1R, always introduces an open discussion at an IWUG general meeting. IWUG members are free to raise their concerns in the general meeting and subsequently find a mutually-acceptable resolution. A number of authors (e.g. Innes & Booher, 2004; Mitchell, 2002; Stewart & Sinclair, 2007; Webler et al., 2001) consider authentic dialogue as critical to facilitating a thorough discussion and initiating mutual learning among stakeholders.

The provision of adequate information was revealed in a number of ways throughout the study. Staff at the Krasiew O&M Office acknowledge the importance of sharing information equally by providing updates via newsletters, village loudspeaker announcement, local radio stations, IWUG general meetings, and JMC meetings. Information on subjects such as water supply and demand and irrigation techniques helps farmers and other parties to understand the current water situation and subsequently to make reasonable decisions about water administration. Updated information provided to every party by staff at the Krasiew O&M Office is a public display of the respect the irrigation officers show every stakeholder, which helps accomplish the PIM's ultimate goal. Scholars including Kapoor (2001), Stewart & Sinclair (2007), Widditsch (1972), and Sidaway (2005) regard adequate and equally accessible information as critical to achieving meaningful public participation, since the relevant information helps stakeholders to participate effectively in the decision process.

Having influence on decisions requires having early and ongoing participation and feedback to participants. Staff at the Krasiew O&M Office completely devolve water decision-making of the entire irrigation system to established WUGs, IWUGs, and JMC and serve as technical advisors. The IWUG general meetings and JMC meetings held before the major and second crop seasons to decide on a pattern and schedule of water delivery show that established WUOs can influence decision-making. A mutual agreement among farmers at WUG, IWUG, or JMC meetings which is agreed to be final confirms that individual farmers hold power in water decision-making in the irrigation areas. Sidaway (2005) agrees that the devolution in decision-making is central to meaningful public participation.

The regular IWUG general meetings and JMC meetings facilitate two-way

communication between stakeholders to enhance knowledge regarding water and agriculture. Training sessions and study tours for related PIM participants held by staff at the Krasiew O&M Office show the effort to build more relevant knowledge among stakeholders. The meetings, as well as individual communication, are channels to provide feedback to any requests or concerns from participants. Support for building more knowledge among participants and providing feedback to them is deemed necessary in the literature to enhance the competence of stakeholders to participate productively (e.g. Stewart & Sinclair, 2007; Widditsch, 1972).

6.6.2 Empowerment through PIM implementation

Empowerment for marginalized people is based on improvements in how their voices will be heard and how they will have more power in making decisions that affect their lives, as detailed in Section 2.2.3, Chapter 2. It is obvious that local farmers are empowered through PIM implementation. Voices of marginalized farmers are being heard by responsible government officials, i.e. staff at the Krasiew O&M Office, through IWUG general meetings and JMC meetings. Final decisions on water are being made by a mutual agreement among individual farmers or farmers' representatives to direct water schedules and delivery patterns at all levels, i.e. ditches, canals, and reservoir, at WUG meetings, IWUG general meetings, and JMC meetings, respectively.

It can be said that PIM creates opportunities for marginalized farmers to access relevant and timely information regarding water and agriculture, to share water problems and concerns with public irrigation staff, to be treated as valuable personnel with a right to speak and be listened to, and to influence decision-making in irrigated water delivery, thus refining service accountability. Such opportunities for marginalized farmers are signals of empowerment well recognized in the literature

(e.g. Helling et al., 2005; World Bank, 2002; World Bank, 2007a; UN-Water, 2005).

PIM, moreover, enhances the capability of marginalized farmers at both individual and collective levels. At an individual level, local farmers embrace additional capability by having increased access to water and agriculture information, by developing skills through training sessions and study tours held by staff at the Krasiew O&M Office, and by learning experiences from practical O&M. Helling et al., (2005), Lyons et al., (2001), UNDP, (2006) and others argue that individual capacity building is vital for empowering marginalized people to participate meaningfully.

At a collective level, PIM activities such as meetings and maintenance tasks help reinforce or build networks, norms, and social trust among local residents, thereby laying a foundation for further collective action. The significance of collective capacity building through establishing networks, norms, organizations, and social trust is illustrated in the literature (e.g. Putnam et al., 1993; World Bank, 2007b). In addition, social norms become one grounded theme of instrumental learning outcomes and rural society is found to be one grounded theme of communicative learning outcomes through PIM implementation and operation. A number of farmers and public irrigation staff indicated that applying social norms and living in a rural society serve as means to encourage alignment among local farmers. A close relationship between fostering high degrees of social capital (i.e. establishing networks, norms, organizations, and social trust) and success in local development and participatory natural resources management is mentioned by a number of authors (e.g. Amornsanguansin, 2005; Narayan, 1997; Pantoja, 2002; Reid & Salmen, 2002). As such, marginalized farmers are empowered by the implementation of PIM to obtain increased opportunities and capabilities to participate effectively in irrigation water

delivery.

6.6.3 Learning through PIM implementation

The key concepts of transformative learning are reviewed in Section 2.4.1, Chapter 2. Instrumental learning significantly relies on personal experiences in order to control and manipulate the environment or other people to meet an objective. The nature of an agricultural career is inherently empirical by means of the better the observer, the greater the success in farming. Even local farmers who are non-WUG members experienced instrumental learning, especially task-oriented problem solving related to water supply, by applying trial and error on their own farms. However, as the data revealed, PIM implementation explicitly creates opportunities for instrumental learning: obtaining skills and information; using political, legal, economic, social, or administrative procedures; determining the cause-effect relationships; and task-oriented problem solving among PIM associates through PIM activities (e.g. WUG meetings, IWUG committee meetings, IWUG general meetings, JMC meetings, water allocation, maintenance tasks, conflict resolution, training sessions, and study tours).

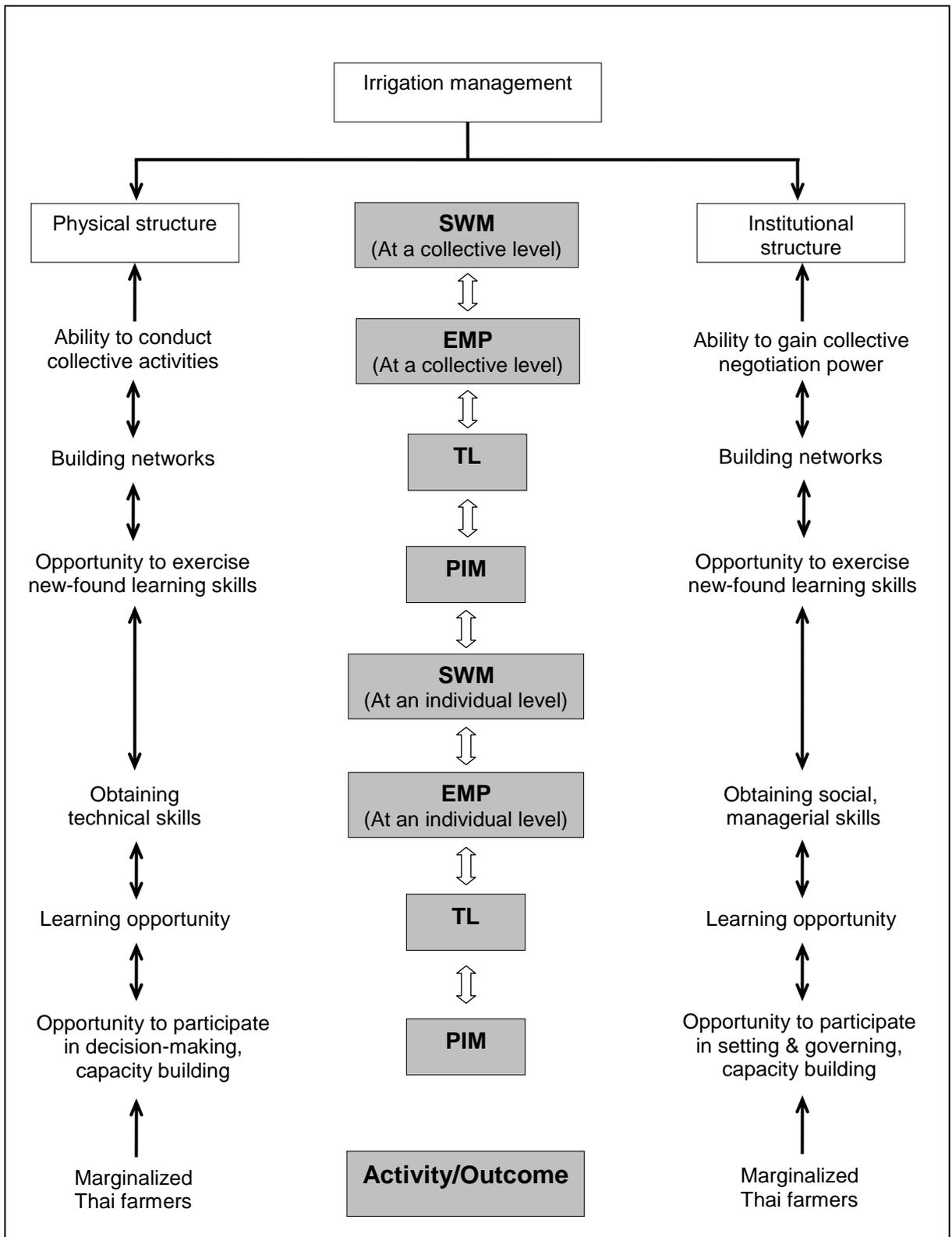
Communicative learning can be achieved through rational discourse, which pertains to free, full participation in empathic dialogue. PIM activities such as WUG meetings, IWUG general meetings, JMC meetings, O&M tasks, training sessions, and study tours undoubtedly contribute to communicative learning among farmers as well as other related PIM participants. It is apparent that IWUG general meetings and JMC meetings are forums which create authentic dialogue by fulfilling the ideal conditions for discourse mentioned in Section 2.4.1, Chapter 2. At the IWUG general meetings and JMC meetings, staff at the Krasiew O&M Office provide accurate and complete information to every stakeholder in order to allow for proper decision-making related

to water management. The IWUG and JMC presidents not only encourage meeting attendants to voice their opinions but also introduce open discussion at the end of the meetings to offer equal opportunity for participation. Having an opportunity to listen to issues of other relevant parties at the meetings develops a better understanding of the interests of others, thus initiating mutual learning among stakeholders. Such mutual learning leads to jointly seeking a solution to maintain the optimal benefit for every stakeholder.

