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Water Governance in Cambodia: Policy in the making and links to implementation

Abstract
A water policy framework is being formulated in Cambodia. This paper discusses the policy making process, notably its capacity to promote realistic approaches, and integrate multi-stakeholders dialogues and experiences from the field.
Then, the potential gap between formal policy and implementation is investigated, notably via two case studies on Participatory Irrigation Management and Development projects, and recommendations on policy frameworks and implementation are issued.

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Abbreviations and acronyms

ADB	Asian Development Bank
AFD	French Agency of Development
APIP	Agricultural Productivity Improvement Project
APS	Associazione per la Participazione allo Sviluppo (Italy)
CEDAC	Centre for Study and Development in Agriculture
CGIAR	Consultative Group on International Agricultural Research
DIA	Department of Irrigated Agriculture, MOWRAM
DGIMH	Directorate General of Irrigation, Meteorology and Hydrology
EFRP	Emergency Flood Rehabilitation Program
FAO	Food and Agriculture Organisation
FERP	Flood Emergency Rehabilitation Project
FSP	Priority Solidarity Fund
FWUC	Farmer Water User Community
GDIMH	General Directorate of Irrigation, Meteorology and Hydrology
GRET	Groupe de Recherche et d'Echanges Technologiques
IFAD	International Fund for Agricultural Development
IO	International Organisation
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
MAFF	Ministry of Agriculture, Fisheries and Forestry of Cambodia
MCC	Mennonite Central Committee
MIME	Ministry of Industry, Mines and Energy
MoE	Ministry of Environment
MOWRAM	Ministry of Water Resources and Meteorology
MRC	Mekong River Commission
MRD	Ministry of Rural Development
NGO	Non-Governmental Organisation
NWRP	National Water Resources Policy

NWISP	Northwest Irrigation Sector Project
NWSP	National Water Sector Profile
O&M	Operation and Maintenance
PDOWRAM	Provincial Department Of Water resources And Meteorology
PIMD	Participatory Irrigation Management and Development
PRASAC	Projet de Réhabilitation et d'Appui au Secteur Agricole au Cambodge
RBM	River Basin Management
RGC	Royal Government of Cambodia
SEDP	Socio-Economic Development Plan
UNDP	United Nations Development Program
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific

Introduction

Recent years have seen an upsurge in the interest given to water governance matters, to ensure adequate, reliable and sustainable supply and use of water.
The International Water Management Institute together with a number of leading research institutes[1] is undertaking a major research project (2004-2007) untitled "multi-scale Mekong Water Governance: inter-disciplinary research to enhance participatory water governance from local watershed to regional scales."

As a sub-project of the research initiative, my aim is to describe here processes relating to water governance in Cambodia[2]. I focus on how public agencies and external agents interact to shape the policy framework, and on how the framework thus set will be put into practice.
I first study water policy in the making at the national level, by describing organisations involved and processes for interactions, focusing on the draft "Law on Water Resources Management".
I then highlight how the policy concepts promoted can be put in action, and how relevant they might be. I first study plans for implementation and justification for the main new concepts introduced: Integrated Water Resources Management (IWRM), River Basin Management (RBM), and water licences and fees.
I then particularly investigate the case of the Participatory Irrigation Management and Development[3] policy in Cambodia, as it is of a high importance for the country, and it is amongst the most advanced facets of water policy-making and implementation. I take two case studies as examples:

- Modalities for institutional development in Stung Chinit irrigation scheme, as operated by the Non-Governmental Organisations (NGOs) GRET/ CEDAC[4], under supervision of the Ministry Of Water Resources and Meteorology (MOWRAM).
- Modalities for institutional development and achievements in O'Treng irrigation scheme, directly led by the Department of Irrigated Agriculture (DIA) from the MOWRAM.

A synthesis of challenge emerges from this analysis, central to which are coordination between actors and flexibility and means required for implementation.
My first argument is that the policy process has promoted principles little adapted to the actual country's situation, has been shaped by power struggles, and has little accounted for field experiences or non-institutionalised opinions.
My second argument is that there is a gap between formal policy making and actual implementation. Further adaptation of the legal framework is required via drafting of Decrees promoting a middle-way to turn the framework into a useful reality, and implementation by the government would need to be progressive, prioritised and flexible.

[1] The lead institute in the initiative is Chiang May University, Thailand – see "Challenge Program Full proposal", CGIAR, 2003
[2] Governance here will be used in the meaning "the structure and processes chosen or imposed on society to debate and create policy directions and manage its affairs", as suggested by J. Dore, 2003.
[3] PIMD. This terminology is promoted preferably to « irrigation management transfer » as in effect management is yet at a low level, given the limited capacities of the Government, and most of the schemes have to be rehabilitated before being handed over.
[4] GRET: Groupe de recherche et d'Echanges Technologiques
CEDAC: Centre for Study and Development in Agriculture

Country background[1]

The Kingdom of Cambodia was founded in 1993 and promoted the development of a multiparty system and a market economy. The country remains one of the poorest countries of the Mekong Region, and suffers from high governance matters[2].

National policy objectives

The objectives of the government are geared towards good governance and poverty alleviation

The Government's Socioeconomic Development Plan II (SEDP 2001–2005) gives a strategic vision for national economic growth and poverty reduction, and targets (i) economic growth to reduce poverty, (ii) development of the private sector, and (iii) good governance. SEDP-II emphasizes the importance of agriculture and rural development to achieve its objectives, identifying water resources management as a key element by the (i) accelerated sustainable development of irrigation and drainage systems; (ii) establishment of farmer water user communities (FWUCs) to manage irrigation water resources more efficiently; and (iii) orientation of research and extension toward rain-fed lowland agro-ecosystems[3].

The water sector

Cambodia has a tropical monsoon climate, with two seasons (dry and wet), and it is much dependent on the Mekong hydrological system. About 86% of the territory is included in the Mekong River basin. Water use for all purposes is a tiny fraction of surface water and groundwater resources (see Tab. 1).

	Supply		Withdrawal: including all water used for irrigation, industry and agriculture.		
	Total km3	1998 per capita m3	Total km3	% of Internal resources	Per capita m3
Cambodia	88.10	8 195	0.52	0.59	66
Lao PDR	270	50 392	0.99	0.37	259
Thailand	110	1 845	31.9	29	602
Vietnam	376	4 827	28.90	7.69	416

Tab. 1: Water resources in South East Asia (Santikarn, 2000).

The dominant abstractive use (approximately 500 million m3/ year and about 95% of the total according to the National Water Sector Profile[4], 2001) is for irrigated agriculture. Water managed areas amounted to around 390 000ha in 1993, of which:

- 69% were equipped with full/partial control irrigation
- 31% were flood recession cropping areas.

According to the NWSP (2001), given the very small volumes yet used, it is unlikely that development of the water sector (increase in irrigated areas, or improved water supply) will cause any significant pressure on the water resource in the years to come. Currently, there is little competition for water, except for some serious conflicts between use of water bodies for waste disposal (and unintended non-point source contamination) and as sources of domestic water. In addition, in the dry season, particularly in localities where watercourses cease to flow, seasonal shortages or unreliability of water impose a constraint on human activity and welfare. The cumulative effect of large and growing numbers of groundwater abstraction wells, catchments and aquatic ecosystem condition, related to

[1] See Appendix 1 and Appendix 2.
[2] Notably government institutions are still quite weak and corrupt (Varis, 2003)
[3] As emphasised by Asian Development Bank (ADB) on the North West Irrigation Sector Project (NWISP), 2003
[4] NWSP

deforestation, uncontrolled mining, fishing pressure etc., are other causes for concern, and more information is required to define the threats.

The water sector helps achieve many development goals, and the priority areas identified for action are, as listed in the National Water Resources Policy (NWRP, 2004):

- ⇨ Access for all to safe, adequate, and affordable drinking water, hygiene and appropriate price
- ⇨ Provide sufficient water for agriculture, industry, and economic activities
- ⇨ Tackle and minimise for all the threat of loss of life and livelihood as a result of water related hazards.
- ⇨ Manage the water resource environment in an unpolluted way.

Financial resources

The Royal Government of Cambodia (RGC) is promoting establishment of FWUCs to relieve burden of Operation and Maintenance (O&M) from the government, and is encouraging private companies, NGOs, and International Organisations[1] to invest in hydraulic work. Most funds for the development of public infrastructure are actually obtained from foreign aid.

There are few data on annual governmental expenditures. Tab. 2 shows some of the figures available on sources of funding.

	Government	Private sector	Loan (ADB, WB, IFAD[2])	Grant (JICA, AFD, APS, MRC, ADB[3]).
Hydroelectric power generation (1999-2001)	5	26	?	>0.7
Irrigated agriculture (1999 - 2001)	1.25	0.05	48.85	42.36
Muncipal/ domestic Water Supply and Sanitation	?	?	>34.7	?

Tab. 2: Sources of investment funds for water resources development (NWSP, 2001), in million US$

Irrigated Agriculture[4]

About 700 irrigation schemes were operational in 1994 in Cambodia[5]. The irrigated area amounted in 2000 to 277 000 ha of rice fields[6]. Both because of its importance, as the Cambodian economy is still based on agriculture[7], and of its potential for improvement, irrigated agriculture is seen as essential to address rural poverty and promote economic growth.

Chann Sinath[8] emphasised in 2000 some of the major difficulties faced in irrigation management:

- The irrigation systems suffer from design defects and inadequate maintenance.
- Almost no trained managerial personnel, means, capable organizations or databanks are available.
- The key constraint facing investment in agriculture is the poor state of the national economy.

[1] IOs are considered here to include both multilateral and bilateral agencies.
[2] WB: World Bank. IFAD: International Fund for Agricultural Development
[3] JICA: Japan International Cooperation Agency. AFD: French Agency of Development. APS: Italian Cooperation. MRC: Mekong River Commission.
[4] See Appendix 2.
[5] Fully or partially operational. The majority of them had been constructed during the Khmer Rouge period, with attendant design defects. (Halcrow, 1994). This list might be incomplete.
[6] This representing only 16% of cultivated areas and 40% of rice production. It is estimated that with the current existing systems, the potential irrigated area related to those systems is more than 606 000ha (Pillot, 2000).
[7] 85% of the population is living from family-based agriculture (Pillot, 2000).
[8] Deputy Director of the Department of Irrigated Agriculture, MOWRAM

A two-fold research project

My overarching goal is to analyse the water policy, and especially the draft "Law on Water Resources Management", and related documents:

- The process of formulation of water policies, with a particular focus on the Draft Law on Water Resources Management, with actors, events, and coordination. Other water policy documents are also referred to for comparison of processes.

The conceptual framework was inspired from Mollinga and Bolding's analysis of irrigation reform (2002):

- Strong tendency to think in terms of reform "models"
- Substantial discrepancy between theory and practice, or between propaganda and reality
- Little space and attention for the debate of experience, of partial results and complexities in implementation
- Explicit analysis of the political dimensions of irrigation reform would be required

Specific questions addressed for analysis of policy in the making included:

Who were the main actors involved in it? Was it a very exogenous process? What were the mainstream ideas? Marginalised ideas/ stakeholders? How were the civil society or external institutional agencies consulted? How were the different events and contributions relating to the subject (seminars, workshops, issuing of strategic documents) coordinated?

- Comparing formal state policies with reality on the ground. I first highlight theoretical justification for the major principles promoted, and explore how they might be implemented, before pointing at their relevance. Because the most advanced area for implementation is PIMD, I study more in depth prospects for FWUCs establishment. For doing so, I contrast two approaches in the field, with different levels of governmental involvement:

  One pilot scheme of the Department of Irrigated Agriculture (MOWRAM)

  One PIMD project operated by a NGO and supervised by the Department of Engineering (MOWRAM)

Initial lines of analysis for field experiences[1] were refined as interviews proceeded in O'Treng. They include legal, institutional and financial arrangements, with assessment of their relevance to the field/ compliance with the policy framework[2]. Finally, achievements of objectives in one scheme were estimated.

My objectives are to highlight the process of policy-making, and point at critical areas in implementation of the policy. Broader objectives include contributing to the pool of knowledge about water governance in Cambodia, and feed in the "Mekong Water governance" initiative.

Methodology

Secondary data was collected from legal drafts and from past agencies' reports and documents on the policy process, and on PIMD projects.

Primary data collection was undertaken via:

- Interviews at the national level, with officers from public agencies and IOs/ NGOs about national policy and their knowledge of implementation[i] (see Appendix 3)
- Attendance to the National Workshop on PIMD 14th – 15th Sept. 2004
- One-day field visits to irrigation schemes to select schemes for deeper investigation, and improve the analytical framework

[1] Established via analysis of the legal and policy framework, and with the help of resource persons, notably F. Molle from IWMI and S. Balmisse from the French Cooperation (Priority Solidarity Fund FSP).

[2] Policy framework as set by

- Legal texts : Circular n°1 and its Appendix on the Statute of the FWUC, and Policy for sustainable O&M of irrigation schemes
- Draft decree on PIMD and sub-decree on FWUC (as these were drafted from 2000, and have been communicated to partners).

Following selection criteria[1], using secondary information at hand and previous field visits, O'Treng and Stung Chinit schemes were selected for more thorough field study.

- PIMD project case studies: interviews with project officers, farmers' representatives, local authorities and farmers[2].

Limitations

As not all resource persons[3] could be interviewed, and very few comprehensive or academic studies had been undertaken on the subject, information collected on past events for policy-making, and past projects, was often fragmentary and could not be cross-checked.

For the case studies[4], major limitations for O'Treng included lack of secondary information, and selection procedures for interviews with farmers[5]. For both schemes, the method adopted, which was of a qualitative type, forbids generalisation on some aspects[6]. Comparison between the two schemes was then limited by differences in context[7], and shall therefore focus on methodologies adopted by the intervening entity. Finally, achievements in O'Treng scheme, as compared to stated objectives, are scheme-specific.

[1] - They should be projects that aim at influencing PIMD modalities nationwide
- Establishment of the FWUC is on going or recent.
- One is a pilot experiment of the Department of Irrigated Agriculture of MOWRAM, the other is operated led by a NGO.
- There is some secondary data available (surveys, feasibility studies, reports).

[2] See Appendix 14and Appendix 17 for field activities

[3] Many people involved have been short-term consultants in the country, other longer terms residents have left it.

[4] See Appendix 18.