Upon reflecting on the findings, my view is that PIM is considered a venue to facilitate learning, empowerment, and sustainable water management as illustrated in Figure 6.5. Through PIM implementation and operation, marginalized Thai farmers are challenged by incorporating an institutional reform of joint-irrigation management, i.e. establishing WUGs, IWUGs, and JMC. Such WUG and JMC establishment provides opportunities for the marginalized Thai farmers to enhance their capability through participating in PIM activities (e.g. WUG meetings, IWUG general meetings, JMC meetings, O&M activities, training sessions, and study tours). Attending WUG, IWUG, or JMC meetings gives individual Thai farmers opportunities to exercise their rights, either by themselves or through representatives, not only in water management decision-making (e.g. water allocation, water delivery schedule, water delivery pattern, and maintenance activities) at every level of an irrigation scheme, but also in formulating an organization (e.g. voting for IWUG executive members and IWUG representatives, comments and voting on IWUG rules and water fee collection, and discharging WUG chiefs).

Collaboration in O&M activities facilitates learning opportunities for individual farmers to develop technical skills, thus building capacity for dealing with

Figure 6.5: PIM as a venue to facilitate learning, empowerment, and sustainable water management



Source: Author.

Note: TL = Transformative learning; EMP = Empowerment; SWM = Sustainable water management

the physical structures of an irrigation scheme (e.g. water gate, ditch, irrigation canal, and drainage channel). Continual collaboration is a vehicle by which to apply new-found, empirical learning in O&M activities. Working collaboratively fosters acquaintances, thus possibly building networks to further conduct collective activities to improve water management.

Being WUG members, WUG chiefs, IWUG executive committee members, or JMC members, as well as joining training sessions or study tours, provides learning opportunities for individual farmers to develop social and managerial skills, thus building capacity in institutional management (e.g. WUG/IWUG/JMC administration, finances, financial and information access, communication skills, negotiation, mediation, and conflict resolution). Continuing membership in PIM organizations provides a venue to practice new-found learning skills in institutional management. Working cooperatively develops acquaintances, thus possibly creating networks which could further gain collective negotiation power to yield benefits to the organizations.

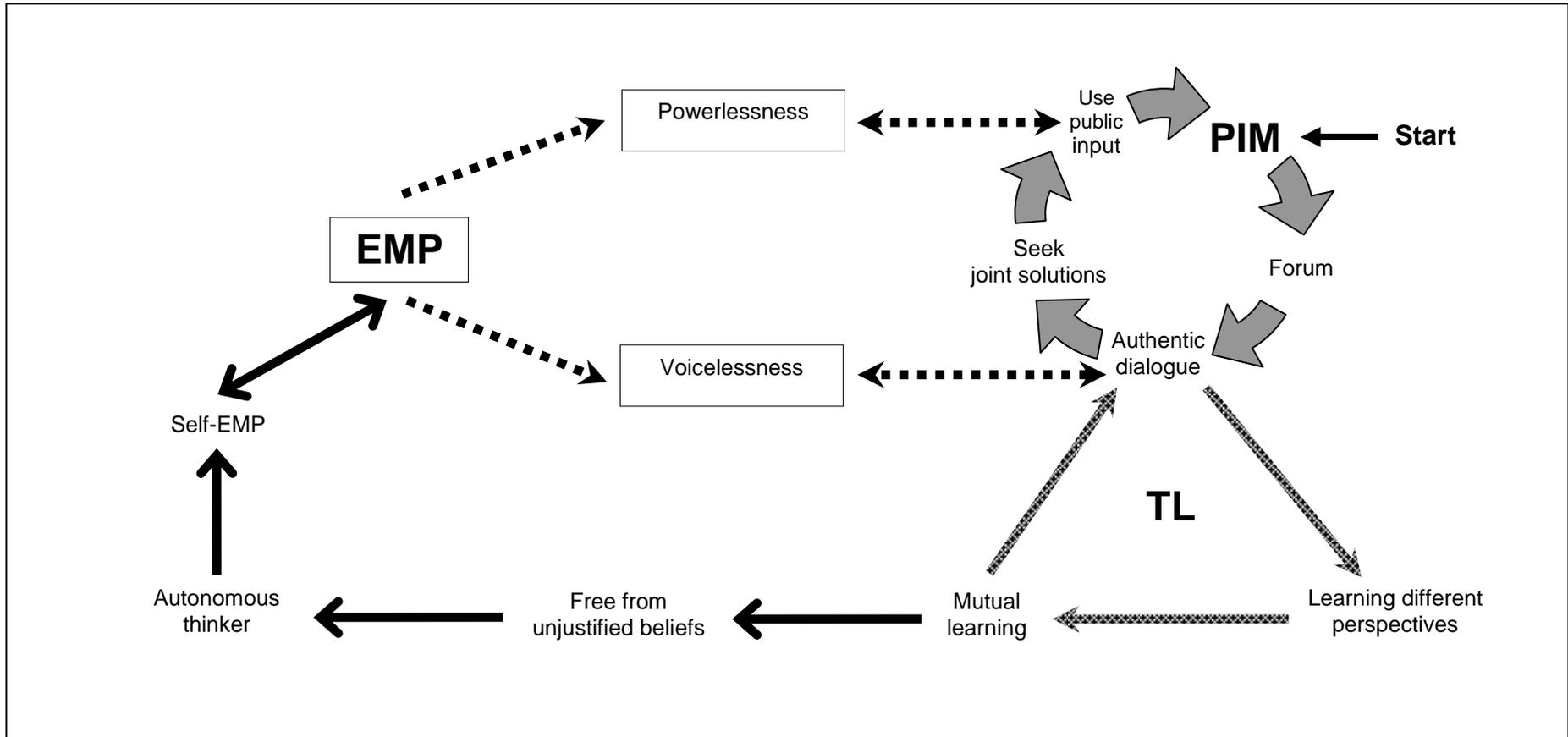
At the individual level, marginalized Thai farmers are empowered when they obtain capacity, either technical or managerial, through participating in PIM activities. Such PIM engagement also facilitates various learning outcomes (e.g. information of water supply and demand, water and cultivated management at a ditch level, and reservoirs as finite water resources). These learning outcomes are beneficial in that they detail the inclusive water situation in the area, thus provoking more sustainable water practices among individual farmers. The skills and learning outcomes, moreover, help equip individual farmers for actualizing sustainable water practices. Continual participation in PIM activities enhances opportunities for individual farmers to work collectively or gain collective negotiation power aimed at more

sustainable water practices.

My resulting conceptual framework regarding the connection between PIM, empowerment, and learning is depicted in Figure 6.6. Participation in PIM activities (i.e. IWUG general meetings or JMC meetings) serves as a forum to exchange problems and opinions among participants. Each participant is allowed to speak freely and to be listened to respectfully, therefore helping to facilitate understanding of the different perspectives that others hold and jointly seeking a solution to further implementation. The noted examples of authentic dialogue showed that participants are listened to and heard respectfully, which provides opportunities to learn different perspectives and for the creation of mutual learning among participants. This mutual learning helps participants to critically reflect and assess their present beliefs and values, and to reintegrate new justified beliefs and values into their lives. The ability to critically reflect nurtures participants to be autonomous thinkers, promoting a state of self-empowerment – which was partly revealed in the study. The authentic dialogue initiated in PIM activities (e.g. IWUG general meetings or JMC meetings) enables participants' voices to be heard, in contrast to the general voicelessness of marginalized Thai farmers. As well, when participants in a meeting develop a final water management decision by seeking joint solutions, it helps counteract the general powerlessness of marginalized farmers.

It is clear that the heart of my conceptual framework is authentic dialogue. Authentic dialogue, where participants are listened to and heard respectfully, is drawn from forms of collaborative participation promoted by authors like Innes & Booher (2004). For them, authentic dialogue serves as a central activity to understand other perspectives, generate new professional and personal relationship, build trust, create networks, and jointly develop solutions among participants. Despite the

Figure 6.6: Conceptual connection between PIM, empowerment, and learning



Source: Author.

Note: EMP = Empowerment; TL = Transformative learning

characteristics of authentic dialogue being developed in the western context, the data show that they are not unfamiliar to Thai farmers and came naturally. Having respect for others is, in fact a common Thai manner. As well, collaborative participation for achieving authentic dialogue includes engaging all stakeholders, treating every participant equally, seeking to address the interest of all, emphasizing dialogue and exchange, incorporating citizen knowledge, allowing time to explore data, and joint fact finding (Innes & Booher, 2004), which are also characteristics of the findings from my case studies. So, at least on the context of the case study that I completed, the WUO activities that farmers participated in had all of these characteristics

My argument is that this conceptual framework is applicable universally in any public participation processes that seek collaborative participation. The successful cases of collaborative participation are exemplified by issues as diverse as affordable housing, hazardous waste, resource management, ethnic conflict, and building civil society in USA (Chrislip, 2002; Connick, 2003; Fung & Wright, 2003; Innes, Gruber, Neuman, & Thompson, 1994; Susskind, McKearnan, & Thomas-Larmer, 1999) to Local Agenda 21, participatory planning, and building social, intellectual, and political capital in Europe (Healey, 1999; Khakee, 2002; Webler et al., 1995). However, the critical condition of my conceptual framework lies in the development of an environment where authentic dialogue occurs, which absolutely depends on culture and norms in each specific setting as shown in this study.

In the case studies, for example, the staff at Krasiew O&M Office apply several techniques to encourage authentic dialogue. The staff know that being acquainted with others you might work with is necessary for Thai co-workers, so first they arrange an overnight study tour for JMC members in order for participants to get acquainted before they try to start to work cooperatively. The frequent visits to meet

farmers in the field help to build rapport with individual farmers and to make them feel more comfortable sharing their opinions in a meeting setting. Treating farmers as valuable persons, ensuring equal information distribution to every stakeholder, regularly updating information, greeting the farmers first, indicating that every opinion welcome in a meeting, and offering a caring response to farmers' problems are all techniques used by the staff at Krasiew O&M Office to try to ensure that authentic dialogue occurs. When farmers are first treated respectfully by the public irrigation staff they indicated that they are more inclined to treat others in respectful manner as well. Farmers said they are more willing to listen to other opinions and more willing to try to understand new information thus enhancing mutual learning among farmers. The staff at Krasiew O&M Office affirm that it took a couple years to develop such rapport and trust with famers (Informant No. 96, personal communication, January 22, 2009).

6.6.4 Critical transformative learning

In addition to the theory's key concepts contribution, this research also considers the unclear points of transformative learning, including transformative learning in a cross-cultural context, considering marginalized voices, rationality of the learning process, and social action contributions as described in Section 2.4.2, Chapter 2.

1. Transformative learning in a cross-cultural context

Marginalized farmers as well as public irrigation staff in Thailand have learned abundantly through PIM implementation and operation, as revealed by the data. Similar to a western setting, instrumental and communicative learning can be achieved through two domains of learning in an oriental setting. Thai governance is remarkably controlled by government officials. Marginalized Thai people should be

provided an opportunity to participate by the government which seriously exercises a devolution approach to local organizations. To make participation effective, the marginalized Thai also require continual support as it relates to emotions, techniques, and updated information from government officials.

2. Considering marginalized voices

This research shows that considering marginalized voices is crucial for the inclusiveness of every class of society, thus providing a comprehensive understanding of current situations in a local community. According to the World Bank (2002), marginalized people are normally identified by their voicelessness and powerlessness. However, the voicelessness and powerlessness should not be interpreted to mean that marginalized people lack wisdom, experience, or maturity to participate meaningfully. It is evident that marginalized local Thai farmers possess a more profound knowledge of problems in the area, as well as practical water saving practices, than educated public irrigation staff. It should be noted that marginalized groups are usually a main part of society.

In Thailand, for example, twenty-two million or 34% of the total population is engaged in an agricultural sector, based on the latest 2003 Agriculture Census (NSO, 2004). It is therefore critical to include marginalized voices to generate mutual learning among society members. Such mutual learning could develop ways to overcome the marginalized constraints to be more liberated and responsible persons in communities, thus contributing to the sustainable development of the country as echoed by Krishna, Uphoff, & Esman (1997), “[T]he future of both rural and urban populations depends on finding ways to make rural life both more productive and more attractive, so that urban societies and economies are surrounded and supported by vigorous, progressive rural communities and regions” (p. 2).

3. Rationality of the learning process

The instrumental and communicative learning outcomes from both case studies involve a number of emotional aspects, including having faith in local leaders, a loss of trust in public irrigation staff by farmers, building acquaintanceship among co-workers, the superior attitude of public irrigation staff, a caring response to farmers, equal information to every stakeholder, welcoming every opinion at IWUG general meetings and JMC meetings, compassionate communication, building rapport between public irrigation staff and local farmers, greeting farmers first by public irrigation staff, and the friendly and helpful public irrigation staff. Structural society is embedded in Thai society. Making personal discussion between acquaintances – rather than public discussion – is the preferred means of communication to avoid conflicts (Nopgaysorn, 2002). Thus, building acquaintanceship among co-workers and building rapport between public irrigation staff and local farmers enhances effective communication between related parties at the Krasiew Reservoir.

The importance of the emotional dimension of the learning process in an oriental setting, e.g. Thailand, can be supported by the communicative learning outcome in relation to caring response, “Sometimes farmers do not expect an immediate solution from public irrigation staff. They, however, do need a caring response of attentive inquiries from the staff” (Informant No. 96, personal communication, January 22, 2009) which is resonated by Anderson (2005), “They [people] don’t care how much you know . . . until they know how much you care” (p. 51).

Treating local farmers as valuable personnel is accomplished by using methods such as ensuring a caring response to farmers, delivering equal information to every stakeholder, welcoming every opinion at IWUG general meetings and JMC

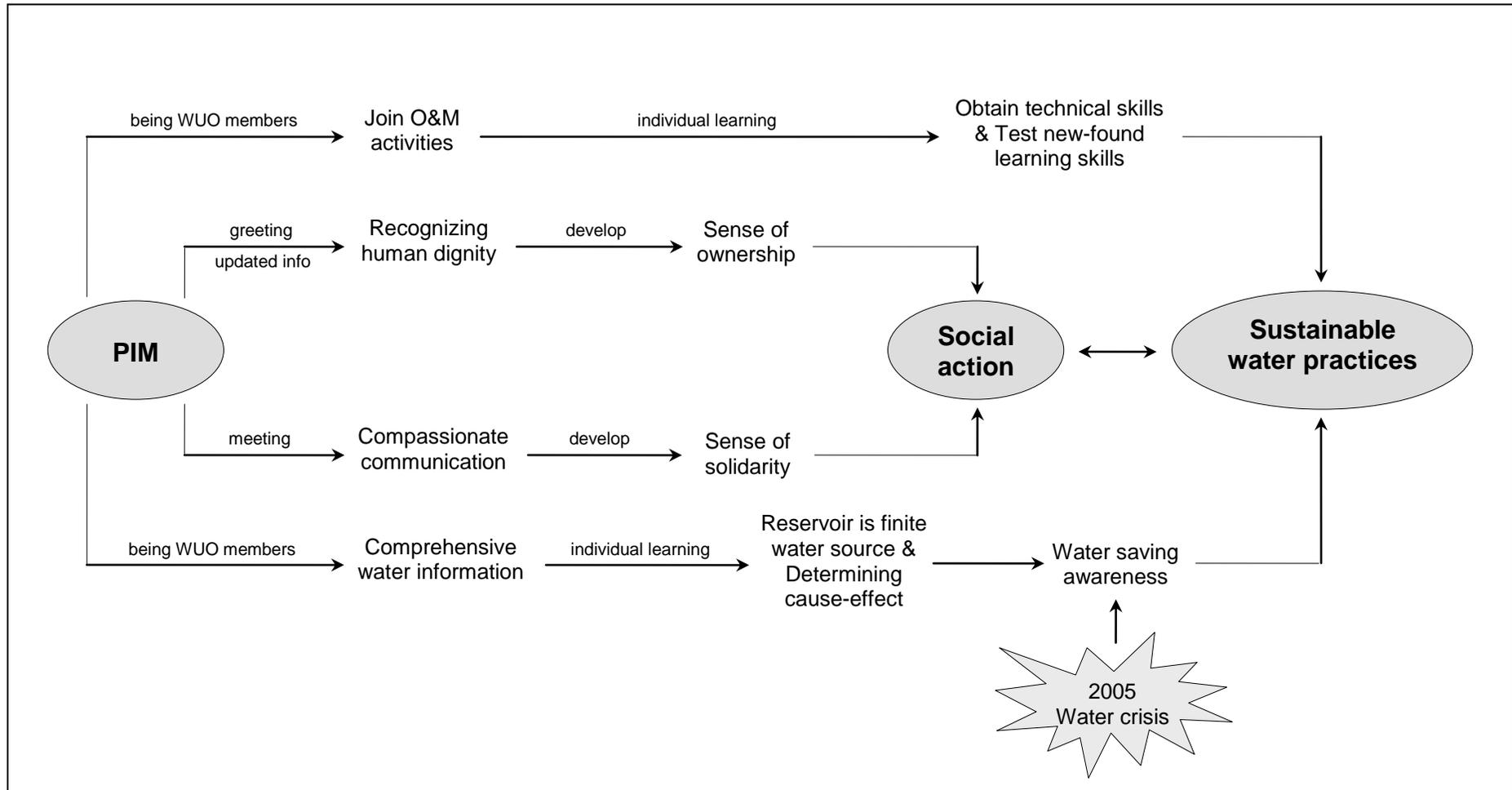
meetings, greeting farmers first by public irrigation staff, and providing friendly and helpful public irrigation staff. This generates a foundation of trust and self-esteem among farmers, as affirmed by a comment on basic needs of human beings, “[R]ise out of our deep vulnerabilities, our deep dependency on others and our need for acceptance and love, for belonging, for a sense of importance and worth, for a feeling that we matter” (Covey, 1990, p. 100). When the basic needs of farmers are fulfilled, farmers tend to respond to others in respectful manner that promotes compassionate communication and leads to the ultimate authentic dialogue. The process of compassionate communication is explained by Reynolds & Ballard (2007), “[W]hat happens when a person stops judging and starts connecting. Compassion creates a real possibility for what can happen in all human interactions, when a simple willingness to understand brings about a life-altering shift in perception” (p. 7) and Rosenberg (2003):

[Nonviolent or compassionate communication] guides us in reframing how we express ourselves and hear others. Instead of habitual, automatic reactions, our words become conscious responses based firmly on awareness of what we are perceiving, feeling, and wanting. We are led to express ourselves with honesty and clarity, while simultaneously paying others a respectful and empathic attention. In any exchange, we come to hear our own deeper needs and those of others. (p. 3)

4. Social action contributions

Social action contributions aimed at achieving more sustainable water practices among local farmers are ignited by a number of factors as outlined in Figure 6.7, that is, recognizing human dignity to initiate a sense of ownership; compassionate communication to develop a sense of solidarity; learning that the Krasiew Reservoir is a finite water source; learning the cause-effect relationships of saving water and other social and ecological benefits such as water for the next crop season; learning to obtain technical skills and test new-found practices for achieving more sustainable

Figure 6.7: Diagram of how PIM leads to social action aimed at achieving more sustainable water practices



Source: Author.

water management; and, self-experiencing the 2005 water crisis in the irrigation areas.