[5] Specific types of households were met by asking a farmers' representative to lead them to me.

[6] Particularly for exact awareness of different actors, agricultural growth and livelihood activities

[7] In terms of social context, past history of irrigation and collective action for irrigation, basis for institutional development, stage of the project, sizes of the schemes.

I. Policy in the making

Establishment of a legal framework for management of water resources was promoted from the mid-1990s. Circulars and Decrees are currently used to regulate the sector, and policies, draft Laws and draft strategies have been formulated.

A. Background

a. Actors

Water resources management is under the responsibility of several institutions at different levels.
The MOWRAM was established in 1999[1] on the basis of the Department of Hydrology (DGIMH)[2] of the Ministry of Agriculture, Forestry and Fisheries (MAFF). The head of DGIMH, close adviser to the Prime Minister, advocated for the creation of MOWRAM on the ground that SEDP I (1996 – 2000) placed a high importance to water resources management, that worldwide recommendations were to establish apex bodies for management of the sector, and that there was a need to better attract and channel international funding. The MOWRAM inherited an initial focus on irrigation, river bank erosion and flood control[3], but it was allocated by the RGC overall responsibility for water resources management and meteorology (Sub-Decree 58, Art. 2)[4].
Within the Ministry, the line agency responsible for PIMD is the Department of Irrigated Agriculture[5] -but the Department of Engineering is also supervising PIMD operators in a number of rehabilitation projects.

Other organisations (see Appendix 5) are involved in water management, such as:
- Ministries, among which the Ministry of Rural Development (MRD), notably for rural water supply and sanitation, the Ministry of Industry, Mines and Energy (MIME) for urban water supply and sanitation and hydropower, and the Ministry of Environment (MoE), notably for control of liquid wastes and pollution).
- The Cambodia National Mekong Committee, which coordinates water resources issues in the relations with the other riparian countries of the Mekong Basin.
- Lower levels agencies[6] are Provincial Departments for Water Resources and Meteorology (PDOWRAM). Provincial Departments are responsible in the MOWRAM organisation chart directly to the Minister, and to Provincial governors for operational matters.[7]

An Interministerial Irrigation Working Group has in addition been recently constituted (2003)[8], with the mandate to refine the policy, develop operational guidelines, and act as a coordination forum. It consists at present from senior officers of the MOWRAM, MAFF and MRD.

External actors have been paramount since 1991[1] for the country.

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[1] Law 0699/98 of 23 June 1999 – Sub-decree 58 of 30th June 1999.
[2] Directorate General of Irrigation, Meteorology and Hydrology.
[3] MOWRAM, 2003: Water sector "roadmap".
[4] The MOWRAM organisational structure had 759 staff in headquarters, and 830 staff in 24 provincial and municipal departments (6 of which had less than 10 persons), according to the NWSP (2001). See Appendix 4 for MOWRAM organisational structure, from Tara, 2004.
[5] The DIA is responsible for management of irrigation and drainage, and of pumping schemes. 136 staff were employed at central level in 2002, according to Koster.
[6] The country is organised administratively in Provinces (24 of them), Districts, Communes and Villages. A process of devolution is transferring responsibility to Provincial and District levels, as well as to Commune Councils (elected in 2002) and Village Development Committees.
[7] The ADB note on the Water sector in 2001 emphasises that, at provincial level, operational activity is focused through Provincial governors, who are responsible to the Minister of the Interior. Provincial departments receive their budget allocations from their parent ministries, and in principle receive technical support from and report to them. However, in practice, linkages to national parent ministries appear to be weaker than within the provinces.
[8] With assistance from the French Priority Solidarity Fund (FSP).

The main agencies involved in technical assistance on water-related issues have been the ADB, the World Bank, the FAO (Food and Agricultural Organisation), the IWMI (International Water Management Institute), French Cooperation, JICA, and AusAID (see Appendix 6). Many more agencies have actually carried out water supply and sanitation, flood mitigation or PIMD projects (see Appendix 12 for PIMD projects).
NGOs involved (such as MCC[2] or GRET) have mostly been directly conducting projects. There is no comprehensive database of such initiatives.

Private sector activity in the water sector is mostly focusing on water supply. For irrigation, activities are limited principally to that based on groundwater, with individual wells and pumps, on a very-small scale[3].

b. A political narrative

Water resources development has been given high priority since the first SEDP. General Laws on Environment, Land or Fisheries, as well as sub-policies, decrees or Circulars on specific sectors provide for the existing regulatory framework. Water-policy making has been marked by numerous workshops, seminars, conferences, and the writing of strategic statements and legal documents. The aim of the RGC is currently to define an overall strategic approach for management of water resources, with the Strategic Framework for the Water Sector being drafted.
Nevertheless, many arrangements are very recent, or are not yet fully operational, as stressed in the draft Water Vision to Action (Tara, 2003). The overall National Water Resource Policy has for example only been promulgated in January 2004. Two major regulatory frameworks are currently under consideration:

- Law on Water Supply and Sanitation[4]
- Law on Water Resources Management

Strategies, strategic frameworks and/or action plans have been promoted in some water-related areas, including electricity, fisheries, agriculture, forestry, and the natural environment.

In 1995 a first draft Water Resources Law was proposed by AusAID technical assistant to the MAFF[5]. Given the lack of national policy documents and the limited pool of knowledge about the specificities of the water sector in Cambodia, the draft was inspired by existing regulatory documents in other countries (Australia particularly), with the aim of providing MAFF staff with a basis for reflection. The GDIMH felt the necessity for promoting a regulatory framework, but did not carry this tentative further.
The initiative was revived internally in 1999, and the pace for formulation of the policy framework has particularly increased since 2000 (see Appendix 7). The main steps on the way are listed in Tab. 3.

Tab. 3: Main water policy documents in Cambodia

	With assistance from	Date
Circular n°1 and its Appendix on the statute of the FWUC	FAO	1999
Draft Law on Water Resources Management	FAO with World Bank/ APIP[6]funding	1999 – ongoing

[1] Signature of Peace Accords
[2] MCC: Mennonite Central Committee
[3] According to the draft Water Vision to Action (2003), there are several thousand such applications – corresponding to irrigation of groups of 3-4 farmers. However, there is only one privately run medium-scale scheme in the country yet (Kbal Po in Takeo Province).
[4] Examined here only for comparison on policy processes. It is linked to the Water supply and sanitation policy (2000) and the Rural water supply and sanitation policy (2003).
[5] The main elements promoted were: principle of ownership by the Government, allocation of Licenses, creation of an "Authorised Officer" position to centralise management, payment of water fees, creation of Water Users Associations in irrigated areas (Cameron, 1995).
[6] Agricultural Productivity Improvement Program

Prakas n°306, [1] instructing implementation of PIMD		2000
Policy for sustainability of Operation and Maintenance of irrigation Systems		2000
Water Supply and Sanitation policy		2000
Draft decrees and sub-decrees on PIMD	FAO with World Bank/ APIP funding in 2000. IWMI in 2003.	2000 – ongoing
Strategic Framework for the water sector	ADB	2001
Draft Law on Water Supply and Sanitation	World Bank	2001 – ongoing
National water resources strategy, draft	World Bank/ APIP	2001
National Water Sector Profile and Agenda for Action	ADB	2001
National Water Vision to Action – draft	FAO/ UNESCAP[2]	2003
Rural Water Supply and Sanitation Policy	PRASAC[3] (European Union)	2003
National Water Strategy and Action Plan	World Bank/ APIP and ADB	ongoing
National Water Resources Policy	World Bank/ APIP	Drafted from 2002. Adopted in 2004

Policy processes

The draft Water Vision to Action (Tara, 2003) highlights the common process for policy formulation. For most of the exercises listed above, the MOWRAM drafted a document with the help of a consultancy mission provided by an external supporting agency (WB, ADB, FAO/ UNESCAP). When the draft was satisfactory, it was distributed for comment within the Ministry, and revised accordingly. The subsequent process included one or two more stages of consultation, commonly in the form of national workshops, seminars, or conferences. At these, representatives of concerned ministries, Provincial Departments, NGOs and IO[4]s were invited to comment on the draft document. For strategies, policies and Laws, which require approval from the Council of Ministers, there was a further opportunity for consultation between Ministries[5]. In theses case, the National Assembly and the Parliament finally voted to adopt the documents.

Such a process broadly applies to the case of the draft Law on Water Resources Management. A consultancy was hired by the World Bank under the MOWRAM capacity building component of APIP, and performed by FAO (2 sessions in 2000). An initial document had been provided by MOWRAM staff but was very much modified by the consultancy. The document was then presented in Dec. 2000 in a National Conference[6] to most stakeholders (IOs and NGOs were invited) – however, no opportunities for comments or debates were provided. Final modifications were introduced by the MOWRAM in Feb. 2001, before the document was passed on to the Technical Interministerial Committee in March 2001. It was finally adopted by the Council of Ministers on the 26th Feb. 2002 in

[1] Prakas (Regulations) is a document issued by a government office or official, to the extent that such office or official holds regulatory authority to regulate the matter. Prakas 306 was issued by MOWRAM and promotes national implementation of PIMD through three documents: (i)Circular No 1 dated 11 January 1999; (ii)Policy for Sustainable O&M of Irrigation Systems; (iii)Steps in the Formation of a FWUC

[2] UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific

[3] Projet de Réhabilitation et d'Appui au Secteur Agricole au Cambodge.

[4] International Organisations: here, I include multilateral and bilateral agencies.

[5] The draft has to be reviewed by an Interministerial Committee before being signed off by the Council of Ministers.

[6] National Conference on Cambodia's Water Resources: An Agenda for Action. The Conference was aimed at debating the National Water Sector Profile.

a Plenary Meeting (see main steps in Appendix 9 and latest version in Appendix 10) then passed on to the National Assembly. The National Assembly did not have the opportunity yet to review the Law[1].

c. Content[2]

The National Water Resources Policy (2004) sets the general framework for the water sector:

- Fundamental principles for water resources management are: responsibility of the government, plans to be prepared following available data and in accordance with other strategic plans, right to individual uses, and utilisation of the resource in a sustainable and environmentally friendly way
- RBM and IWRM
- Appropriate development of freshwater resources: notably water for agriculture, for energy, for industry, and water for domestic use
- Promotion of licences and fees for adequate allocation of the resources
- Priority uses in case of shortage, in order: domestic and municipal uses, irrigation, hydropower[3]
- Mitigation of water-related hazards
- Data collection and forecasting
- Financial sustainability: encourage private investment, establishment of FWUCs, seek foreign aid

Most documents established earlier contained parts of the strategic issues reflected here.

Appendix 9 presents the steps of formulation of the draft Law on Water Resources Management, with actors and principles/ modifications introduced by them. The final version adopted by the Council of Ministers in Feb. 2002 notably emphasises:

- *Inventory of water resources and uses by MOWRAM*
- *Water resources planning by the MOWRAM*
- *Registration of users to MOWRAM*
- *Water licences*
- *Payment of water fees*
- *Watershed Management, in a coordinated way*
- *Central role of the MOWRAM in managing the resource*
- *Definition of priority areas of implementation*
- *Promotion of FWUCs establishment*

Finally, the general framework for PIMD in Cambodia is set by the Policy for sustainability of Operation and Maintenance of Irrigation Systems[4] (2000), which established principles and objectives for PIMD. It states that farmers must take the lead in defining irrigation development and managing irrigation schemes, and sets the framework for establishment of FWUCs for O&M of the schemes. It also defines arrangements for financing.

Principles promoted are:

- Legal status of FWUC
- Involvement of FWUC in system development
- Obligation of farmers in paying the O&M cost, and emergency cost of O&M
- Permanent maintenance and improvement of the existing irrigation systems
- Arrange the water delivery in an equitable and effective way

[1] There are many documents waiting to be adopted, and furthermore the National Assembly was suspended between July 2003 (elections) and July 2004 (formation of the new government). Further delays will be introduced in addition by the requirement recently imposed to review the format of the Law (which will need re-approval by the Council of Ministers).

As stressed in ADB's governance assessment in 2001, the Assembly tends simply to review and enact bills drafted by the RGC, often without being given sufficient time and lacking the requisite expertise – therefore it is expected that the final document will not differ much the mid-2002 draft available.

[2] See Appendix 8 for the content of the main documents formulated for water resources management

[3] Followed by industry and small manufacturing enterprises, navigation, aquaculture, and minimum flows for ecosystem maintenance.

[4] The legal base is set by Circular n°1. It specifies mostly objectives of PIMD, formulation for calculation of the ISF, and model statute for FWUCs, All of these provisions are repeated in the Policy.

- Receive supports and assistance from the MOWRAM on technical backstopping, managing, monitoring, evaluating, etc.

B. Analysis of policy in the making

Examination of the policy process suggests that its characteristics are:

- **(Ir)relevance and opportunity cost?**

There is a strong tendency to think in terms of models. As emphasised in the World Bank comment on the draft Water Law (2001), the original draft was "in line with modern trends in water resources management". For all documents issued, worldwide best practices have been promoted: these include notably IWRM, river-basin management, and water licences and fees.

This promotion of models partly stems from the exogenous way in which most of the work has been undertaken, with technical assistance from international funding agencies[1]. As put by Mollinga and Bolding (2002): "Selling success is a structural element of the donor's world". Also, external consultants were hired on short-term basis, and could not develop an intimate's knowledge of the country's challenges, and their Ministerial counterparts lacked capacities to master in a short time, and question, proposals made.

On the other hand, concepts and practices promoted have been imported also because there was in the country a legislative void, as well as a lack of knowledge about water resources and management challenges. Interviewees also stressed that policy concepts promoted will be operationalised through adoption of relevant decrees and sub-decrees, and these will give more opportunity for improvement and adaptation to the country's reality.

In addition, some concepts that were disapproved of by the governmental agency in charge were suppressed. For example, external stakeholders called for provisions to decentralise regulation activities in the draft Law on Water Supply and Sanitation –but such a provision has been strongly opposed throughout the process by the MIME[2].

If Ministries' staff were first bewildered by the new concepts introduced to them, later phases of policy formulation enabled them to regain some control over the process: the MOWRAM and the Interministerial Committee for example both had opportunities to modify the draft Law on Water Resources Management before adoption by the Council of Ministers.

Fundamental principles were not abandoned, but significant provisions were altered. In Feb 2001 for example[3], the MOWRAM erased provisions in the draft Law about modalities for collaboration with other Ministries. The Interministerial Committee then introduced further modifications linked to coordination between Ministries (see Appendix 9). For example, Ministries will not have to pay to use the databank developed by MOWRAM. A sense of ownership is therefore developing alongside adoption of documents.

It appears that the level of understanding, or ownership developed by officials of the concepts promoted varies. Licences and fees are becoming widespread motto for management within the country, both because it has been widely promoted in different sectors (electricity as well as for water supply for example), and because, as some interviewees suggested, governmental agencies favour the control and resources it brings to them. On the other side, however, officials interviewed showed very little knowledge and/ or understanding of the concepts of IWRM or RBM. The situation is evolving, as well, and progress is made in some related area alongside implementation of policy documents: for example, promotion of bidding mechanisms for awarding water supply contracts is now promoted directly by MIME officials, whereas they were unaware or reluctant at first to take such steps.

[1] ADB, World Bank, FAO, FSP, IWMI

[2] Discussions have reopened most recently, with a new round of consultations on the draft Law, at the initiative of the World Bank. It is expected that some requirements for decentralisation will finally be included – both as all external stakeholders pressure for it, and because decentralisation is claimed to be at the core of RGC policy.

[3] Before submitting the Draft to the Council of Ministers in March 2001

Finally, relevance of the imported concepts is questionable. Interviewees stressed that the principles and fields for action promoted are not all immediately relevant to the country's situation, but provide with a long-term model, and with tools for facing future challenges (we will examine this issue in II).
The risk exists of developing a framework that will be little applied (few needs) and applicable (few capacities). In addition, there has been also a cost to the process: government institutions – and external donors- had to spend scarce human and financial resources on these processes, which could have been better allocated to other uses.

- **A political perspective**[1]

Many different institutions are involved in water resources management, each trying to secure and increase its prerogatives and power. As stressed by interviewees, prerogatives in the first place have not been clearly defined. The process followed for institutional building has been of adding Ministries and agencies, and extending responsibilities (MRD created following 1993 elections, MOWRAM created in 1999 for example), instead of wholly reforming the system. Ministries progressively reached agreements to define their areas of responsibility, so that difficulties over major prerogatives rarely occur at present, but some overlapping areas remain at times sources of conflict.
As overall manager of water resources for example, MOWRAM has responsibilities that overlap with those of other ministries and agencies, and is still trying to assert its position, as a new comer. The NWSP (2001) emphasises that, as a new Ministry with responsibility for water resources, the MOWRAM is likely to experience difficulty in its relationships with older-established ministries that have linkages with specific sectors and interest groups, and probably a more-targeted view of their functions.
However, progress is made to define respective prerogatives. The MOWRAM has reached a series of agreement with the MIME, the MRD and the MAFF to define their respective spheres of competence. For example, the MOWRAM will be responsible for multipurpose dams[2], whereas the MIME will take in charge single-purpose dams. The NWSP (2001) suggests that, overall, the MOWRAM will be expected to perform mainly a regulatory role in water resources management, and the other Ministries will continue to perform the role of water resources developers or service providers, under overall supervision of MOWRAM.

Policies and other documents are used to reinforce the position of line agencies. The MIME and the MOWRAM both promote their own draft Law relative to the water sector, on different, but often overlapping subjects. It is remarkable that both draft Law support centralisation and concentration of regulation, planning and control (by MOWRAM for the draft Law on Water Resources Management, and by a National Authority to establish for the draft Law on Water Supply and Sanitation), whereas there is a claimed decentralisation dynamics in the country. Establishment of a National Authority for regulation of water supply and sanitation is widely seen for example as aiming at reinforcing the authority position of the MIME[3].
The draft Laws are also used to reinforce position of the Ministries respectively to the other national institutions. They install for example parallel systems of licensing and fee payment for bulk providers of potable water supply, to the MOWRAM (as manager of the resource) and to the MIME (as regulator of the sector). The draft Law on Water Resources Management also provides the MOWRAM

[1] Politics and political parties will not be explored here, as there was not enough time to explore in depth this sensible issue. In addition, although generally important for Cambodian policy-making, a political analysis of the drafting of the Law would bear mainly upon the delimitation of responsibilities between the MOWRAM (main political party) and MRD (challenger).
Individuals and interpersonal struggles might be more influential elements in the process, however again time for analysis was too short.
[2] No such dams exist at present on a significant scale in Cambodia. One project however is at the stage of the feasibility study.
[3] Interviewees remarked new institutions set up are rarely independent from their original body, and through the new National Authority, the MIME would effectively establish a tight control over the sector.

with the responsibility to set technical standards for wastewater discharge – even though the MoE is already responsible for such a system, under Sub-Decree 27 (1999)[1].
However, in most cases, agreements have been reached to delineate responsibilities and avoid conflicts between agencies. In the examples quoted, interministerial negotiations will reach an agreement before the texts are implemented[2].

A mean for agencies to increase their authority is to increase their resources. Interviewees stressed that indeed one core objective of the water policies promoted is for agencies to earn more revenue, directly (for the MOWRAM via the water fees for example), by attracting foreign aid (one of the stated objectives of the PIMD policy), and by removing financial burden from the State (PIMD policy via FWUCs establishment).

- **Coordination issues**

The general backdrop for water policy-making is provided by the SEDP (I and II), and by definition of governmental overall strategy. The overall policy framework for the sector has been established only in 2004, and a comprehensive strategy or action plan is still lacking[3].
The approach chosen in the water sector has been therefore to build up progressively before defining the overall framework. The NWSP (2001) stressed that there were some advantages to this approach:

> "It might be more convenient (because of limited human resources, or greater ease of working with particular stakeholder groups) to address particularly urgent or well-defined requirements with a small number of more specific strategies. In this case, continuous attention to inter-linkages would be essential."

Laws drafted, sub-policies developed previously (for irrigation, on urban water supply and sanitation, or rural water supply and sanitation) were not part of an "integrated" package of policies and strategies. As earlier policy formulation did not take place on a consistent and comprehensive background, coordination of policy processes was a crucial issue. However, good coordination has proven difficult to ensure.

Policy formulation has been characterised by parallel processes, which contributed to different perspectives. Water Strategies have been drafted at the same time for example both by ADB and World Bank consultancy. Assistance to the sector has furthermore been generally undertaken on a project basis, and therefore institutional strengthening took place in a fragmented way, reflecting different priorities, and targeted at different actors (at the national or provincial level).
The great number of national institutions concerned with water management issues has also slowed down adoption of one vision for water management and development, and has rendered coordination more difficult[4]. The NWSP (2001) emphasised that relationships between agencies with water-related responsibilities appeared to be weak, or hindered by requirements to follow strict lines of communication.

The principal vehicles identified for inter-agency cooperation are the Cambodia National Mekong Committee, the Ministry of Economy and Finance, and the council for the Development of Cambodia. However, the NWSP (2001) notes that in practice there is very limited inter-agency coordination at national level (in planning or operational matters), and that arrangements for exchanging information are also rather hierarchical and controlled. Specific groups of donors exist in some sectors and to a certain extent provide room for sharing views and coordinate actions among donors and government

[1] Sub-Decree of MoE for implementation of the Law on Environmental Protection and Natural Resources Management.
[2] In the examples quoted, the agreement might be that double licences and fees will have to be subscribed and paid by bulk providers/ polluters.
[3] Drafting began in 2001 with initiatives by the WB and ADB, but a comprehensive strategic draft is far from being finalised.
[4] As emphasised by Santikarn (2000), it is common to most Asian countries that water management is fragmented and sectoralised.

agencies: the Water and Sanitation Group[1] has been a vehicle for coordination since 1993 for example. Water resources management however has suffered from the lack of any organisation for donors' coordination[2].

Coordination on policy making therefore occurred first mostly on an ad-hoc basis, as they were no formal instances set up for sharing and exchange of reflections. During drafting, it was ensured within Ministries by governmental officers directly involved[3], and by resident technical assistants to the Ministry[4]. There were also some informal talks between Ministerial staff (from different Ministries), but without official recognition and support these talks did not seem to have influenced the process.
During the process of adoption, for policy documents requiring such a process, the Interministerial Committee then ensured a common review and agreement by Ministries. Most modifications introduced in the draft Law on Water Resources Management at this stage have to do with issues of coordination between Ministries (see Appendix 9). This explains also why, according to interviewees, the process took almost one year to complete: agreements had to be reached on delimitation of responsibilities and activities of Ministries[5]. For example, where previously all licenses referred to in the Law had to be granted by the MOWRAM, the final proposal did not specify which institution is to deliver licences. The MIME has generally proven particularly powerful in the negotiations, particularly in regaining responsibilities: for example references to activities such as petrol and gas extraction were erased, licensing of professional drillers was abandoned.

In the future, it is expected that the situation will improve. Adoption of documents defining the framework for the sector (NWRP already adopted, strategy upcoming) will be paramount in ensuring the consistency of steps taken.
Finally, coordination shall be promoted by the upcoming establishment of a Technical Working Group on Agriculture and Water (TWGAW), involving main donors and Ministries[6]. It will identify sector priorities and harmonise activities particularly. It shall be formally created at the end of 2004, and could become "a visible champion" that would articulate all water-related activities in the country.

- **Few inputs from alternative stakeholders, civil society or field experience**

An external agency has commonly been leading each policy process, via funding and/ or technical assistance provided. Although some requirements were set regarding consultations needed with external partners, including NGOs, the level of inputs from other stakeholders in the process was generally low.
For some documents, the existence of a coordination group of donors offered a space for discussion. However, external agents expressed dissatisfaction even with this mechanism (Water and Sanitation Group) for the draft Law on Water Supply and Sanitation: not all stakeholders could participate in these discussions (NGOs had no direct contacts with MIME for example), and comments made were not enough taken into account by the draft team.
Then, in general, one or two workshops of discussion marked the policy formulation process. However, it was not necessarily so: for the draft Law on Water Resources Management, the National Conference of Dec. 2000 was actually used only to present the document, and not to discuss it, so that external stakeholders did not have a voice in the process. Finally, even when workshops specifically aiming at discussing policy documents had been held, interviewees stressed their influence over the final document was often limited to a few technical areas – and did not bear on general principles. It has been suggested that workshops do not provide adequate time or format to discuss in depth and

[1] On water supply and sanitation.
[2] The sector was in principle to be included in the discussions of the "Natural resources management" group formed by donors, but the group focused actually on forestry issues.
[3] From the MOWRAM, on general water policies, the Department of Planning and the Department of Water Resources Management have been usually involved.
[4] ADB and FSP resident particularly
[5] In some difficult cases, it was left to the Prime Minister in the last place to statute over delimitation of responsibilities.
[6] To include French cooperation, World Bank, ADB, FAO, AusAID and other IOs, and MAFF, MOWRAM and other Ministries on the governmental side.

make proposals on the subjects reviewed. In addition, there has been generally little follow up – due to reluctance from the governmental side to adopt the proposals, or because of a lack of capacity from officials in charge to build on the comments made.

The policy process in Cambodia has been referred by some as a "black box", whereby a draft document agreed upon by external stakeholders and Ministries would enter the official adoption process, disappear in the opacity of Interministerial negotiations, and finally resurface very much modified. A certain opacity is certainly marking the process at some critical stages. For example, it is quite rare that a draft policy should be circulated for comments between approval by the Interministerial Committee and the Council of Ministers. However, it is not always the case. For the draft Law on Water Supply and Sanitation for example, the World Bank has been able to impose the RGC to release the draft document at this stage, and to reopen consultations on the draft Law. A translated version of documents is usually also made available after adoption by the Council of Ministers, although at this stage it belongs only to the Parliament to modify the document.

Finally, although PIMD has been undertaken since 1991 in the country, few –if none- field experiences have yet fed in the policy formulation. Few ex-post evaluations were conducted, and one comparative study on the subject has been undertaken only (see ADB, 2001, FWUCs: review of past experiences), but was not used for policy formulation.
The main influence of the large projects undertaken at the end of the 1990s (PRASAC[1], Prey Nup) appears to have been to force quick adoption of a regulatory framework. The Circular n°1, Prakas 306, and the Policy on Sustainable O&M of irrigation schemes, have all been adopted to provide the legal recognition and official backing to the structures established.
However, this is currently changing, with most actors promoting use of experience: donors via studies of experiences, and MOWRAM via the pilot schemes for implementation.

Conclusion

Policy-making has been to a certain extent exogenous, little adapted to the country's actual challenges, submitted to struggles between sectors of the administration for areas of action and budget, and built little on other experiences. However, ad hoc mechanisms to correct parts of the main critical biases were used. Furthermore, the situation is now evolving, with implementation plans being defined, and more coordination promoted, as well as increased feedbacks from the field.

[1] First phase 1994 – 1999

II.Policy concepts in action

The model/ exogenous-approach followed to policy making is a palliative for the absence of institutional basis on which to build, and the lack of national capacities and expertise. It also provides the country with tools to face future challenges.
On the other hand however, the policy process has resulted in a framework that might be little relevant to the most pressing issues for the country. As stressed by Bolding in 1997: "Effective measures in water reform come from the application of a realistic approach to the subject. The debate must also be reclaimed from theoretical discussions that have little practical relevance. We support Edward's concept of theory: theory should be used as a tool for understanding and explaining the world, [water reforms] as a necessary precondition for changing it".

In the draft "Law on Water Resources Management" and in the NWRP (2004), diverse principles are promoted and notably new major concepts for management are introduced: IWRM and RBM on the one hand, and water licences, and fees on the other hand[1]. To highlight differences between formal policy-making and actual implementation, we examine here theoretical justification for the new principles introduced, plans for implementation, and point at their relevance for Cambodia.
Then, as establishment of FWUCs is a recurring theme, and as it is one of the most advanced aspects for implementation, we will particularly investigate the case of PIMD.

A. New concepts

➢ Integrated Water Resources Management, River Basin Management

IWRM and RBM have gathered momentum since the 1980s. They aim at rationally sharing water between competitive uses, in a sustainable way, by recognising interlinkages that take place between all water using activities among one watershed. They are now becoming "ubiquitous attributes of a 'modern' water policy" (quotation from F. Molle, 2004).
As promoted by ADB (2003, NWISP) for example, water resources planning and management need a river basin development perspective to ensure that water is used to achieve the greatest net economic and social benefit, while preventing conflict and competition, creating an environment conducive to satisfying present and foreseeable demands, and sustaining environmental requirements. ADB stresses in addition that this is best done through the adoption of an IWRM approach.