Treating local farmers as valuable personnel by means of, for example, greeting farmers first at the meetings by public irrigation staff, welcoming every opinion at the meetings, and distributing equal information to relevant parties helps farmers feel like they belong to the meetings and PIM initiatives. Regular updated information from public irrigation staff at the meetings or training sessions additionally validates the fact that farmers are key players in irrigation water management and therefore instill a sense of ownership among local farmers. Recognizing human dignity and initiating a sense of ownership are imperative to promote meaningful actions as recommended by Reynolds (2009), “To generate a work environment that brings out the very best in people, you simply must get back to treating people as if they matter” and a zoneman, “The first vital step is to formulate a sense of ownership among farmers as well as to develop trust between zonemen and farmers. Once those senses are established, every action needed to reach a common goal will easily follow” (Informant No. 99, personal communication, November 18, 2008).

In a meeting, farmers who are treated respectfully by public irrigation staff favor to react to others in respectful manner. They are more patient to listen to diverse points of views and willing to learn different perspectives from fellow farmers which contribute to compassionate communication. Starting to communicate compassionately among local farmers develops a sense of solidarity that furthers social action:

Remembering that there is a heart that beats within every single one of us. Compassion calls the heart of the matter forth in ways that are beyond our human understanding. How compassion works is a mystery, and when we put it first, there is a range of possibilities. Compassion for ourselves and for others turns “me” into “we” and the magic of love returns to our opened hearts, once again. (Reynolds, 2009)

Staff at the Krasiew O&M Office continuously provide farmers with complete information about the Reservoir's water supply and demand. This relevant information helps farmers learn that water at the Reservoir is limited, thus creating the cause-effect relationships to saving water for the next crop season for their own benefit. Being a WUO member, farmers also obtain technical skills and have a chance to test new-found learning skills of how to allocate and deliver water adequately in order to make the best use of available water.

According to Mezirow (1995, 2000) a life crisis is acknowledged to be one out of ten steps to transform one's belief. The 2005 water crisis, which badly affected cultivation in the irrigation areas, proved that the water supply in the Reservoir was limited and that water shortages were possible. A sense of water saving among local farmers consequently has been sparked, as agreed by Covey (1990), "Survival would be your only motivation. . . . This is one of the greatest insights in the field of human motivations: *Satisfied needs do not motivate*. It's only the unsatisfied need that motivates" (p. 241).

In conclusion, PIM facilitated social action for achieving more sustainable water practices at the case study sites. Social action is fostered by the recognition of human dignity and compassionate communication that develops a sense of ownership and a sense of solidarity. The notion of sustainable water practices among local farmers is spurred through learning that the reservoirs water resources are finite and self-experiencing the 2005 water crisis in the irrigation areas. The practicality of sustainable water practices can be tested and adjusted when farmers join O&M activities under PIM implementation.

6.7 Summary

It is clear that the Krasiew O&M Office has already handed over water management decision-making to farmers. Individual farmers in the irrigation areas of the Krasiew Reservoir are fully involved in decision making regarding water administration, from the lowest level of an irrigation system, i.e. ditch, to the highest level, i.e. reservoir, through established WUOs, namely WUG, IWUG, and JMC. In general, farmers from both case studies apply consensus decisions at JMC meetings, IWUG committee meetings, and WUG meetings which have about 10-50 participants. Majority decisions are commonly used by farmers at IWUG general meetings where more attendants, about 70-100 persons, are expected. Both consensus and majority decisions made by farmers are final and implemented in managing irrigation water in the areas. The public irrigation staff at the Krasiew O&M Office now act as technical advisors to the WUOs and provide water according to farmers' decisions.

Case study I, IWUG 2L-1R, is a much more robust WUO than Case study II, IWUG Ruamjai Patthana because IWUG 2L-1R committee members have strong leadership skills and that they use to solve water conflicts in the areas. Also, individual farmers at IWUG 2L-1R typically show more active participation in PIM activities. The two case studies show that under the same environment, the IWUG governance can yield considerably varied results based on the personal character of key players, including WUG chiefs, IWUG executive members, and zonemen. Additionally, the robust WUO, IWUG 2L-1R, demonstrates a higher number of both instrumental and communicative learning outcomes.

Introducing PIM into a local community enhances a spirit of reconciliation among irrigators at the Krasiew Reservoir through PIM activities such as WUG meetings, IWUG general meetings, JMC meetings, O&M practices, training sessions,

and study tours. Active participation in PIM activities facilitates both instrumental and communicative learning for local participants associated with PIM. Such learning develops a better understanding of a reservoir as a limited water supply among local farmers, thus leading to both individual and collective action to achieve more sustainable water practices.

The reader should recall, however, that IWUG 2L-1R at the Krasiew Reservoir was selected intentionally as a case study because of receiving a national outstanding WUO award in 2008. The award was viewed as evidence of successful PIM implementation and the presence an active WUO that could in fact facilitate meaningful participation and learning. Such site selection bias, may affect how generally applicable these findings are to what might be more average WUOs throughout the country.

Chapter 7

Conclusions

7.1 Introduction

This chapter summarizes findings from the study and draws conclusions in relation to each objective. To begin, a review of why this research was undertaken is provided and conclusions are drawn. Next, recommendations are made for improving PIM implementation and operation in order to encourage sustainable water management in Thailand. Finally, future research directions are introduced to complete the chapter.

7.2 Conclusions

The main criterion for my scholarship from the ARDA to pursue my PhD studies was to develop a research project related to the agricultural sector of Thailand. Serving as an Environmental Scientist with the RID for five years at the time I received the scholarship, I had experienced the passive practices of public participation used by the RID in EIA processes with regard to new reservoir projects. Such passive practices have long caused opposition from the public and deteriorated the agency's image, providing the impetus for this study.

The RID adopted the PIM approach in 2004 to enhance efficient water use in agricultural sector. PIM has never been studied in the context of the relationship between public participation and the learning occurring through PIM processes. Therefore, I saw the potential of this research to consider both meaningful participation and learning directed at sustainable water management. Through learning from the case studies, I hoped to improve public participation processes and

contribute to the sustainable water management discussion in the country.

Furthermore, the learned experiences may be applied towards sustainable water management practices at a regional level.

The set purpose of this research was to understand the relationships between public participation, learning, and implementing more sustainable water practices through PIM in Thailand. I wanted to determine whether participating in PIM activities could foster learning as well as lead to achieving more sustainable water practices among PIM participants. By exploring how PIM influenced learning and caused more sustainable water approaches, I hoped to gain understanding of the relationships between PIM, learning, and implementing more sustainable water practices among local Thai farmers. The following pages are the conclusions drawn from the study.

1. Current status of PIM

My first objective was to identify the current status and approaches of PIM implementation across the country. I found that although PIM in Thailand had quite a long history, the current PIM implementation was based on the ADB's institutional reform. PIM was incorporated in the RID's Strategic Plan in 2004. The RID recognized the importance of PIM by devoting some key performance indicators for the Department with regard to PIM, i.e. numbers of new WUGs and IWUGs in an area. The ultimate goal in relation to PIM, as outlined by the RID, was the involvement of both WUOs and LAOs in making decisions on irrigation management at all levels of an irrigation system, i.e. from reservoir to ditch.

I found that there were four key players in PIM implementation and operation, including the RID, WUO, JMC, and LAO. Every regional office of the RID was responsible for implementing PIM nationwide, specifically in the construction and

O&M phases of irrigation activities. The most recent statistics indicated that as of 2009 WUOs and JMCs across the nation included 38,106 WUGs (35,564 non-legal entity and 2,542 legal entity WUGs), 1,381 IWUGs, 9 FGs, 35 WUAs, 45 WUCs, and 18 JMCs. The WUOs established thus far covered approximately 60% of the entire irrigated areas of the country and had with 876,432 members. The largest coverage area of existing WUOs, 48%, was present in the central region.

“Learning from past failures” could best describe how PIM is being implemented by the RID. The organizational structure, rules, and fees are now suggested only as guidelines for a WUO. The final decision as to how PIM is implemented depends on a mutual agreement among WUO members. There is little evidence of common agreement between the RID and local people prior to reservoir construction or major modification. The RID conducts passive public participation by merely informing local residents of an anticipated project.

The data showed that the three main activities of PIM implementation for O&M included WUG establishment, WUO federation, and JMC formation. Farmer involvement usually began before ditch construction because a voluntary contribution of private land was a prerequisite for the ditch. The RIO staff then needed permission from individual farmers prior to ditch construction. To facilitate farmer participation, the RID revised its regulations to allow changes in a ditch design to be made on site instead of requesting written approval from headquarters. During construction, RIO staff tried to establish WUGs over the entire irrigation areas. The WUG would take care of water allocation and maintenance within a ditch.