Plans for implementation
These approaches have not yet been implemented in the country. The Interministerial or Interdepartmental Committees set so far (Provincial Consultation Committee for Stung Chinit project, or Interministerial Core Working Group) have the mandate only to improve coordination of agriculture and infrastructure (irrigation, rural roads) development activities,
The MOWRAM does not have specific plans for implementation yet, although the concepts are listed as priority areas in the draft Strategic Plan of the MOWRAM (2004). A draft sub-decree was prepared under the World Bank/ APIP consultancy in 2000, but has been left dormant for 4 years. Technical assistance from JICA, starting at the end of 2004, working together with the Department of Water Resources Management of MOWRAM, will provide for an upgrading of the Decree- so that it will be ready for adoption when the Law is enacted.

As stressed by government officials, most activities under the IWRM and RBM heading will actually take place in a project context, at least for the years to come. The NWISP for example will focus on selected river basins of northwest Cambodia[2] and apply there the concept of IWRM in river basin development. The project is to start in 2005, particularly with four water use studies in selected

[1] Other issues and management concerns are also enlisted, such as mitigation of water related hazards, development of the information base, which we do not examine here.
[2] 4 target provinces of Pursat, Battambang, Banteay Meanchey, and Siem Riep

priority river basins, to identify most suitable areas for irrigation rehabilitation/ development. Water Resources Multi User Committees for management of water resources will then be established at basin level. The project will also include capacity building at national and provincial levels on these concepts (ADB, 2003. NWSIP). It aims at developing particularly understanding, knowledge and application of the integrated water resource management approach in a river basin context[1].

Relevance

Policy related documents stress that there has been yet limited competition for water, and use is a tiny fraction of resources size (NWSP, 2001). As noted by Koster (2001), competition for water has not yet developed to a significant extent, except for the severe conflict in some areas between use of water for domestic purposes and the contamination (often unintended) of water bodies by waste disposal.

However, competition for water is likely to increase because of development of urban areas, hydropower, and irrigation, against the residual stream flow requirements to maintain ecosystems and fisheries, especially in the Tonle Sap and Mekong River systems (ADB, 2003, NWISP). Irrigation and hydropower[2] for example are likely to develop further. As they are by large volume users, this could bring serious conflicts with other water users. Pressures on water resources are also likely to increase as changes in vegetation cover and land use will lead to increased erosion and sedimentation, with consequent impacts on the availability of high quality water (Koster, 2001).

Lack of coordination in management of diverse water uses is widely pointed at as one of the major issues for water management, and a threat for sustainability. There is no strategy for example to avoid conflict between schemes or cumulative environmental impacts. The NWSP (2001) emphasises that numerous water related developments are proceeding with little integration, prioritisation, or assessment of interactions. This is why, as the NWSP (2001) presents it:

> "It would appear prudent for Cambodia to implement an integrated, cross-sectoral approach to water resources management now, to ensure that human pressure does not degrade the water resource".

In particular, actors interviewed generally called for implementation of IWRM and RBM as a pragmatic solution to coordination issues. As they noted, deconcentrated (at provincial level) coordination was both needed and feasible, in targeted areas. Koster stressed in 2000 that coordination among ministry/departmental staff at provincial level may be stronger than at national level, because of more immediate oversight by governors. Coordination is already particularly strong in the context of project implementation at Provincial and more local levels, and through Provincial Rural Development Committees.

On the other hand, promotion of RBM and IWRM would not serve efficiency of water governance, if it were applied rapidly on a large-scale, and in an over-ambitious way. In particular, to be effective, these concepts have to be understood and supported by implementers. Officials interviewed[3] showed generally little awareness, understanding or interest in these new concepts. They did not feel any necessity for management of diverse water uses in an integrated way, or taking into account interactions – largely because no general sense of scarcity is developing, except in a few particular areas. A wide range of knowledge and awareness therefore needs to be developed to adopt and apply an IWRM approach in a river basin context.

In addition, a thorough approach to RBM and IWRM demands resources, particularly to understand interactions between hydrological flows and undertake water resources planning on this basis. The allocation of scarce governmental funds to such an aim has a high cost, whereas benefits from this approach will not be as directly felt.

[1] Initial reactions by government officials were indeed reportedly quite negative ("more studies, more resources spent and more delays")

[2] Notably through the development of multi purposes schemes, as promoted under MIME's (1999) power sector strategy.

[3] Apart from higher-ranks officials who participated in the drafting of the Law.

Another difficulty that might arise is the keenness of central agencies to actually relinquish power and responsibility to decentralised authorities – if IWRM and RBM are to be implemented in a deconcentrated way. Interviewees from external agencies particularly stressed the reluctance of Ministries to actually delegate power and decision-making capacity to provincial authorities, even though a stated goal of the RGC is of deconcentration and decentralisation of governance.

➢ Licences and fees

Introduction of water rights and management of scarce natural resources via economic instruments are increasingly promoted worldwide, they are part of a "demand management" strategy of the resource. This tool aims at making economic agents bear the opportunity cost of the scarce resource they are using – so that resources are reallocated to their optimal economic use.
Santikarn (2000) presents the rationale for introduction of economic instruments for management of the resource in Asia:

> "The first priority for reform is to reflect fully the scarcity value of natural resources in costs to users. This includes the value of natural resources both as inputs and sinks. The open-access regimes that prevail will have to give way to systems where resources are properly valued and priced. Instruments to correct market failures in the water sector are primarily legal and regulatory instruments, implemented under command and control regimes. The continuous degradation or natural resources and the environment to date demonstrate that these regimes are no longer effective in achieving both growth and sustainability objectives concurrently. Other instruments, such as economic instruments, concessions and property rights, pricing, charges, fees, and transferable development rights, need to be employed appropriately."

Plans for implementation
The National Water Sector Profile (2001) stresses that demand management is not, in any formal way, practised in Cambodia, except perhaps through revenue collection by the Phnom Penh Water Supply Authority and the provincial water supply operators.
Adoption of the Law on Water Resources Management will however make licences and payment of water fees compulsory for all non-individual uses[1], and these shall be implemented rapidly, although it appears that actual implementation is little planned yet. It is left to sub-decrees to specify procedures for granting, cancelling, transferring, duration of licences, and uses subject to payment of a water fee (draft Law, 2002).
A first draft decree was issued by the World Bank/ APIP consultancy in 2000, but was left dormant. The Decree will be upgraded via JICA Technical Assistance from the end of 2004, in collaboration with the Department of Water Resources Management[2].

It is remarkable that, nor in the draft Law, neither in the draft Strategic Plan of the MOWRAM (2004), any mention is made of water rights, or of the allocative objective of water licenses and fees. Other policy documents however refer to the ultimate goal of these instruments: the NWRP (2004) for example stresses that "sharing and allocation of water among sectors has not yet been implemented in a formal way that meets the needs of all water uses. Therefore, the RGC will promote equitable sharing and allocation of water, apply fees and/or licences for water use when they are necessary to conserve the natural resource." The draft decree on PIMD (2003) even refers to "provincial allocation plans" on the basis of which water rights would be granted to FWUCs.

[1] Individual and family uses are permitted without a licence, including drinking, washing, bathing and other domestic purposes, the watering of domestic animals and buffaloes, fishing and the irrigation of gardens and orchards.
[2] This Department is going to be the line agency responsible for licensing. Higher-rank officials interviewed stressed it is likely that some responsibilities will also be delegated to Provincial Departments.

Relevance

Some policy documents place a high emphasis on competition for water and the need for sharing between different uses. In the NWRP (2004), for example, one of the key issues identified is "competition for water, sharing the resource",

However, as already stressed above, competition between water uses is rarely acute at present. Most conflicts occur between water supply and wastewater management, or at a very micro level. The NWSP (2001) notes for example that:

> "Any conflicts between users, for example between neighbouring paddy farmers, are local and on a small scale, and usually are dealt with informally, at a community level."

It is generally widely acknowledged that instruments such as licenses and fees are promoted to avoid future degradation of the situation. The rhetoric found in water policy documents emphasises in this way that the issue is to "implement practicable measures for regulating competing uses of water, before[1] competition becomes a constraint" (example taken from the Strategic Framework of MOWRAM, 2001).

Moreover, even in a context of water scarcity, to serve the goal of sustainability of water use, and reallocation of uses between sectors, allocation of water rights and setting of fees shall be based on a thorough knowledge of the hydrological situation (and of future likely developments) and important means for enforcement. As emphasised by the NWSP (2001):

> "The provisions of the Law that relate to licensing of water uses must be translated into usable tools for controlling competition before it eventuates. This will require careful monitoring of the situation to identify impending competition, timely preparation of the appropriate tools, and provision of the capacity needed in MOWRAM for administration, monitoring and enforcement."

The information base is however lacking. Ministerial officials interviewed stressed that the registration process, where water users will have to provide information on their activities, will allow for the constitution of the information base. However, even if all users would register and provide accurate information, the need to unfold hydrological interlinkages, and study the available resource, could not be avoided.

Capacities for enforcement are then questionable. For example, a possible sustainability issue is the effect on shallow groundwater aquifers of unplanned exploitation by large numbers of individual farmers. The Law provides for recording of abstractions and of well drillers, but it is questionable whether its enforcement will be practicable.

Relevance of these instruments to the present situation appears very limited. In addition, their contribution to prevention of future damages appears therefore questionable.

Sustainable management of the resource might not require the widespread use of demand management tools. Even in the context of acute water scarcity in some areas, implementation of licences and fees in the present context (without thorough data, allocation plan, and limited understanding by government's officials) would not serve the goal of sustainability.

There appears to be little understanding or ownership by the governmental side of the ultimate goal of sustainable management.

External actors interviewed suggested that this low level of understanding stems from the lack of pressing needs for demand management in the country, and because there is a more direct goal identifiable: that of yielding power and financial resources to the MOWRAM. As stressed by Santikarn in 2000:

> "Water pricing has been adopted by many Asian countries, but mainly for the purpose of paying for the O&M costs of irrigation only, rather than as a basis for allocation purposes."

Interviewees from external agencies generally stressed the danger there is in introducing instruments of control and taxing the sector without establishing transparent allocation plans. The risk is at best to create a source of revenue for the MOWRAM, without improving management of the resource, and at worse, to create a new channel for corruption.

[1] Underlined in the original version.

Conclusion

Promotion of IWRM, RBM and licences/ fees in Cambodia has been inspired by mainstream practices worldwide. These tools are instruments for demand management, which ultimately aim at ensuring an optimal allocation of the resource between users, in a sustainable way.
As competition over the resource is yet little developed in Cambodia, it is widely acknowledged that these principles are promoted mostly to avoid future degradation of the resource.

However, there are many obstacles on the way for these instruments to serve the designated goals.
First, the very need for overall demand management in Cambodia is still questioned, and most observers recommend implementation on a few targeted areas, where competition for water is acute. Then, the information base necessary to ensure that these instruments serve a rationale allocation of water uses is lacking, as well for capacity for enforcement.
In addition, because of the lack of pressing need for demand management, these instruments and their ultimate goals are little owned by governmental agencies. It is feared that they will be either little promoted, or promoted in a detrimental way -taxing the sector without reallocating water to optimal uses for example.

However, there are also wide differences between the two sets of principles promoted.
There are indications that implementation of IWRM and RBM will start in a pragmatic way in a few targeted areas, through a project-base. These will enable for a progressive capacity building of governmental staff, The NWISP will also both promote pragmatic deconcentrated coordination (both feasible and wished for) and provide the means for an optimal implementation of the principles (through thorough hydrological studies). In the best of cases, they shall provide room for a testing of the approach – this last, and crucial, point however will rest on the willingness and capacity of actors engaged.
Licences and fees however shall be quickly implemented nationally, but there is no knowledge yet on how any allocation plan will be decided upon, or how they will be set up or enforced. They are promoted by governmental agencies for reasons that appear wrong to the eyes of many external stakeholders. Observers are also widely afraid about by the opportunities for corruption –which is one of the major obstacles to good governance or economic growth in Cambodia[1]- they will offer.

"Policy models must be tailored to the local situation and be based on what is feasible rather than on what is considered desirable"[2]
A critical issue in the water sector, identified in all policy-related documents, is the capacity of MOWRAM and other relevant institutions to carry out their responsibilities, at both the national level and the provincial level. Operational effectiveness is constrained by limited financial and human[3] resources, as noted by ADB in 2003 (NWISP). Generally, the vast array of principles promoted in the documents (licences, IWRM, river-basin management) are considered overly-ambitious, considering particularly the limited means for implementation, as only about 20million US$ are assigned annually to the sector (draft Water Vision to Action, Tara, 2003).
As governmental resources (human, technical, or financial) are scarce, promotion and widespread implementation of principles not directly relevant has a high opportunity cost.
However, the acute problem of lack of capacity for implementation is treated as a side issue, whereas it should form the base of the framework. In the draft Law (2002) a provision on the definition of "Water Law Implementation Areas" ensures full implementation of the Law will take place only in a few areas, where issues and challenges are acute. However, no other texts refer to such progressive implementation.

[1] The governance and corruption diagnostic (2000) showed that public corruption is perceived as a leading problem for citizens and enterprises.
[2] Molle, 2003.
[3] Because of the country's recent history, and low public services salaries, government agencies do no have sufficient numbers of experienced, trained staff.

Generally speaking, implementation has been little considered yet, with an overall strategy and an action plan for the sector, still being drafted. Most recent documents for the sector in this regard include the "roadmap for the water sector" (MOWRAM, 2003), and the draft Strategic Plan of MOWRAM (2004). No timeframes or specific actions are enlisted, and no comprehensive view of the sector is developed. Although the MOWRAM has been working on these for several years, the drafts are still very general, and can not in their present state guide governmental action in the sector: they still lack description of precise areas for action, setting of targets, and estimation of revenues[1].

In summary, the debate over the need to equip Cambodia with instruments that are not relevant to most pressing needs is left open. Success or failure will much be determined by the method and the pace chosen for implementation. Sub-decrees and detailed action plans might provide the opportunity for adoption of a pragmatic approach to implementation of the principles. There are however great risks as well, that is if the main principles are applied too widely, in a way where instruments cannot serve their ultimate goal, and on the contrary misallocate scarce resources or encourage poor governance.

[1] Samphois (2003) stressed in 2003 there was a widespread tendency to forget to establish quantifiable targets and real plans.

B. PIMD

The rationale behind Irrigation Management Transfer is based on powerful recent paradigms, such as reversal of Harding's paradigm, and the ability of rural communities to manage local resources (Ostrom, 1999). Another strong force driving towards Irrigation Management Transfer in developing countries has been the financial crisis of the state, and the expectation to save the government's money (Vermillion, 1996) [1].

Although objectives are far reaching for PIMD in Cambodia (see Box 1), and "participation principles are reaffirmed in a standardised and politically-correct manner" (quotation from F. Molle, 2004), the main objective pursued is actually to remove the financial burden of O&M from the State. In most water-related policy documents, the rhetoric behind enhancement of farmers' participation is that of the limited capacity of the State for O&M. For example, the rationale developed in the sector "roadmap" (MOWRAM, 2003) is that:

> "Water management systems cannot be sustained because of limited government resources. MOWRAM is implementing a policy of irrigation management transfer and participatory irrigation management and development. These are applied to new and rehabilitated schemes and progressively introduced to existing systems, with establishment of Farmer Water User Communities".

The PIMD policy has a special status in Cambodia, as, contrary to the principles studied above, there is a strong impetus for the reform, and it has been experimented in the country for a long time.

➢ PIMD projects in Cambodia[2]

Irrigation rehabilitation took place in an emergency way following foundation of the Kingdom of Cambodia. A major study by Halcrow (1994) enlisted all medium- and large-scale irrigation schemes in the country, and set the reference base for investment decisions.

In the early 1990s, NGOs were the first involved in the area, mainly on small-scale schemes[3]. From the mid-1990s, IOs became involved with irrigation development[4]. Farmers' participation was promoted from the start in irrigation development projects, driven by worldwide best practices, and the acknowledged lack of capacity for O&M or support from the RGC. These initiatives were however marked by the emergency context in which they took place, leaving little actual space for institutional development.

PIMD has particularly gathered momentum since the end of the 1990s[5], with a high increase in the number of schemes concerned, and launching of large-scale and longer-term projects by donors and NGOs. Institutional development has taken and still commonly takes place on the basis of a rehabilitation project.

There are also direct governmental initiatives of transfer, with the pilot schemes[6] from MOWRAM since 2002, and direct implementation by PDOWRAMs.

There are to date 77 schemes registered to the MOWRAM[1]: most are PRASAC, SEILA[2] and DIA schemes[3].

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[1] According to Geiger (1995) as quoted by Molle (2002): "the strong impetus for government support of the reforms are the "lack of government funds to pay for O&M, inability of governments to collect service fees, and poor management by underfunded irrigation agencies".

[2] In the cases where no Communities have been established, the PDOWRAM and District officers are in charge of managing the scheme. They receive financial support from the government, and also from international donors.

[3] MCC was one of the most active NGO then, Its activities were located in Prey Veng Province and 6 FWUCs were established covering about 1995 ha of irrigated land.

[4] The major project undertaken in the 1990s was rehabilitation and institutional development under PRASAC I. 11 medium-scale schemes were concerned.

[5] Most recent and current projects are listed in Appendix 12.

[6] Under ADB Funding Cam 1445 (about 1million US$).. Implementation undertaken with human, technical and financial support provided to the FWUC, together with rehabilitation or improvement.

As reported by ADB (2003), about 100 FWUCs "have been formed to date, and are functioning to a limited extent only". Observers interviewed emphasised that most FWUCs established had a tendency to collapse after external support ceased. One comparative study particularly was undertaken on the subject in 2000-2001 by ADB (FWUCs: review of experiences), and stresses that constraints observed were: (i)Insufficient follow up after transfer of the systems to the FWUC, (ii)Medium and large-scale irrigation reservoirs difficult to manage by water users, (iii)Low irrigation service fee collection rates for O&M of most systems, and (iv)Insufficient qualified staff at provincial level of MOWRAM. Some interviewees added also local political pressures among the constraints to sustainability of FWUCs[4].
Nevertheless, there has been generally a lack in capitalisation from experience:

- Projects have rarely entailed a ex-post evaluation
- If so, there have been no mechanisms put in place to ensure it was shared, debated and could feed in a common pool of knowledge[5]. The ADB comparative study for example was unknown to most interviewees involved in PIMD.
- Finally, as stressed earlier, mechanisms to feed in policy formulation have been very limited. NGOs have not been asked to share their experiences. Inputs in policy processes only came from IOs directly involved and consultants.

➢ Plans for implementation of the policy

The only targets set yet were to have FWUCs established in 80% of the irrigable area by December 2005 (Draft PRSP, 2002[6]). However, such a target was quickly considered unreachable. C. Sinath now suggests however that the pace of implementation will gradually increase over the years, so that around 2015- 2020 all schemes are handed over to farmers[7].
The line agency responsible is the DIA, which is currently pilot-testing modalities for PIMD in 11 pilot schemes[8]. Human, technical and financial support is to be provided to these schemes for 5 years. The experience shall be used to define guidelines for implementation and capacity building, as well as train PDOWRAM officers.
Direct implementation by PDOWRAMs[9] is also promoted, and shall be the main mechanism for implementation in the future. Already schemes where no external agencies are involved are managed directly by PDOWRAM staff in collaboration with District officers. The staff receive annual training

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[1] See Appendix 13.
[2] UNDP/ Cambodia Area Rehabilitation and Regeneration program for decentralisation: development funds are attributed to Local Development Councils.
[3] It was suggested at the National Workshop on PIMD (Sept. 2004) that 129 FWUCs had been formed overall, but no list was available.
[4] Staab noted for example in 2000 that difficulties experienced in PRASAC II schemes were: insufficient communication between project and farmers, inadequate participation of local authorities, lack of understanding, different systems of canal management and maintenance in place, fees collected are too low to cover O&M, political interference, lack of trust between farmers and scheme managers.
[5] Some initiatives took place at the beginning of the 1990s, but did not lead to a continued process of exchange and reflexion.
In 1993 a workshop on Irrigation Sector Community was held under the initiative of CIDSE (Cooperation internationale pour le developpement et la Solidarite), gathering NGOs, IOs and governmental officials (Himel, 1993). In 1995, a discussion group of about 10 NGOs was then set up to share experiences in PIMD, with follow up by officials from the DGIMH. However, the group functioned only for one year.
[6] Draft National Poverty Reduction Strategy – Action Plan Matrix..
[7] The draft terms of reference for the "Development of a Seven Year Master Plan for PIMD and Selected Enabling Activities" (DIA, 2004) refer to a pace of about one scheme handed over per year in each of the 14 main Provinces with irrigation schemes.
[8] Under Loan ADB Cam 1445. Human, technical and financial support is to be provided to the schemes for a 5-year period.
[9] FWUC support teams

on PIMD[1] (by DIA officers), and are to establish FWUCs following national guidelines. They submit the draft statute to the DIA, which then controls the process[2].
Finally, the Department of Engineering from MOWRAM is also involved in supervising rehabilitation and institutional development projects of major donors[3], such as JICA (BAPEP), World Bank (FERP), ADB (Emergency Flood Rehabilitation Program EFRP) and AFD (Prey Nup and Stung Chinit). Better coordination between its activities and the DIA activities will be promoted in the future, particularly with the upcoming establishment of an internal Committee on O&M within the MOWRAM, to unite different Departments.
Other organisations support PIMD:

- Interministerial Working Group (see I.a) established in 2003
- A National Secretariat of PIMD might be established, as advised by the international consultancy from the IWMI. The Minister, considering the risk there was to create an additional entity with no clear mandate, means or effectiveness, has however delayed its creation.[4]
- FWUC Support Teams in provinces, with 3-4 officers from PDOWRAM, already designated. They should be in charge of establishing FWUCs, providing technical support, organising training for FWUCs, and collecting data for the M&E system.
- Provincial Working Groups, to be established. They will be coordinating entities for Provincial Departments involved (from MOWRAM, MAFF, MRD) and other actors at the provincial level.

➢ Analysis and contrast of 2 approaches to PIMD

Presentation of the schemes[5]
O'Treng irrigation scheme was originally built under the Khmer Rouge Regime. Until 1998, villagers and local authorities undertook small repairs and basic operation to irrigate about 30ha in wet and dry season. Following rehabilitation in 1998, the District Authority set up a Community to manage and maintain the scheme. Collective action was then formally organised following national guidelines in 2000, with the involvement of the DIA/ PDOWRAM.
In 2002, the scheme was selected to become a Pilot Scheme of the DIA. The MOWRAM/ PDOWRAM have since then undertaken capacity building activities, and provide human, technical and financial support to the scheme.
Irrigated areas amount currently to more than 400ha in wet season and 250ha in dry season, and the scheme is providing water to almost 900 families.

The Stung Chinit Irrigation and Rural Infrastructure Project is located in Kompong Thom province, Cambodia. The irrigation scheme was originally built under the Pol Pot regime, and became dilapidated in the 1980s. The project is designed to rehabilitate the scheme, increase agricultural productivity and stimulate the rural economy in the province, and began in 2001.
The NGOs GRET/ CEDAC are in charge of institutional development, under supervision by the Department of Engineering of the MOWRAM. The aim is to provide wet season supplementary irrigation to 3 000ha, and irrigate 1 800ha in the dry season. By October 2004, a temporary reservoir was operational, and construction of Secondary Canal 1 (SC1) was almost completed. Irrigation of a pilot block of 56ha has been possible since October 2003.

[1] A training manual has been prepared by an IWMI consultancy in 2003 (supported by IWMI).
[2] 11 schemes were submitted for registration already from 3 provinces. Only 2 were considered satisfying and will be registered. The others have to revise establishment of the Community and draft statutes.
[3] Involvement of this Department result from its links with PIMD projects since the early 1990s, and from the fact that projects entail a rehabilitation component is prior to (or in simultaneity with) institutional development.
[4] The Technical Cooperation Project from FAO aims at establishing such a Secretariat, but has stepped back because political instability, and now will wait that a clear political will is expressed towards creation of the National Secretariat.
[5] See Appendix 16 and Appendix 16 for background information on the schemes.

Collective organization of farmers first began with consultation on the design of the infrastructure, and representatives were elected in 2002- 2003. The experience of irrigation in the pilot block is being used to test arrangements for collective management of irrigation.

A. Comparative study

The main elements for analysis of the schemes are detailed in Appendix 22.
The existing legal framework rests on the Circular n°1, its Appendix model "Statute of the FWUC" (1999), and on the Policy for sustainable O&M of irrigation schemes (2000). Draft decrees and sub-decrees refine, adapt and modify most provisions of the current framework.

- **Institutional arrangements**

I focus on the organisational structure, information flows/ decision-making arrangements, and on the links with local authorities[1].

Structures adopted in O'Treng and Stung Chinit are relatively different to the formal structure promoted in the legal documents, both in terms of types and roles of levels, of number and duties of representatives, and of links with the administrative structure.
In both schemes, structural organisation is a complex one, with many levels and intervening entities. Organisation at the highest level parallels the hydrological structure, but is a mix of administrative/ hydrological units at the lowest levels (whereas sub groups are to be defined by "irrigated area" according to the Circular n°1). In O'Treng, for each type of task (operation, information sharing, fee collection…) a different entity is called upon, formal or informal. In Stung Chinit, sub-levels include both village based- and tertiary canal based- groups.

Arrangements for information flows and decision making are very important to give farmers and their leaders the means to understand the stakes and issues of water management, and to allow them to give their opinion and influence decisions. Draft texts impose a higher level of participation of farmers than the existing legal framework: the Model Statute advises that farmers shall participate only for establishment of the budget and cropping pattern schedule.
In the schemes, issues open to consultation with farmers differ: in Stung Chinit approval from farmers is sought on all major organisational/ regulatory/ financial decisions, whereas farmers are rarely consulted in O'Treng. In Stung Chinit however, appreciation about effectiveness of participation differed between farmers and project officers interviewed[2]. It is suggested that participation of farmers to decision making is actually not straightforward in Cambodia:

- They usually lack experience with irrigation
- There is a reluctance to speak up in meetings[3]
- There are other informal bottom-up channels to transmit information and requests[4]
- Traditional patterns of authority are top-down[5]

Representatives have been in both cases involved more intensively in decision-making. In Stung Chinit, various methods for formulation of arrangements, with differing levels of inputs from representatives and time spent, have been experimented, to try and find the right balance between contribution from representatives, and effectiveness of decision-making. In O'Treng, most formal documents have been adopted following discussion between MOWRAM officers and representatives.

[1] See Appendix 20 for the matrix of analysis of arrangements.
[2] For the CEDAC project officer, there have been examples of critics by farmers of the proposals made to them, particularly on arrangements for the water turn, and on organisation for maintenance. Most farmers interviewed however stressed that they did not discuss proposals made to them, or bring modifications to them.
[3] O' Leary and M. Nee (2001) note that: "the combination of hierarchical culture, patronage, and the education system has resulted in a widespread reluctance to openly oppose, disagree with or even to question those who have power."
[4] Via interpersonal relationships.
[5] As emphasised by Chandler (1996), the society is traditionally very hierarchical and marked by an authoritarian exercise of power.

However, such exchanges have been reportedly primarily top-down, and representatives have little been given the opportunity to have a say about definition of arrangements. This lack of formal participation has been compensated for by the use of informal arrangements (mostly inherited from the past) in the actual day-to-day running of the scheme by representatives.

Finally, the potential for using the local administrative structure is little promoted in the legal framework. The hydrological structure only is recognised as the basis for organisation, and no reference is made to he administrative basis, or to involvement of local authorities in management. In the draft texts, the FWUC "shall inform and consult with local authorities on plans or decisions that are important for the area".
In both schemes however the village level is an important unit for organisation, and local authorities are called upon for support in formal (specific meetings in Stung Chinit) or informal (local chiefs holding representatives positions in O'Treng) ways[1]. Support from local authorities was particularly sought for enforcement.

- **Legal arrangements[2]**

Legal arrangements are the basis for collective action. They include membership/ registration, elections, statute and by-laws, service contract and recognition by the government.