If farmers fought over irrigation water between several ditches, RIO staff then encouraged farmers to unite several WUGs into an IWUG, which was a non-legal entity, to facilitate more interaction and communication among farmers. The IWUG

was to oversee all related WUGs and water allocation within a canal. If the IWUGs needed more financial support, they could consider scaling up to be a legal entity, that is, one of FG, WUA, or WUC based on their preference. Only one JMC, which was made up of representatives of RIO, WUOs, LAOs, and related public and private agencies, was organized in each irrigation project. The JMC would jointly make a decision about water allocation, water delivery schedule, and control measures for water use in a reservoir or water resource. It was noted that the RIO staff tended to establish a WUG or an IWUG hurriedly to meet key performance indicators of the Department. A fragmented agreement on WUO establishment among farmers resulted in insufficient governance structures and a lack of sustainability within the organization.

2. The nature of community involvement in PIM

My second objective was to explore the participatory nature of community involvement in water management decision-making through PIM. The findings were comprised of data related to the overall country level interviews and at the regional level through case study. At the overall country level, data showed that WUG chiefs, together with WUG members, were authorized to set their own ditch rules and patterns of water allocation within a ditch. However, the joint water management decision-making between the RIO staff and local farmers normally started when farmers established a united WUO (i.e. IWUG, FG, WUA, or WUC). Most committee respondents of the united WUOs worked cooperatively with the RIO staff on behalf of individual farmers and influenced the decision-making at the canal level in profound ways. The farmers felt that they had control of decisions about when water would be allocated and how much they would get. A number of farmers also specified that their united WUOs were endorsed to fully control the water gates of their

secondary canals. The JMC members at the Krasiew Reservoir, for example, made decisions about water allocation and distribution at the reservoir level before each crop season, a decision typically made by RIO staff. Eighteen JMCs were founded throughout the country to date. This could signify what is happening in the other 17 JMCs, which seem to have similar make-up structure and like authority over water allocation and distribution as in the Krasiew case. The RIO staff showed a promising attempt to limit their roles to serve as technical advisors and to devolve water management decision-making to local farmers at every level of an irrigation scheme.

The Krasiew study also revealed that after the water allocation and delivery schedule were designated by JMC members, the final water delivery pattern (i.e. rotational or continual water delivery) at each canal was made by a majority vote among IWUG members at an IWUG general meeting. Staff at the Krasiew O&M Office now acted as technical advisors by providing relevant water information at IWUG committee meetings, IWUG general meetings, and JMC meetings. Staff also used various means to update water information to relevant parties including biweekly newsletters, village loudspeaker announcements, and local radio stations. This relevant water information provided by the public irrigation staff tremendously helped local farmers at the Krasiew Reservoir to make meaningful decisions about water.

Case study I, IWUG 2L-1R, was governed by IWUG committee members that consisted of WUG chiefs and IWUG executive members. The IWUG executive members, including a president, two vice presidents, a secretary, a treasurer, a registrar, and a receptionist were elected for a six-year term, but a WUG chief is a lifelong position unless prohibited by poor health. Discussion among IWUG committee members was used to designate a water allocation strategy. The IWUG committee members agreed to deliver water on a rotational basis between the upper

and lower parts of the canal, since the amount of available water was not sufficient for everyone. If the agreed rotation was on a seven-day basis, for example, an IWUG executive member who resided at the upper canal would lead farmers from the upper areas to block water at the middle of the canal. On the eighth day, an IWUG executive member who lived at the lower canal then brought farmers from the lower areas to lift the block from the canal. The period of water delivery in each part was specified, however, farmers could extend the water delivery based upon a mutual agreement. At a ditch level, the water allocation plan and pattern, as well as maintenance tasks, depended on a consensus between a WUG chief and WUG members of that ditch. WUG members who could not participate in biannual maintenance (e.g. weed control or ditch excavation) before water delivery had to pay a penalty of US\$6 per maintenance day to a WUG chief. If additional funds were required for maintenance, each WUG chief would collect money on a case by case basis from related WUG members or submit a budget request to LAOs in the areas.

Case study II, IWUG Ruamjai Patthana, was also administered by the same structure of IWUG committee members as Case study I, IWUG 2L-1R, but the IWUG executive members were elected for a four-year term. Located at the lower half of 1R-1R canal, IWUG Ruamjai Patthana and another IWUG at the upper half of the canal had to share a main water gate. The main water gate was controlled by a zoneman at the upper IWUG. Presidents from both IWUGs arranged an informal meeting to schedule water delivery. The upper IWUG generally took water first for about seven days and then let water flow through a sub-water gate, which was also situated in the upper IWUG areas, to IWUG Ruamjai Patthana for 10 days. Every ditch under IWUG Ruamjai Patthana received water simultaneously. As well, WUG chiefs and WUG members were responsible for designing their own water allocation pattern and

schedule for ditches. Head-end farmers in a ditch normally got water first to prepare their plots and waited to sow rice seeds at the same time as tail-end farmers. A fine of US\$6 per maintenance day was imposed for a farmer who was absent from the biannual maintenance. Many problems did exist in the areas. The location of IWUG Ruamjai Patthana created disadvantages on the amount and timely water receiving due to water dependence on the upper IWUG. Furthermore, irrigation water was drawn from a drainage channel in the upper IWUG for use outside of the Krasiew irrigation areas. Part of the problems also came from farmers. A number of WUG chiefs demonstrated a lack of enthusiasm. An IWUG executive member took advantage of fellow WUG members to obtain surplus water for his own benefit. The IWUG president did not possess strong leadership skills.

3. Creating new opportunities for civic engagement in PIM

My third objective was to establish ways that new deliberative space could be created for civic engagement in PIM. From my fieldwork experiences I found three essential activities could be applied to favor PIM success and sustainability in Thailand. Firstly, public participation in planning, survey, and design is necessary because farmers need to be engaged at the very beginning of a water development project. Participatory planning of this sort helps instill in farmers and other stakeholders a sense of ownership of water management issues. Public participation in the survey and design of an irrigation system is also needed to fully respond to geographical and practical constraints in an area.

Secondly, participatory WUO establishment is important to WUO sustainability. Typically, RID field staff try to establish WUOs by only presenting the PIM concept and benefits to prospective farmers without understanding the water problems of farmers in an area. I would suggest that at the beginning of the first

meeting, RID field staff should listen to farmers talk about their water problems. Once the field staff understand the current water situation in the area, they can then have a joint-discussion about the potential solutions with farmers. PIM should be introduced as an option to solve the relevant water problems. The final decision of PIM incorporation should solely depend on farmers. The farmers' commitment will inspire a sense of ownership in the established WUOs, thus encouraging farmers to participate in the activities of the organizations.

Thirdly, a participatory evaluation meeting, facilitated by RID field staff, could be arranged to collectively assess WUO governance and service satisfaction among WUO members instead of just filling in a survey, as is currently done. By arranging an informal meeting, with a series of questions to stimulate discussion, farmers could feel more comfortable sharing their experiences and opinions in a realistic, creative fashion. Past problems regarding O&M activities in an area would serve as great topics for joint discussions. These discussions would be a starting point from which to find possible solutions, thus facilitating mutual learning between public irrigation staff and local farmers.

4. Elements of individual learning

My fourth objective was to examine the elements of individual learning occurring through PIM implementation. It became clear that participating in PIM activities fostered learning, both instrumental and communicative, among PIM participants. The review focused on the individual learning which occurred among two key players of PIM implementation and operation, namely local farmers and public irrigation staff.

The findings showed four theory-based subcategories of instrumental learning, including: obtaining skills and information; using political, legal, economic, social, or

administrative procedures; determining the cause-effect relationships; and task-oriented problem solving. Local farmers gained more skills and techniques (i.e. water and cultivated management at a ditch level, canal delivery technique, ditch drainage technique, and teamwork skills) from their working experiences. Farmers also obtained information about water supply and demand and crop price from the IWUG general meeting and JMC meeting, respectively. Staff at the Krasiew O&M Office first learned about the PIM concept in a training session held by the RID. As well, staff improved their skills and techniques (i.e. water management at a canal level, ditch excavation, and teamwork skills) from their practical experiences.

Running WUOs and the JMC by representative committees provided opportunities for local farmers to exercise various administrative procedures including power balance (e.g. setting an IWUG rule to allow WUG chiefs to be dismissed by WUG members), acknowledging a meeting resolution, conflict resolution, and devolution to reinforce the administration. Staff at the Krasiew O&M Office also applied different administrative procedures (i.e. acknowledging a meeting resolution, equal information, and devolution) to strengthen healthy water administration in the irrigation areas. Both farmers and staff at the Krasiew O&M Office realized that social procedures, i.e. social norms, played an important role in ensuring the satisfactory participation of local farmers in agricultural activities and water management.

Joining in O&M activities, as well as their own working experiences, helped farmers to establish a number of cause-effect relationships, i.e. water saving, pesticide saving, ditch layout design, and having faith in local leaders. Staff at the Krasiew O&M Office also learned to determine the cause-effect relationships about pesticide saving, ditch layout design, uncooperative water management, and loss of trust.

The nature of agricultural requires continued adaptation, so the learning outcomes in relation to task-oriented problem solving were common among farmers. The grounded themes of task-oriented problem solving were exemplified by local farmers in a variety of ways such as water leakage into a plot, seeking water supply, water drawn to outside irrigation areas, and problem solving in an IWUG. As well, staff at the Krasiew O&M Office learned to solve problems relating to building acquaintanceship, information distribution, water delivery checks, and two IWUGs in one canal.