Of the principles guiding PIMD, the "democratic" statute of the Community has proved difficult to guarantee. Candidates to elections were appointed by local authorities and Community leaders in O'Treng. In Stung Chinit, candidates had been partially volunteers, and partially pushed by their fellow villagers. Widening of the candidature base might prove difficult, as the pool of literate people is not very extended, and "there is a widespread reluctance to hold position authorities" (Hasselskog, 2001).

Legal arrangements rest primarily on statute and by-laws. The Circular n°1 entails an extensive Model Statute, but there is no requirement to apply it strictly. The draft texts emphasise that the statute should be simple and scheme-specific: "the FWUC support team should not force all FWUC to follow exactly a single detailed model".
The MOWRAM has promoted adoption of model statute and by-laws in O'Treng[3], with only modification of levels of fees and fines, and of budgetary allocations for the 5-year work plan. There appeared to be no ownership of the legal base by representatives, and little use made of the planned functional arrangements: only general provisions about the structure are applied. Steps are taken to try and modify some arrangements, and make them abide to the formal regulation (introducing a water turn for example). It could be interesting however to, reversibly, build on existing arrangements to formalise and rationalise them – as they are often time-consuming for farmers and their leaders, and they are also open to contestation[4].
On the contrary, in Stung Chinit a very extensive work has been undertaken with leaders for formulation and understanding of the legal framework. The legal model was used as a basis for work, and the statute was modified according to the local situation[5], and simplified. Specific regulations are then added for operational procedures, and offences.

As emphasised by Prevost (2003):

> "The method used to draft the statute is perhaps more important than the actual results in their own right. The users' representatives have to develop answers to the many questions raised".

[1] The DIA itself promotes in the pilot schemes direct involvement of local authorities in the structure.
[2] See Appendix 19 for the matrix of analysis of legal arrangements.
[3] As in other pilot schemes. Statute and by-laws then include: statute, structure, names of representatives, revenue raising target and 5-year work-plan
[4] This does not happen at present, but might in the future (with increased pressure on farmers to pay fees for example).
[5] Relevance however cannot be appreciated yet, as the statute is still a draft and will be tested only from next dry season.

For legal arrangements to be valuable to the Community, it is necessary that representatives develop a good awareness about them – which is not the case in O'Treng yet, and still in process in Stung Chinit, where representatives have lacked opportunities to confront them with field experience.
The debate is however open on the adequate level of legal documents to reach. A few words of caution can be expressed about a possible over-focus on formulation of legal arrangements:

- In many cases, in Cambodia, legal arrangements are either non existent or non applied (ADB, 2001). De facto arrangements and social coercion are often used preferably, as for example in O'Treng so far, as there is a good social consensus on rules and the FWUC has had enough authority over farmers[1].
- Regulations in Stung Chinit are extensive and very detailed. However, if the authority of the Community is well established, farmers will know and respect broad principles of rules. In addition, the ability of farmers' representatives to actually enforce specific points of detail is questionable.
- Finally, there is an opportunity cost to the extensive work undertaken on formulation of legal arrangements, in terms of human resources. This work should be balanced with other work on reinforcement of the authority and the capacity of representatives.

On the other hand, a minimum specific legal basis, in correspondence to the action of the FWUC, would be necessary in O'Treng, to assert its activities. Then, multiplication of legal documents, as in Stung Chinit for example, also present some advantages: it may increase chances of seeing farmers abide by them (although this is debatable[2]), and in any case they represent good opportunities to raise awareness of leaders and of farmers. The level of detail necessary, and the time to spend on fine-tuning them, should however be reasonably limited.

Then, for recognition by the State, the main modality is registration to the MOWRAM, with publication of a decree. O'Treng Community was registered from 2000, and negotiations are in process for Stung Chinit. Although legal texts do not provision for it, the DIA promotes registration after each elections[3] or changes in statute, which is a constraining procedure.
Finally, the draft texts provision for a Management Transfer Agreement to be signed between the Community and the government, and for allocation of water rights to the Community. This last issue is however not addressed yet, although it is one of the highlights of the draft Law.

- **Financial arrangements[4]**

Financial arrangements are concerned with revenues, accountancy, and expenditures.
In Stung Chinit, fee collection will start only when dry season cultivation becomes profitable to farmers, and most financial arrangements have not yet been decided upon.
The legal framework entails some important provisions about financial arrangements:

- Sources of revenue include water fee, fines, support from external agencies (Government, NGOs/ IOs), and business operations.
- There is a formula for financial support by the Government, as a share of revenue, to be phased out over 5 years.
- The water fee should be calculated based on O&M expenditures, and taxing agricultural productivity improvements.

Drafts texts however abandon these last two provisions: financial support from the government would depend on the type of expenditures[5], and the fee level is to be decided by farmers.

The main source of revenue will be the water fee and external support[1] for both Communities. In O'Treng, the fee level was set by farmers, as advised by the MOWRAM[2], at 10 US$/ ha/ year (but is

[1] With assistance from local authorities.
[2] As stressed by DFDL, people would be less keen to openly disobey a greater number of contracts and formal documents of obligations.
[3] Hence in O'Treng, the Community registered in 2000, and in 2003
[4] See Appendix 21 for the matrix of analysis.
[5] Operation, routine maintenance and minor repairs and improvements financed by the Community
Major rehabilitation and upgrading, development shall be shared.

rarely effectively aid by farmers, because of the high flexibility in fee collection). In Stung Chinit, a consultancy mission (end 2004) will estimate O&M costs, and the level of the fee will then be debated with farmers. Flexibility in water fee collection[3] is an important topic in O'Treng – however it is not referred to in legal texts, and it is not planned for Stung Chinit, whether linked to agricultural returns or water service quality.
Then, financial support is to be provided by the government. It is calculated as a share of the target for revenue generation in O'Treng, and will be phased out over 5 years as water fee collection increases. The FWUC will then have to be self-sustaining. In Stung Chinit, given the size of the scheme, an effective cost-sharing mechanism will be implemented, with the government supporting primary structures.
Although the level of routine O&M expenditures in both schemes is yet unknown, it is suggested that it might be quite high, as the sandy soil used erodes quickly, as in some places the construction work has been done poorly (some parts of canals in O'Treng), and as the structures are subject to annual floods. As returns to irrigated agriculture have yet been poor in Stung Chinit, and as they are highly variable in O'Treng, it is unknown whether the Communities will be able to raise enough revenue to cover for their full share of expenditures.

B. Comparison between stated objectives and potential achievements[4]

Evaluating the potential for achievements of objectives of the policy (see Box 1) in Cambodia would require a general survey. I focus on the potential achievements of some objectives in O'Treng scheme only.

Box 1: Governmental objectives for the Participatory Water Management Programme

- Receive efficient and sustainable irrigation systems
- Promote food security and national economic growth
- Decrease government responsibility for development of the sector
- Enhance the capacity of farmers in managing the systems
- Promote awareness of the farmers
- Encourage international agencies to increase funding
- Bring about uniformity the government institutions

Adapted from: Policy for sustainability of Operation and Maintenance of irrigation system, June 2000

- Efficiency of water use

Water is a very constraining resource for irrigation in O'Treng, with the limited capacity of the reservoir (limited recharge during the dry season or dry spells in the wet season). Efficiency relates to:
• Arrangements for operation
The Statute requires implementation of a water turn. In O'Treng scheme, however, practical arrangements for operation are based on a water-at-request method, inherited from the past. At the scheme level, there appears to be very little water wasted. Water supply is very fine-tuned and responds to individual demands of farmers. Existing arrangements appear economic and effective in terms of water use for cultivation[5].
MOWRAM officers now promote adoption of a water turn in the scheme, in order to improve the cropping pattern[6], and diminish conflicts between farmers[7]. Such a turn would - in the best case - save on farmers and leaders' time, but should not serve the stated aims, and even less change economy in water use. There is on the contrary a risk to this measure if implementation is too rigid, and if the turn

[1] At least for the project support period
[2] Recommendation of the DIA adopted in all pilot schemes
[3] Based on agricultural returns. Farmers negotiate directly the price to pay with their representatives.
[4] See Appendix 23 for a detailed study.
[5] Arrangements used are however very demanding in terms of human resources, for farmers and for leaders.
[6] By introducing a time lag between different sub-groups' cultivation. However, this is already the case.
[7] However, farmers interviewed stressed all conflicts on water supply were very small, and solved by themselves.

is not established on adequate water requirements. It might then disrupt existing farming practices and challenge the social consensus over irrigation.

• Management of water shortage

A major constraint on the extension of the irrigated area is water availability, as the quantity of water available in the reservoir before the beginning of dry season cultivation varies from year to year –and is some years insufficient for the planted area. In 2004 for example, just enough water could be provided to irrigate the whole area, by pumping water to the bottom of the reservoir.

Different attempts to limit in advance the area cultivated in 2004 have been reported, but proved ineffective, such as asking all sub-groups to limit the area cultivated, or warning farmers at the tail they would not be guaranteed with water supply.

Management of water shortage is an unsolved issue, and the problem will become more acute in the future, either because of low level of water availability, or because of an important increase in areas cultivated[1]. Response of the DIA is at present to investigate possibilities to link O'Treng reservoir to a big-scale irrigation system, to double the size of the scheme – which is a costly and risky measure, and should be balanced against the benefits of reaching an equilibrium size.

- **Agricultural growth**

The second main objective of the PIMD policy is ensuring food security and economic growth. In O'Treng, 400ha of rice field receive supplementary irrigation in the wet season, and 250ha are cultivated in the dry season, benefiting almost 900 families.

There have been beneficial impacts on agricultural productivity, estimated as:

- An increase in wet season rice yield, from 1.5 tons/ha (rainfed) to 2.5 tons/ha (irrigated).
- High returns for watermelon cultivation in the dry season[2] –although with a very high variability (micro local and from year to year).

Although irrigation has a positive impact on agricultural returns, other aspects of the farming environment constrain agricultural growth. Steps advisable could include providing technical advice on watermelon and rice cultivation[3], making higher quality inputs available, facilitating of credit for investment, and promoting marketing facilities.

The economic basis for the area is agriculture[4], but backwards and forwards linkages to encourage local economic growth appear very little developed. These linkages could be promoted, notably by improving marketing (of inputs and of crops).

- **Empowerment**

Objectives for empowerment are capacity building and awareness. In O'Treng, because of the long history of small-scale irrigation, there is a good social basis to increase these.

Capacity building activities were undertaken by the MOWRAM from 2002, and include trainings and collaboration on definition of arrangements. These are however little adapted to demands from leaders. Although the Policy for sustainable O&M of irrigation schemes (2000) does not refer to such elements, empowerment also includes gender issues, and emergence of new leadership:

- No women are yet holding Community positions, but their involvement shall be sought in the future. As noted by Ahlers in 95, although women have the same activities as men, they are socially discouraged from participating in decision making processes.
- For emergence of new leadership patterns, the situation is mixed, as half the representatives interviewed had other responsibilities in the area[5].

- **Decrease the government's responsibility**

[1] Cropping intensity for the areas within the Community reached last dry season 70%, and could increase if constraints on cultivation lessen, such as lack of means for investment, and lack of labour. In addition, the Community area will be extended in 2005, as infrastructure is already rehabilitated.

[2] 250 to 500 US$/ ha/ year, with inputs costs about 10 to 25 US$/ ha

[3] The FWUC is planning to promote some agricultural extension activities in 2005.

[4] Economic basis appeared as: cash crops in dry season, cattle raising, and some pig raising.

[5] Such as Village chiefs or vice-chiefs, leaders of the Fertiliser Credit Organisation, or some other NGOs referent.

A particular emphasis is put on the financial burden, and the MOWRAM project officer stresses that the Community will have to be self-sustaining. However, some decision will have to be reached for the cases of major damage[1] in the future.

- **Receive sustainable and reliable irrigation systems**

Reliability of supply is primarily constrained by the physical infrastructure, as the reservoir dries up in cases of prolonged droughts.
Regarding sustainability, there is a strong local leadership and commitment to actual management of the scheme. The major constraint appears to be financial sustainability, which the FWUC Board tries to tackle by increasing revenue generation activities. Routine costs have not been estimated, and revenue generation capacities yet unknown, but farmers' representatives expressed doubts regarding the capacity for self-sustainability of the Community.

Conclusion

Achievement of objectives: Objectives promoted in the Policy for sustainable O&M of irrigation schemes (2000) are diverse, and positive progress could be noted on each aspect. However, further additional steps could be taken towards achievements of the goals.
The question of sustainability of collective management of the scheme is however left open: there are strong local dynamics, but the future of the scheme will much depend on the possibility for the Community to be financially self-sustaining. As the main impetus behind PIMD policy is actually the taking over by farmers of the burden of O&M costs, potential achievement of the main governmental goal is yet unknown.

PIMD added value?
Based on the case of the Philippines, of the Office du Niger and on comparative studies[2], I suggest that factors that influence PIMD success are the stress on water resources, political support, returns and incentives for irrigated agriculture, and past collective actions and social interactions.
In O' Treng irrigation scheme, there is a good endogenous basis for collective action for management of irrigation, with a past history of collective management, led by local authorities, and a strong local leadership. There are also high incentives for promotion of irrigation linked to agricultural returns, with, in the dry season, high returns and few other livelihood opportunities.

What is the added value of the MOWRAM initiative in this context?
Endogenous processes seem to be still at work, with most functional arrangements being informal and inherited from the past. However, important contributions of the MOWRAM appeared as:

- Widening the organisational and leadership base, particularly in promoting higher levels of management delinked to the administrative structure.
- Promoting formulation of a longer term vision for the scheme, particularly with the work on the 5 year plan, and with reflection on revenue generation and needed investments and expenditures.
- Rationalisation and formalisation of ad hoc arrangements, for example with current efforts for promotion of a water turn. However, formal arrangements have proven until now little implemented as compared to informal and ad hoc ones.
- Human and technical support to the Community. There are now formal links between the MOWRAM/ PDOWRAM and the Community.
- Capacity-building, with extensive trainings provided to leaders[3]. However, restrictions were expressed by some interviewees on the real adequacy and relevance of the trainings.
- Financial support.

[1] All interviewees stressed that it would be too expensive for the Community.
[2] Fujiie (2001), Couture (2002), Johnson (2002) and Shah (2002) respectively
[3] However, some interviewees estimated that trainings were not enough adequate.