The data also exhibited five theory-based subcategories of communicative learning including: understanding an issue at hand; gaining a more critical understanding of themselves or situations; insight into the interests of others; communication strategies and methods; and comparative reflection. Attending an IWUG general meeting or JMC meeting helped individual farmers gain more understanding about several issues, for example, reservoirs as finite water resources, water information and problems in the irrigation areas, fellow farmers' situations, and water sharing approach between two IWUGs in the same canal. Staff at the Krasiew O&M Office also learned about water delivery techniques to sugar cane fields from a personal talk with experienced sugar cane growers. As a result of long experience in the irrigation areas, both farmers and staff at the Krasiew O&M Office knew that the main crops in the areas were rice and sugar cane, so they understood that water needed to stop being delivered to facilitate sugar cane cutting.

Both farmers and staff at the Krasiew O&M Office gained a more critical understanding of the following issues: norms of rural society; community learning approach; benefit of water crisis; PIM as a sound method of irrigation management; and poor information distribution from Thai public officers to farmers. Staff at the

Krasiew O&M Office also gained greater critical understanding about the past superior attitude of public irrigation staff, lack of information sharing among RID staff, past PIM failure, and current PIM success.

Farmers gained insight into human nature and specifically fellow farmers' behavior when they had to collaborate to get water. Farmers who served as IWUG executive members gained additional insight into water-taking practices and the expectations of water management from fellow farmers because they themselves had farmed and lived in the area for a long time. Staff at the Krasiew O&M Office, who worked closely with farmers, also gained insight into human nature and the caring response need of farmers.

Water is essential for farming activities. Farmers therefore applied diverse communication strategies and methods (i.e. benefit sharing, value sharing, fact explanation, compassionate communication, seeking a mutual agreement, and negotiation on water delivery) either in a meeting or through personal discussions to get sufficient water. Farmers who were IWUG executive members indicated that attending a meeting was the key to receiving equal information and to facilitate a joint discussion. Other communication strategies (i.e. building rapport and every opinion welcome) were used by farmers to foster a meaningful discussion in a meeting. As well, staff at the Krasiew O&M Office utilized several communication strategies and methods (i.e. benefit sharing, fact explanation, using different communication methods with different groups, building rapport, and greeting farmers first) to generate acquaintance, thus promoting effective communication with local farmers.

PIM incorporation into a local farming community provided first-hand experiences for farmers that enabled them to make a before-and-after PIM comparison. Farmers associated with PIM received great satisfaction from more

friendly and helpful public irrigation staff. Farmers, as well as staff at the Krasiew O&M Office, confirmed that water service delivery in the irrigation areas was much better. Farmers criticized public irrigation staff for managing water based on theory, thus lacking a sense of modification to the real situation. On the other hand, farmers felt that since they possessed insights about the area based on their farming experiences and living there, they therefore preferred managing water on a practical basis. Farmers who participated in a study tour could apply their experiences from visiting different water management schemes to their own situation. In addition, both local farmers and staff at the Krasiew O&M Office agreed that having a joint discussion among stakeholders was a sustainable way of solving water conflicts in the area.

It was noted that local farmers from Case study I, IWUG 2L-1R, showed more instrumental and communicative learning outcomes than farmers from Case study II, IWUG Ruamjai Patthana. As well, the zoneman of IWUG 2L-1R expressed more instrumental and communicative learning outcomes than the zoneman of IWUG Ruamjai Patthana. The data presented in Chapter 6 indicated that personal characteristics and backgrounds played an important role in the critical reflection of one's experiences as supported by Cranton (1997).

These findings regarding learning outcomes indicate that my conceptual framework of the connection between PIM, empowerment, and learning (Figure 6.6) can apply universally in any public participation processes that seek collaborative participation. Authentic dialogue was central to triggering the learning outcomes that occurred through the collaborative opportunities provided by PIM activities. When PIM farmer participants are listened to and heard respectfully by all participants it helps instill a sense of importance and worth (Covey, 1990) and participants then

react to others in a respectful manner. This provides an opportunity to learn different perspectives and create opportunities for mutual learning among participants.

Therefore, a condition of the conceptual framework is creating the environment for authentic dialogue to occur, which will relate to the culture and norms in each specific setting. The case studies revealed that the conditions for authentic dialogue were not at all unfamiliar to Thai farmers and that building acquaintanceship and treating farmers as valuable people were key techniques that enhanced dialogue among participants.

5. Social action for sustainable water management

My fifth objective was to consider whether and how participation and learning through PIM led to social action aimed at achieving more sustainable water practices. PIM in this case proved to be a platform for encouraging social action aimed at accomplishing more sustainable water practices. Attending PIM activities (e.g. meetings) provided opportunities for local farmers not only to learn individually about the Krasiew Reservoir and that it was a finite water resource, but also to practice empathic listening and compassionate communication that was helping develop a sense of solidarity for acting collectively to protect their mutual interest (e.g. water for agriculture). Participating in the O&M activities of PIM, moreover, provided opportunities for individual farmers to obtain technical skills and to test their new-found learning skills (e.g. water and cultivated management at a ditch level, and ditch drainage techniques) in an effort to achieve more sustainable water use.

The following descriptions show how participation and learning through PIM led individual farmers to collectively carry out more sustainable water practices. Local farmers regularly received both basic and updated water information including: the total amount of water in the Krasiew Reservoir; how much water could be used;

how much water would be needed for the agricultural sector per crop season as well as for other relevant sectors; and how much water could be saved if the agricultural sector applied water delivery on a rotational basis. This relevant water information was provided by staff at the Krasiew O&M Office through PIM activities, either in a meeting or through various means (i.e. biweekly newsletters, village loudspeaker announcements, and local radio stations). Constantly receiving comprehensive water information helped farmers and other stakeholders develop an understanding of a reservoir as a finite water resource, thus learning to determine the cause-effect relationship of saving water for the next crop season. Consequently, water saving awareness was created among farmers in order to maintain the water supply for both crop seasons.

Updated information from public irrigation staff at an IWUG general meeting, a JMC meeting, or a training session additionally validated the fact that farmers were key players in irrigation water management and therefore instilled a sense of ownership among local farmers. Recognizing human dignity (Reynolds, 2009) and initiating a sense of ownership as acknowledged by a zoneman were imperative to bringing forth the very best in people, thus promoting meaningful actions. In addition, starting to communicate compassionately through joining in PIM activities (e.g. meetings) could foster social action among local farmers by turning “me” into “we”, as commented by Reynolds (2009). The 2005 water crisis in the irrigation areas was another factor which triggered a sense of the importance of water saving among farmers. That year no farmer could plant the second crop due to insufficient water. First-hand experiences of water shortage played a decisive role in changing farmers’ behavior, as supported by the literature (e.g. Covey, 1990; Mezirow, 1995, 2000).

7.3 Context for change

In reviewing documents for my fieldwork, I found that there were five articles about WUO's in Thailand. These articles were either published in international journals or prepared for regional or international conferences. A couple of the articles displayed the evolution of their target case study WUO and current administration. The rest reviewed the dynamics of traditional WUOs in northern Thailand. I also found a few theses regarding WUOs at the National Research Council of Thailand. They were all conducted using quantitative methods in order to explain water management and WUO administration. Therefore, this research seems to be the very first qualitative study that takes both a national and regional case study approach and focuses on PIM administration, learning, and implementing more sustainable water practices in Thailand.

Given the nature of the previous studies and my work, I have developed recommendations for change related to PIM implementation and operation and sustainable water management.

7.3.1 PIM implementation and operation

The success of PIM implementation and operation is based solely on the competence of the public irrigation staff, as stated by a zoneman:

If public irrigation staff blame local farmers for lack of character strength to accomplish PIM, they had better look back on themselves of how ready they are to serve farmers, how much potential they possess both technical and social skills. . . . They should blame themselves rather than farmers because it is absolutely their responsibility to help strengthen farmers' character. (Informant No. 99, personal communication, November 18, 2008)

Thus, the public irrigation office, i.e. the RID, is the central agency that needs to be improved. Improvements in the following four categories in relation to PIM capacity building, characteristics of RID field staff, PIM implementation approach, and PIM

operation approach are deemed necessary to enhance PIM success and sustainability in Thailand.

1. PIM capacity building

The findings from two case studies showed that external factors, i.e. financial and legal aspects, of established WUOs were not as critical as those of an internal nature, i.e. duty consciousness, of public irrigation officials. PIM capacity building is therefore the key to equipping public irrigation staff for PIM success and sustainability in Thailand. The equipped irrigation staff enable to help farmers and to make a difference in local communities both instantly and continuously.

The current three-year capacity building efforts adopted by the Office of Public Participation under the RID seem to be on the right track, even if it is time-consuming, towards developing a holistic view to serving local people and a deep commitment to PIM implementation among government officials. The next step is to create a network among the “new blood”, who have completed all three years of training sessions, and let them circulate throughout the “old bodies” of the RID and RIOs in order to help create a brighter future for PIM implementation in the RID (Kummerdpet & Sinclair, 2010).

The capacity building of public irrigation staff is presently focused on middle management staff, e.g. heads of different sections, however, it should also be arranged for certain target groups such as RID field staff (e.g. zoneman, gate operator) and executive positions of relevant RID offices. The capacity building sessions of RID field staff can be formulated by a team of new blood who work in the field themselves to incorporate all primary components in relation to field work into the sessions. The capacity building sessions of RID field staff should be held at local offices, as stated by a key field staff at the Krasiew O&M Office:

When a section head attends the PIM capacity building sessions, he rarely shares PIM knowledge with us [field staff at the Krasiew O&M Office]. This may be due to various reasons including being occupied with other tasks, lack of teaching skills, or reshuffling to other positions or offices. It is noticeable that field staff like zonemen and gate operators have never been reshuffled. . . . If the PIM capacity building sessions were organized at local offices, the sessions could engage more local field staff with less cost. (Informant No. 96, personal communication, January 22, 2009)

2. Characteristics of RID field staff

Delivering irrigation water is a public service that deals with varied types and behaviors of customers. The RID field staff are therefore key individuals to interact with the public. The underlying characteristics of RID field staff are as follows:

1) Service mind: The existing three-year capacity building program conducted by the RID can serve as a means of developing service mind among RID field staff. It is apparent that a number of RID trainees who complete the entire capacity building program demonstrate a significant shift in their attitude and behavior as detailed in Section 5.9, Chapter 5.

2) Empathic listening: The greatest lesson of PIM noted by public irrigation staff is to learn to listen, “I [RIO staff] adopt a participatory meeting with farmers. The meeting aims to listening to farmers’ concerns more than presenting by the RIO staff. It may be time-consuming, but it clearly helps solve problems in my responsible areas” (Informant No. 39, personal communication, March 14, 2008). Covey (1990) draws attention to the importance of empathic listening:

In empathic listening, you listen with your ears, but you also, and more importantly, listen with your eyes and with your heart. You listen for feeling, for meaning. You listen for behavior. You use your right brain as well as your left. You sense, you intuit, you feel. Empathic listening is so powerful because it gives you accurate data to work with. Instead of projecting your own autobiography and assuming thought, feelings, motives, and interpretation, you're dealing with the reality inside another person's head and heart. You're listening to understand. You're focused on receiving the deep communication of another human soul. . . . Next to physical survival, the greatest need of a human being is psychological survival—to be understood, to be affirmed, to

be validated, to be appreciated. When you listen with empathy to another person, you give that person psychological air. And after that vital need is met, you can then focus on influencing or problem solving. This need for psychological air impacts communication in every area of life. (p. 241)

The RID field staff need to practice empathic listening as a tool to mend poor relationships and rebuild trust between public irrigation staff and local farmers.

Listening is the gateway to exploring local problems and concerns and to understanding the general conditions in a community. It is a means to treat local people in a respectful manner; they are then more likely to listen to the ideas of public irrigation staff (Kummerdpet & Sinclair, 2010). Listening is also a channel by which public irrigation staff can display careful attention, which in Thai culture, is more meaningful than a successful solution (Informant No. 99, personal communication, November 18, 2008).

The present three-year capacity building program applied by the RID helps foster the requisite empathic listening, especially in the second year of four sequential training courses that deal with: (a) Enneagram, nine basic personality types of human nature and their complex interrelationships (Enneagram Institute, 2008); (b) tasks, power of groups, and happiness; (c) leadership that stresses power of WUOs; and, (d) restorative conflict resolution mechanisms in a public meeting with WUOs.

3) Compassionate communication: When one embraces empathic listening, compassionate communication positively follows. The RID field staff can use compassionate communication to truly connect with local farmers as pointed out by Reynolds & Ballard (2007), “When you simply decide to think compassionate thoughts, the power of the feeling that is ignited is palpable. The connection is instantly available and deeply real” (p. 115). The second year training sessions of the RID capacity building program help instill compassionate thoughts and the third year

training sessions, which include: (a) beginning facilitator for PIM; (b) intermediate facilitator for PIM; (c) advanced facilitator for PIM; and, (d) relaxation and consciousness building in a public meeting, can facilitate compassionate communication among the RID field staff.

3. PIM implementation approach

1) Participatory planning, survey, and design: It is important to engage farmers during the planning phase of a water development project. This helps instill a sense of ownership among stakeholders. Public participation in survey and design of an irrigation system is needed to fully respond to geographical and practical constraints in an area. Any concerns in the area must be noted and passed to the next office that takes over a job.

2) Participatory WUO establishment: Typical RID field staff try to establish WUOs by only presenting the PIM concept and benefits to prospective farmers without understanding the water problems of farmers in an area. I would suggest that at the beginning of the first meeting, the RID field staff should listen to farmers talk about their water problems. Once the field staff understand the current water situation in the area, they should then have a joint-discussion with farmers about possible solutions. PIM should be introduced as an option to solve any relevant water problems. The final decision of PIM incorporation must be made completely by farmers. The farmers' commitment will inspire a sense of ownership in the established WUOs, thus encouraging farmers to participate in activities of the organizations.

Farmers will be more inclined to incorporate PIM if they experience tangible social and economic returns from PIM. Such tangible incentives may be delivered by: featuring the limited water resources and value of water to human life and pointing

out how PIM can help save water; disseminating information about increased irrigation areas, longer periods of water distribution, increased yields and higher farmer income resulting from secure and timely water supply; inviting key persons from a successful WUO to meet with prospective farmers; showing a video clip of farmers' comments regarding the PIM benefits from successful areas; and providing a sample of a WUO that is involved in other activities beyond water management (Kummerdpet & Sinclair, 2010).

3) Evaluation system: The RID needs to establish an adequate evaluation system for WUO governance performance. New qualitative key performance indicators reflecting on the actual strengths and weaknesses of a WUO should be emphasized more than the existing quantitative indicators, e.g. numbers of new WUGs and IWUGs in an area. The current evaluation form was developed by the RID headquarters. Participatory discussion among nationwide field staff should be held to deliberate sound evaluation aspects and procedures to ensure an on-the-ground understanding of WUO performance.

It should be mentioned that a survey form may not be appropriate for illiterate farmers. An evaluation meeting facilitated by RID field staff could be arranged to collectively assess WUO governance and service satisfaction among WUO members. By arranging an informal meeting, with a series of questions to stimulate discussion, farmers could feel more comfortable sharing their experiences and opinions in a realistic manner, rather than the current practice of just filling in a survey. The past problems regarding O&M activities in an area, for example, could be a good topic to start a discussion to find common solutions, thus facilitating mutual learning between public irrigation staff and local farmers.

4. PIM operation approach

The following underlying approaches should be conducted by RID staff: (1) handing over the final water decision-making in operation to farmers and acting as technical advisors; (2) strictly following a WUO's resolution regarding irrigation water management; (3) equally providing inclusive water information to every stakeholder; (4) regularly updating water information to all stakeholders; (5) seeking farmers' opinions related to a maintenance plan and subsequent inspection; (6) organizing a mutual learning forum around the past problems in an IWUG general meeting or an IWUG strengthening session; (7) granting transportation allowances for IWUG committee members; (8) providing a budget for JMC meeting to a relevant office; (9) rewarding the RID field staff working for a WUO that receives an annual outstanding award; and, (10) collecting a popular vote for the RID field staff from WUO members and taking it into consideration of the RID's annual salary increase.

One farmer made an interesting point with regard to organizing a mutual learning forum around the past problems in an IWUG general meeting or an IWUG strengthening session:

I [IWUG executive member] think farmers don't feel comfortable with a survey because it is too theoretical and too formal for them. Farmers need something more empirical and informal ways. The best way to integrate farmers' opinions in the project or activity evaluation is that arranging an informal meeting and throwing casual questions like personal chatting. A facilitator has to clarify each issue, write it down on a flip chart, and then facilitate discussion among meeting participants to jointly find a solution. The interactive communication in this forum definitely fosters mutual learning between public irrigation staff and local farmers. (Informant No. 48, personal communication, November 16, 2008)

7.3.2 *Sustainable water management*

Sustainable water management can also be promoted by public irrigation staff. The lessons learned from this research present obvious ways in which to spur

sustainable water practices among local farmers.

1. Building a sense of ownership

A sense of ownership can be created when one shares an idea in a project. Participatory planning at the beginning of the water resource or irrigation structure development is therefore crucial to instilling a sense of ownership among local farmers. The sense of ownership needs to be nurtured through succeeding PIM initiatives, including participatory survey and design, construction, O&M, and monitoring and evaluation.

2. Comprehensive and updated water information

To promote sustainable water practices, one has to be aware that a water resource is limited. The relevant information, i.e. water supply, water demand from each sector, how to save water, and how much water can be saved, helps present a complete picture of water usage in an area. When all stakeholders understand their roles in the existing water cycle, they are more likely to cooperatively save water for their own benefits.

3. Joint-discussion

Sustainable water management may vary in different locations due to geographical, financial, and cultural restraints. The best way to practically assemble sustainable water practices is to arrange a joint discussion between public irrigation staff and local residents. The public irrigation staff must listen attentively to local residents' ideas and then respond in regards to how those ideas will work based on the technical and administrative aspects. The agreed upon sustainable water practices gathered from the joint discussion require testing to find an optimal way for implementation. For example, an additional method of saving water, introduced by the president of an IWUG, is to check how long irrigated water takes to flow to the

end of a canal. If it takes two days to deliver to the end of the canal, tail-end farmers need to inform the WUG chief at least two days in advance when they plan to stop taking water into their plots. This way the WUG chief can advise the president of the IWUG to make a timely request to the zoneman to stop water delivery before it is wasted in a drainage channel (Informant No. 31, personal communication, March 18, 2008).

7.4 Future research directions

Case studies included in this research deal entirely with the non-legal entity WUO, i.e. IWUG. Another main type of WUO in Thailand is a legal entity consisting of FG, WUA, and WUC. The study of organizational administration and relationship, as well as learning through PIM implementation and operation of legal entity WUOs, is necessary to understand their strengths and weaknesses. Similar or different findings compared to the study of non-legal entity WUOs can contribute to the better understandings of the current PIM situations, thus leading the ways to enhance PIM success and sustainability in Thailand.