C. Issues for PIMD

From the observations made on the two schemes, the gap between formal policy-making and reality on the field leads to discussion of the promotion of a unique model for PIMD, and of the scope for a successful PIMD and agricultural development strategy.
I base the analysis here on additional information obtained on some major other projects, particularly the other pilot schemes of the MOWRAM, Prey Nup polders[1], the Flood Emergency Rehabilitation Program[2], Kamping Puoy scheme[3], and Sdau Kaong project[4].

- **Promotion of a unique model**

a. Standardisation in the approach by DIA

The line agency for implementation of the policy is the DIA. Its approach is mainly one of standardisation, observed in its two main areas of action: direct implementation, and control of registration.
Institutional development is directly undertaken by the DIA in the 11 pilot schemes. Schemes have been chosen from many different types, structures, and contexts[5]. PIMD is however implemented in a standardised way:

- Use of standardised procedures and time frames for FWUC formation.
- The statute adopted is very similar to the model in Circular n°1, and little adapted to the specificities of the schemes[6].
- Standardised and exogenous targets for revenue generation and expenditures (5000US$ and 2000US$ respectively), and for proposals on the level of the water fee discussed (at 10 US$/ ha, lower for pumped irrigation) are used.
- Participation of farmers or their representatives to formal decision-making might be very limited. "Appropriate decisions"[7] are commonly suggested to the FWUC Boards by the MOWRAM/ PDOWRAM staff, and these prescriptions are usually followed[8].
- There are high standard requirements for obtaining release of the financial support[9], which many Communities find very hard to fulfil.

A standardised and inflexible approach is dominating many aspects of institutional development, and makes formal arrangements defined little relevant to the scheme's situation, or little implemented, as was observed in O'Treng. On the one hand, it is a palliative to the lack of capacities in MOWRAM (to evaluate O&M costs, or spend time discussing statute), and can provide a first basis for arrangements on which to build. On the other hand, establishment of a sustainable Community then relies heavily of local dynamics and their capacity to overcome defects in formal arrangements, and the relative easiness of management.
In this regard, it is remarkable that the Department of Engineering, supervisor (but not operator) within MOWRAM of other institutional development projects, shows a different approach to

[1] Large scale scheme with institutional development undertaken by GRET since 1998.
[2] 33 schemes rehabilitated and transferred by the World Bank, 2001 – 2004.
[3] Institutional strengthening undertaken by JICA since 2003, following 3 years of intervention by APS (Italian Cooperation).
[4] Medium-scale scheme, with institutional development undertaken by the NGO CEDAC since 2002.
[5] Including such characteristics as flood recession cropping areas, soils with low/ higher fertility, religious minorities, past experience with collective management of irrigation. In addition, O'TReng is a particular scheme, as it is a model scheme for the MOWRAM: PIMD has been promoted since 2000, the FWUC is active, and the scheme is often used for external communication.
[6] The only modifications from scheme to scheme being the level of fee and fines, and budgetary allocations for the 5 year work-plan. In O'Treng at least provisions are little understood by representatives, and little implemented.
[7] Terminology used by DIA staff.
[8] As for example with the fee level, proposed at 10US$/ ha, and adopted in all schemes.
[9] The FWUC has first to be able to raise important financial means on its own (at least 1 000US$, placed on a Bank account). It is problematic in some areas, where FWUCs face preliminary difficulties: poor state of the infrastructure leads to a poor irrigation service and an incapacity to levy a sufficient fee in Kap Seh for example.

implementation: much freedom is left generally to operators (NGOs, IOs) to carry out PIMD activities. It suggests that there are alternatives to the approach undertaken by the DIA – but does not show whether it would be possible with the only means of MOWRAM (finance, staff).

Then, the DIA has a crucial checking point position for all FWUCs that want to obtain official recognition. During the registration procedure, which last on average 3 months, but can take up to one year, DIA officers go to the field, review documents submitted[1], and negotiate with the implementing agency over the process followed. They check particularly that the "Steps in the Formation of a FWUC"[2] have all been completed, and also that documents and arrangements abide the set format[3]. For example, the requirement in Stung Chinit was to modify the structure, and for Sdau Kaong, to change the number of articles in the statute. In most of cases, modifications have borne more upon the format of PIMD than its real content.
The DIA therefore appears as guardian of a model for PIMD, mostly defined in the legal framework enacted in 1999 and 2000.

b. Relevance of the model promoted

The legal framework comprises Circular n°1, with particularly detailed financial arrangements, the Statute of the FWUC (1999), an extensive model document on regulations, the Policy on sustainable use and O&M of irrigation schemes, and the recommended Steps in the Formation of a FWUC (2000). What we call here the "Model" promoted mainly consists of the Model Statute of the FWUCs, where most arrangements are described, of the financial provisions included in Circular n°1, and of the Steps to follow.

In all the projects documented, actors have referred to the legal framework, and have been applying its broad principles. For example, the basis for formulation of statute in Prey Nup and Stung Chinit has been the Model Statute, modified and simplified. In interventions by governmental of international agencies, in addition, the Model Statute and Steps in the Formation have been strictly adopted[4] - such is the case in pilot schemes of DIA, FERP[5] schemes and Kamping Puoy.

However, some provisions are considered inapplicable by intervening agencies, such as particularly the main financial arrangements put forward in Circular n°1, with the 5-year phasing-out for support by the Government[6], and formula for calculation of the fee[7]. Others are also considered misleading, such as the set numbers and duties of representatives (from the Policy), and not adopted. Finally, the experience in O'Treng suggests that there can be a wide gap between formal arrangements in the scheme (structure, rules) and actual practice. As stressed by Meizein D. (1996): "Legal recognition of the Water Users Associations gives them a stronger presence in dealing with government agencies, but formal registration alone does not make an active association".
Morevoer, actors interviewed often stress that some important elements are lacking to the model. These include compulsory membership of all farmers within the irrigated area, promotion of collaboration with local authorities[8], signature of an official transfer agreement or official transfer of

[1] To include Statute, structure, 5-year work-plan, Fee level.
[2] These include public meetings, setting the levels (for the structure), formation of FWUC Board (delegates), Selection of Farmer Organisers (in charge of forming FWUCs and collecting information), Discussion on the draft FWUC statute, Formation of the system-wide Farmer Water User Committees (from lower levels to higher levels), Final ratification of the FWUC statute, Registration of the Statute and the Committee of FWUC.
[3] For example, the requirement in Stung Chinit was to modify the structure. For Sdau Kaong, it was to change the number of articles in the statute. In both cases, modifications have borne upon the format, not the content of documents.
[4] Only levels of fees and fines were changed on a scheme basis.
[5] Flood Emergency Rehabilitation Program.
[6] Provision implemented in pilot schemes only by the DIA, under the ADB Loan Cam 1445.
[7] Given the lack of capacity for estimating actual agricultural returns, or routine costs.
[8] Brun and Sophat (2004) emphasise for Prey Nup the importance of contribution of local authorities to PIMD, particularly in the field of enforcement. This observation has been made in other schemes as well (pilot schemes, Stung Chinit).

ownership. Most can be compensated for on a scheme-to-scheme basis, however the lack of compulsory membership is acutely felt in the schemes.

The inadequacies or lacks of some requirements in the Model partly stem from the way documents had been formulated. The Circular n°1 and its appendix Model Statute of the FWUC were issued following creation of the MOWRAM, under pressing need of providing a legislative backdrop to some of the major ongoing projects (PRASAC I and Prey Nup at that time). They were therefore viewed at first by external actors as an official backing to institutional development, and as general guidelines, to be improved over time. However, things have not been modified since then, with documents enacted in 2000 (Policy and Steps) mostly building on the basis set.

The upcoming decrees and sub-decrees[1] profoundly modify the framework. Whereas the core of the existing legal documents is currently the Model Statute of the FWUC, draft texts only give general guidelines about the minimum content. It is emphasised that statute and by-laws shall be defined in accordance with the local setting, and much latitude is left as to their content. The draft texts also abandon some major provisions of the existing texts, which have not been applied insofar, ie the formula for calculation of the water fee, and the phasing out of financial support from the government over 5 years, and emphasise some elements widely considered needed: higher participation of farmers to decision-making, some links with local authorities, modalities for support by the government and external organisations.
As progress is made towards promotion of more relevant guidelines, draft texts however still contain very problematic areas. For example, the draft texts forbid the FWUC to take over other responsibilities and activities than irrigation management – such as agricultural production, agri-business or marketing, lending.
Moreover, these documents have been drafted through two consultancy missions, in 2000 and 2003[2], and they have not yet been submitted to review by other actors in the field, or other departments within the Ministry. It is therefore yet impossible to know if they will be adopted as such – or profoundly modified again. A crucial question will then be if and how the documents will be reviewed and improved, taking into account experience of all actors in the field. As the water policy-process has generally proved until now little open to alternative views or stakeholders, it is doubtful whether a true improvement, building on reality, can be expected.

In conclusion, although the current model is widely promoted, it is relevant only in its broad terms and finally corresponds only partially to reality on the field. Draft documents set a framework again only partially relevant, but call for adaptation of institutional development to the local context – however they might not be adopted by the MOWRAM as such.

Would a model be suitable?
The debate should bear in effect on the need and relevance to have one single model promoted, or even impose actors to follow some precise requirements: should there be "One Cambodian Model", as advertised by the Minister during the National Workshop on PIMD (Sept. 2004)? This question is independent from what to model might be in details. It has some governance justification, but also touches to ideology – and entails great risks.

The justification, on the governmental side, is that officials need to be able to follow up on all initiatives that are undertaken under the PIMD heading, and that there need to be some standards for intervention set, and a way to control activities. Circular n°1 and its Model Statute in this way responded to a concern within MOWRAM, that many projects had been taking place since the early 1990s in an uncoordinated, and sometimes poor, way, and that it had been very difficult for governmental officials to follow-up on these. On the other hand, however, checkpoints have multiplied

[1] Decree on PIMD, Sub-Decree on FWUCs, Sub-Decree on Irrigation Management Transfer and Certification of Management Authority. See Appendix 11: Recommendations on draft Decree and Sub-Decrees on PIMD.
[2] FAO under World Bank/ APIP funding for general legislative formulation (2000).
IWMI consultancy to DIA in 2003.

in the past years (at entry via supervision of PIMD activities, or at exit via registration), at different levels (diverse MOWRAM departments and PDOWRAM staff have been involved), so that the argument, valid for the past, might lose of its strength nowadays.

However, there is a tendency within governmental agencies towards a centralised and top-down approach to intervention. Promotion of a unique model then responds to objectives other than, if not opposite to, good governance. In any case, there has to be a gap between any Model and actual elements relevant to local situations - as scale, environment, past history, local dynamics, potential for agriculture notably vary from scheme to scheme. This gap would be decreased by improving on the framework, but, in all cases, too tight implementation of the set model is to result in misallocation of resources (human or financial) and slowing-down - to failure in the worst of cases - of institutional development of FWUCs.

The important challenge is therefore to decide on what model to promote (and improve it as much as possible, as seen above), and how to promote it. The right balance between the model as a guideline to institutional development and promotion of diverse experiences should be sought. Some type of guidelines and control are advisable, as indeed, particularly for medium- to large-scale schemes, the MOWRAM needs to be able to follow up, and a minimum quality of institutional development is to be expected. Diverse experiments should on the other hand also be sought, so as to promote a suitable adaptation of the concept to local conditions, and to develop the knowledge base about PIMD.

- **Scope for a successful PIMD**

As seen in the assessment of achievements of objectives in O'Treng, there are some benefits felt from irrigation development and local management of irrigation. However, direct added-value by the PIMD initiative is more limited than would seem at first (because of the strong local dynamics that actually supplement most institutional development defects), and sustainability of the scheme remains a major challenge. This is particularly so for financial sustainability, and the same concern was expressed in Stung Chinit[1].

As seen above, the main impetus for PIMD, and the main objective pursued, is financial autonomy of Communities, with removal of the financial burden from the State. Structures are however often costly to maintain[2], whereas returns to irrigated agriculture have proved disappointing so far[3].

It therefore calls for evaluating the appropriateness of irrigation development in the country, and the suitability of PIMD in the national context. Most actors interviewed stress the need for assessing the real potential for irrigated agriculture, under different types of management, and to balance these elements with other paths towards agricultural growth.

Initiatives in the field since 1994 have been based on the Halcrow report, with development of areas then identified with good potential for irrigation. Other elements however should be factored in investment decisions and public policy, such as constraints on the farming environment, costs of the approach, and alternatives. The NWSP (2001) questioned for example the value of medium- and large-scale community irrigation schemes that require a large amount of capital investment and depend on effective management for irrigation.

Alternatives to the current pattern of rehabilitation and setting up of FWUCs for water resources development exist, such as:

- Very small scale irrigation based on pumping from groundwater and rivers (managed on an individual basis or by private operators). There is already a high rate of development of these activities in the Cambodian Mekong Delta (see Roberts, 1998) – development in this field is facing however an unknown capacity of the aquifer.

[1] Fernandez (2003) also identified the shortage between resources raised through water fee collection and costs of repairs as one of the major constraints as one of the major constraints to sustainability of irrigation management in SPFS sites (Special Program for Food Security, FAO).

[2] With big and shallow reservoirs, annual floods, soils with high erosion rate, or the poor quality of works undertaken.

[3] Average of 2.07 tons/ha/ cropping season (Pillot, 2000), versus 1.39tons/ha/season for rainfed rice.

- Development of small-scale schemes using a PIMD approach.
- Private investment in irrigation. Kbal Po scheme, in Takeo province, is one example of a medium-scale scheme: it has been operated since 2002, with good agricultural results, and a high level of fee collection[1]. However, the level of capital investment was high, with no legislative guarantee[2], and returns on investment are slow.

There are in addition many other constraints than water resources to agricultural development, such as low quality of inputs, poor marketing facilities, and lack of technical extension services (as seen in O'Treng). Many irrigation projects now also entail an agricultural component (Stung Chinit) – but not systematically (O'Treng).

Initiatives are to be undertaken to suggest what path for water resources development would be the most suitable in different contexts. The IFAD for example plans to field test the PIMD methodology[3] and to estimate the potential for development of sustainable groundwater irrigation[4] in Prey Veng and Svay Rieng provinces. The French Cooperation then aims at studying the different projects implementing PIMD, and suggesting adaptation of the national policy and strategy accordingly[5].