The RID implemented a CBR project in 2006 to empower the local community. Thus far, there have been four voluntary CBR projects incorporated by the RIO staff. Joint-discussion in a community forum drives the CBR project and fosters fruitful learning among participants, as mentioned in Section 5.9, Chapter 5. The study of learning processes and learning issues arising from a CBR project would be worthwhile to illuminate what encourages and impedes a learning process of local Thai residents. This would lead to the formulation of approaches to empowering marginalized local communities.

7.5 Concluding comments

It can be said that people learn from a real and meaningful project (Wiessner & Mezirow, 2000) by engaging in an interactive action (Marquardt, 1999) and that community learning is based on living together and experiencing the success of neighbors (Informant No. 99, personal communication, November 18, 2008). The incorporation of PIM in a local community provides more opportunities to advance both individual and community learning among relevant parties. The lessons learned demonstrate the inherent potential of marginalized Thai farmers, who are capable of directing their own water service delivery. The lessons also illustrate the proper role of public irrigation staff as organizers who arrange the ideal conditions for promoting the authentic dialogue in PIM discussion, thus facilitating mutual learning among stakeholders. Opportunities from PIM help reinforce the recognition of being valuable persons in the local communities of marginalized Thai farmers and, moreover, become the strengthened foundation of Thai society that is able to endure the growing challenge.

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Appendix I: Sample of open-ended interview questions in fieldwork

Phase 1:

1. RID officials at central offices:

1. Please explain the goal(s) of PIM from your perspective and how it was introduced in the RID?
2. Please explain how PIM is currently implemented or operated in the RID. Please provide some specific examples.
3. What incentives are there for farmers to join PIM?
4. What activities did the RID support when conducting PIM implementation or operation?
5. What kinds of training are provided for the RIO staff and WUOs in PIM implementation or operation?
6. How do PIM processes prioritize the water need among competing water users in a basin?
7. How do PIM processes conduct the monitoring and evaluation?
8. What are the key performance indicators of O&M in PIM approach?
9. How do you evaluate the competence of WUOs?
10. What criteria are used when federating WUOs?
11. How satisfied are you with the PIM process as it is currently being implemented? Explain.
12. How successful do you think PIM is in relation to original goal(s) as you outlined above?
13. In your opinion, what has facilitated PIM success to date?
14. In your opinion, what has impeded PIM success to date?
15. How do you want to improve the current PIM process?
16. Which WUOs have been the most successful and why?
17. What have you learned through the process of implementing PIM?
18. How are you trying to incorporate what you have learned into the program?

2. RID officials at regional offices:

1. Please explain the goal(s) of PIM from your perspective and how it was introduced in the RID?
2. Please explain how PIM is currently implemented or operated in your regional offices. Please provide some specific examples.
3. What incentives are there for farmers to join PIM?
4. What activities did the RID support when conducting PIM implementation?
5. How do WUOs affiliated with your regional offices get established and how actively are they involved in irrigation decision-making processes?
6. How do you communicate with the WUOs?
7. How often do you visit the WUOs?

8. How do PIM processes prioritize the water need among competing water users in a basin?
9. What conflict resolution mechanisms are used among water users?
10. Please describe your relationship with the WUOs you have worked with.
11. In what ways do you encourage the active participation of WUOs in decision-making?
12. What kinds of training are provided for the RIO staff and WUOs in PIM implementation or operation?
13. How do PIM processes conduct the monitoring and evaluation?
14. What are the key performance indicators of O&M in PIM approach?
15. How do you evaluate the competence of WUOs?
16. What criteria involve in federating WUOs?
17. What is the range of percentage of irrigation efficiency in your region?
18. How satisfied are you with the PIM process as it is currently being implemented? Explain.
19. How successful do you think PIM is in relation to original goal(s) as you outlined above?
20. In your opinion, what has facilitated PIM success to date?
21. In your opinion, what has impeded PIM success to date?
22. How do you want to improve the current PIM process?
23. Which WUOs have been the most successful and why?
24. What have you learned through the process of implementing PIM?
25. How are you trying to incorporate what you have learned into the program?

3. *WUO members:*

1. Please explain what PIM means to you.
2. How was PIM introduced in your community?
3. How did you establish your WUO?
4. How is PIM currently implemented or operated in your community?
5. How often does your WUO meet? How many members usually attend?
6. How do meetings proceed? How to deliver a notice of meeting? What information is provided before meetings?
7. How do you communicate among members in your WUO?
8. Is there any dialogue and discussion at meetings? How is this promoted? How are decisions made?
9. What problems do you normally encounter since establishing your WUO? And how did you solve those problems?
10. What conflict resolution mechanisms are used among water users in your WUO? How did you decide on this approach? Has it been applied – what sorts of conflicts have arisen?
11. To what extent is your WUO actively involved in irrigation decision-making processes? What types of decisions do you make and how do you make them?
12. Please describe your relationship with the RIO and other WUOs in your area?

13. How do you communicate with the RIO and other WUOs in your area?
14. How do you get the financial support for governing your WUO?
15. How satisfied are you with PIM? Explain.
16. How would you rate the success of your WUO administration? What are the strengths and weaknesses of the group?
17. In your opinion, what facilitated any success of your PIM process?
18. In your opinion, what facilitated any success of your WUO?
19. In your opinion, what impeded any success of your WUO?
20. How do you want to improve the current PIM process?
21. What kinds of training are needed to strengthen your WUO?
22. What have you learned through the process of implementing PIM?
23. How are you trying to incorporate what you have learned into the program?

Phase 2:

1. WUG members:

1. Please explain what PIM means to you.
2. How was PIM introduced in your community?
3. How is PIM currently implemented or operated in your community?
4. What incentives are there for you to join PIM?
5. How do you establish your WUG?
6. Do you get any financial support for governing your WUG?
7. Does your WUG meet? How often? How do meetings proceed?
8. How do you get information from other members, WUG chief, IWUG members, and the JMC?
9. Have you learned from other WUG members or the WUG chief? Did this lead to any action or change of behavior on your behalf or that of the WUG?
10. Do you attend IWUG meetings? If so, how has your experience been time for discussion? Have you learned at these meetings?
11. What problems do you normally encounter since establishing your WUG? And how do you solve those problems?
12. What conflict resolution mechanism is used in your WUG? How did you decide on this approach? Has it been applied – what sorts of conflicts have arisen?
13. Please describe your relationship with the RIO officials.
14. What kind of training is provided by the RIO in PIM implementation or operation?
15. Have you attended any training sessions? Please name them.
16. How did the trainings proceed? What did you learn?
17. What other kinds of training would you find helpful for yourself or WUG activities?
18. Did WUG establishment bring any change in the way irrigation water is managed? What about any changes in your community? If yes, what are they?
19. How satisfied are you with PIM? Explain.

20. How would you rate the success of your WUG and IWUG administration? What are the strengths and weaknesses of the group?
21. How do you want to improve the current PIM process?
22. Are there other things you have learned from being a member of WUG? And how have you learned it?
23. What helped to facilitate your learning?
24. Did your learning through your experiences with the WUG or the ideas shared by the IWUG or JMC cause you or the WUG to do anything differently regarding how you manage the water available to you? Was there any change in your life or perspective? If yes, what are they?
25. Have you changed your practices regarding irrigation? Do you practice sustainable irrigation management, if so, how?

2. Non-WUG members:

1. Please explain what PIM means to you.
2. What if anything prevented you from being a member of WUG?
3. Do you want to be a member of WUG? Why or why not?
4. In your opinion, what are incentives to join a WUG?
5. How have you gotten water the past 5 years? Has the way that you obtained water changed over this time? If so, how did these changes come about (training, experience, neighbor, WUG, RIO)?
6. What are your water needs? How do you currently get water not being part of PIM? Are you able to satisfy your need in this way?
7. Have you changed your practices regarding irrigation? Do you practice sustainable irrigation management, if so, how?
8. Please describe your relationship with WUG members and how they are managing irrigation activities?
9. Please describe your relationship with the RIO officials.
10. Have you participated in any RIO's training sessions?
11. Did the establishment of WUGs bring any change in your community or your own activities? If yes, what are they?
12. Have you learned anything from WUG members or RIO staff (e.g. sustainable irrigation, management, participation, PIM processes)? If so, how did you learn these things?

3. JMC members:

1. Please explain what JMC means to you.
2. How did you establish your JMC in the community?
3. How is the JMC currently operated in your community?
4. What incentives were there for you to join the JMC?
5. Do you get any financial support for governing your JMC?
6. How often does your JMC meet? How do meetings proceed?
7. How do you get information from other JMC members? How is information circulated by the JMC to members? How does the JMC get information to the IWUGs and WUGs?

8. Do you attend JMC meetings? If so, in your experience is there time for discussion among members at meetings? Have you learned from other members or through activities at these meetings? Have you or the JMC taken any action as a result of things that have been learned?
9. What problems do you normally encounter since establishing your JMC? And how do you solve those problems?
10. What conflict resolution mechanism is used in your JMC? How did you decide on this approach? Has it been applied – what sorts of conflicts have arisen?
11. Please describe your relationship with the RIO officials.
12. What kinds of training are provided by the RIO in PIM implementation or operation?
13. Have you attended any training sessions? Please name them.
14. How did the trainings proceed? What did you learn?
15. What kinds of additional training would be helpful to you or the JMC?
16. Did JMC establishment bring any change in the way irrigation water is managed or in your community? If yes, in what way?
17. How satisfied are you with PIM? Explain.
18. How would you rate the success of your JMC administration? What are the strengths and weaknesses of the group?
19. How do you want to improve the current PIM process?
20. Are there other things you have learned from being a member of JMC? And how have you learned it?
21. What have facilitated your learning process?
22. Did your learning bring any change in your life or perspective? If yes, what are they?