Success of these initiatives, and of others in the area, will however depend primarily on the extent to which they will be shared, debated, and to which they will feed in national policy.
Mechanisms for contribution of field experience to national policy-making are currently mostly limited to exchange visits[6], and capacity building of MOWRAM and PDOWRAM staff[7]. Governmental mechanisms for learning from experience are yet to be established[8], and it is yet unknown if and how external evaluations will be factored in policy processes.

[1] Yields between 4.5 and 5 tons/ha / cropping season according to the investor. Fee collected superior to 32 US$/ha. The structure actually combines private investment, and management by local authorities.
[2] The legislative framework for "Private Participation in Infrastructure" is currently being developed.
[3] Pre-feasibility study for development of small or Medium scale irrigation using PIMD methodology. Terms of reference, 2004.
[4] Strategic Study of Groundwater Resources in Prey Veng and Svay Rieng", Terms of reference, 2004.
[5] Balmisse, 2004.
[6] Particularly to Prey Nup and O'Treng by other Communities.
[7] In all projects studied, governmental officers are commissioned by the intervening agency to carry out parts or all of PIMD activities.
[8] The Interministerial Working Group is the only organisation with a mandate in this regard so far. However, its activities have yet been limited to advice on 2 pilot schemes.

CONCLUSION

This paper has given an overview of water policy-making[1] in Cambodia, and of some challenges for implementation.

The process of formulation of the water policy framework has been marked by numerous events and documents. Several restrictions could be suggested regarding the process: it was quite exogenous, little adapted, shaped by power struggles between agencies, and built little on field experience or NGOs/ alternative actors expertise. These processes have also been costly, both for donors, and for government agencies.
Ad-hoc mechanisms however helped improve the most crucial aspects of coordination needed, and steps have been taken recently to promote a more coordinated, and focused-on-implementation approach.

Nevertheless, the principles promoted still lack pragmatism. As stressed by Bolding (1997): "Effective measures in water reform come from the application of a realistic approach to the subject". The main new concepts in the draft Law on Water Resources Management (IWRM, RBM and licences and fees) introduced are little adapted to today's challenges. Their impact, beneficial or resulting in misallocation of resources, will much depend on the way they will be implemented. Actors suggest there is a middle-way for successful implementation. However, these principles contain risks as well. Licences and fees particularly might be promoted by the Government for the wrong reasons, not for improving management of the resource: in the best case, it would yield much needed revenue to the government, but in the worse case, it be detrimental to management of the resource, and encourage poor governance.

PIMD is the main principle put forward in the in draft Law on Water Resources Management and already practised. There have been 10 years of experimentation by NGOs, IOs, and most recently by the government. PIMD is also mush owned by governmental agencies, as its primary aim in the country is to relieve financial burden from the State.
Institutional development can follow different methods. As shown by the GRET/ CEDAC and MOWRAM initiative, they abide by the general principles of the regulatory text in place, but many legal provisions are judged inapplicable - given their inadequacy, or given the limited means of the government. Draft texts of implementation overall promote quite a different approach to PIMD, with flexibility and local adaptation required –but still inadequacies on some aspects.
However, standardisation is a feature of the approach followed by the DIA, and establishment of one single Cambodian model is promoted by the MOWRAM. A model might respond to some of the governance issues faced, but would also encourage centralisation and control by the bureaucracy, and would be necessarily ill-adapted to the diversity of local contexts.
The legal framework should better set core principles and guidelines, promoting flexibility in adaptation.

Finally, the question of the potential for successful PIMD in Cambodia remains open: echoes from the past are quite disquieting[2].
It has been generally noted that there are many challenges to successful PIMD in Cambodia: collective action is difficult to promote, enforcement of rules is challenging (Fontenelle, 2003), and potentialities of irrigated agriculture – and concomitant resources that can be mobilised from it – are unknown.
However, the promotion of irrigation in the country, and its capacity to be self-sustainable, are generally promoted without being questioned. It is advisable to undertake comprehensive studies, and promote capitalisation of experiences, to identify the real factors supporting or hampering collective management of irrigation in the country, the scope for successful PIMD in Cambodia – balanced other paths towards water management and agricultural growth. It will then be paramount to ensure that these feed in policy processes.

[1] In exception to Water Supply regulation, for which a whole independent framework is built.
[2] Some experiences are said to have been successful, but no precisions could be obtained on these from interviewees.

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Appendix 1: Country Background

Since independence in 1953, Cambodia has experienced frequent, and unusually drastic, changes in its political and economic regimes. Following the fall of the Khmer Rouge regime in 1979, the People's Republic of Kampuchea (PRK), was established backed by Vietnamese troops and civil administration and receiving major assistance from the former Soviet Union. Following a socialist economic model, the government adopted solidarity and collectivism policies, but soon relaxed their implementation because they were not succeeding. In 1991, the four main political factions signed the Peace Accords in Paris. This laid the groundwork for the foundation of the Royal Kingdom of Cambodia in 1993 and the development of a liberal, multiparty system and a market economy.

After many years of turmoil and war, Cambodia is at least at peace with a unified territory under one government. The three-decade long civil war finally ended in 1998, and general elections were held in 1998 and 2000. Government institutions are nevertheless still quite weak and corrupt, but "on the way to the better" (Varis, 2003). The State is yet unable to fully provide public services—such as safe drinking water, basic education, or protection of property rights.
Cambodia remains one of the poorest countries of the Mekong Region. In 2000, it ranked 136 of 174 countries in the world on the human development index (UNDP, 2001). Reducing poverty is the overarching development objective of the Royal Government. Reforms place emphasis on fundamental fiscal and governance matters. The strong commitments to good governance include sound macroeconomic and financial management, participatory, pro-poor policies, effective delivery of public services, and enforcement of contractual and property rights.

The economy has a comparative advantage in natural-resource based products and labour intensive light manufactures products (Pillot, 2000). These assets are however still much compromised by the depletion of human capital due to major human tragedy and large-scale exodus or death of educated citizens during the Khmer-Rouge years (1975-1979).
International funding agencies and foreign Non-Governmental Organizations (NGOs) have been involved in the country for more than 15 years, since the opening of the country at the beginning of the 1990s. The country was administered by the UN for 2 years, between 1991 and 1993, before the Royal Kingdom of Cambodia was declared. The ADB noted in 2003 (see the Country Strategy) that, with inadequate domestic revenue mobilization, as well as inadequate expenditure and revenue allocation, Cambodia will remain heavily dependent on official development assistance for basic goods and services for some time. In 1992–2002, net ODA disbursements to Cambodia reached $4.5 billion, with 34% from multilateral sources, 58% from bilateral sources, and 8% from NGOs. In 2002, about $450 million in ODA was disbursed, almost 8% of Cambodia's GDP.

Box 2: Cambodia in Figures

• Geography	Land area : 181 000 km²
	Cultivated area : 21.6%
• Demography	Population: 11.4 million (2000)
	85% rural – 15% urban
	Annual growth rate : 2.5%
	Life expectancy at birth: women 58.6 – men 54.1 (years)
• Economy	GDP: US$ 3.1 billion
	GDP per capita (2000): US$ 253
	Agricultural sector : 36% of GDP
	Industry 24% - Service 40%

Sources : UNDP and FAO, Aquastat

Cambodia has rejoined the United Nations, has become full member of ASEAN (Association of South East Asian Nations), and is in the process of entering the World Trade Organisation.
The country is also increasingly involved in regional cooperation, as pointed by J. Dore in 2003. This increased inter-governmental cooperation is represented in the water sector by the Mekong River Commission (MRC): it was set up in 1995 between the countries of the Lower Mekong (Cambodia, Lao PDR, Thailand and Vietnam) and acts mainly as a data-sharing organisation.

Appendix 2: Irrigated agriculture in Cambodia

Agriculture

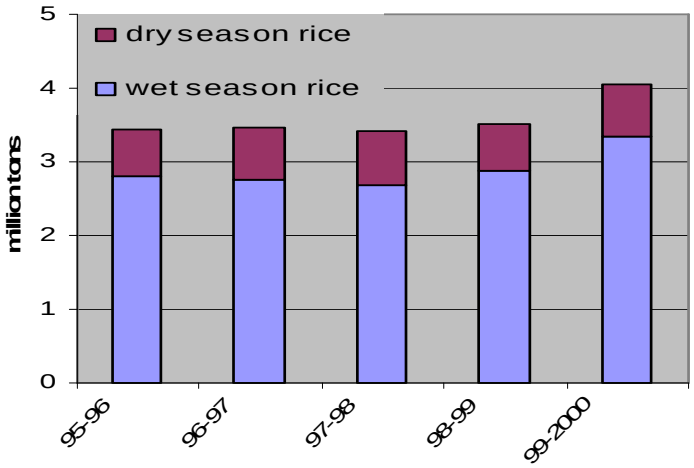
The Cambodian economy is still based on agriculture. The cultivable area is estimated at 25% of the total area and the current cultivated area amounts to around 3 914 000 ha, or 21.6% of the total area (FAO, Aquastat, 1999).

Structural problems continue to hamper expansion in agriculture, which accounts for 33.5% of GDP in 2002. Farmers have limited access to productive land, irrigation, improved seeds, inputs, and finances; those deficiencies hinder their ability to raise productivity and diversify to higher value-added products. In 2002, a combination of drought and floods also hurt the sector, resulting in a negative growth of 2.7%.. (ADB, 2003, CSP)

85% of the workforce is living from family-based agriculture (Pillot, 2000) and the government has identified the agricultural sector as having especially great potential to lead national economic growth and to reduce poverty.

Rice production is particularly important for Cambodia. It is the staple food of the country today. In addition, it is one of the three largest single sub-sector, contributing an average of 14% of national GDP (Pillot, 2000), and it also dominates the use of cultivated land: the total harvested area was 2.08 million ha or 91.2% of cultivated areas in 1999. The average rice yield is estimated at 1.39t/ha under rainfed conditions and 2.07t/ha under irrigated conditions

Figure 1: Evolution of rice production in Cambodia[1]



History of Irrigation in Cambodia

Water management has always been a primary concern for the Khmer civilisation. Due to irregular patterns of rainfall with dry spells during the growing season, the annual inundations and variations in micro relief, water management is quite difficult, and various methods have been developed over the time. The Angkor civilisation (9^{th} – 15^{th} century) is famous for its hydraulic achievements. The irrigation system was then based on four reservoirs, built between the tenth and the thirteenth centuries, and storing some 100-150 million m^3 of water to irrigate approximately 14 000ha.

Modern hydrological systems were first developed between 1930 and 1953, during the French colonial period. They consisted of colmatage canals and great perimeters of irrigation. Prince Sihanouk (1953-1970) then promoted upgrading water management, largely through rescaling traditional structures into larger ones.

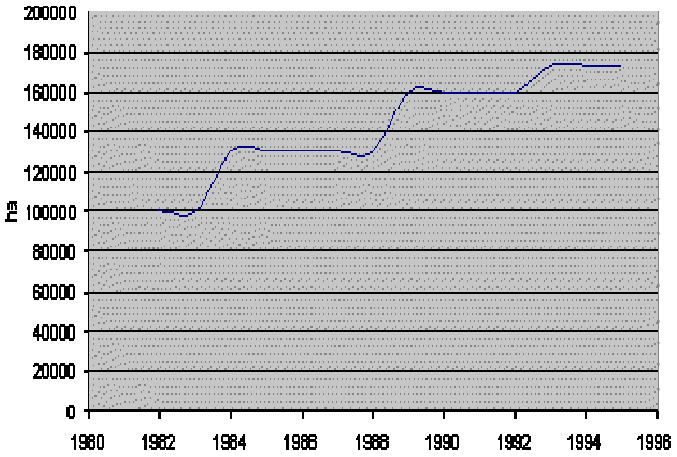
Under the Khmer-Rouge regime (1975-1979), rice became the state's economic basis and the country was to be turned into a super-irrigation system: hundreds of large-scale hydraulic schemes were built at that period. The government supplied a rectangular grid of canals across a large part of the rainfed area – but often the works were designed and built with little regard to basic hydrological and engineering principles. For example, canals were not laid according to contour lines, but regularly from topographical maps. Because of design defects, many of these structures are useless and sometimes even disruptive to water management.

[1] Pillot, 2000.

Under the Republic of Kampuchea (1979–1991), and the following administration by the UN, the country was pacified and progressively opened to the market-economy. The international commitment was crucial over these two decades. In the irrigation field, the achievements were hampered by the lack of resources and efforts concentrated on monitoring, rebuilding and managing existing schemes as much as possible.
After the declaration of the Kingdom of Cambodia in 1993, priority was given to "urgent rehabilitation" of irrigated schemes (Fontenelle, 2003), and villagers were mobilized for working on it. But it was soon acknowledged that the performances were poor, and that little money was available from the government.

In the 80's and early 90's externally aided projects have mostly concentrated on the repair of the main irrigation infrastructure. Emergency repairs of embankments and main structures were carried out and secondary and tertiary level infrastructure improvement was left to the government and farmers to further improve, operate and maintain. Farmers' involvement in management was sought, but over a short-term, and without adequate means.

Figure 2: Evolution of cropped areas under full/partial control irrigation schemes during the wet season[1]



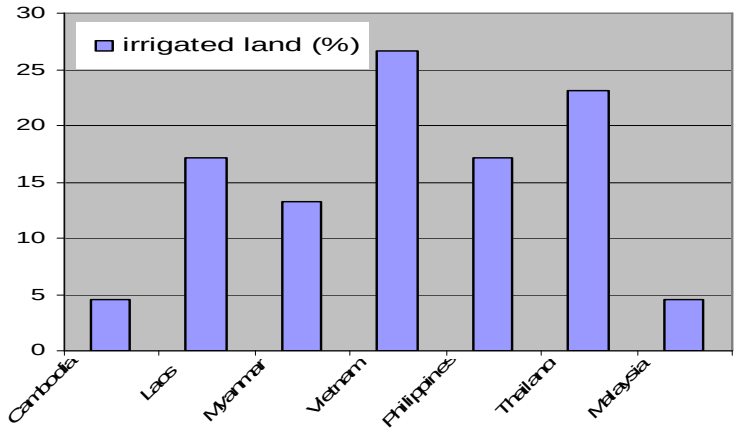
Recent developments
In the recent years, there has been a rapid development of individuals or small-group (drill/pump systems) irrigation projects, notably for dry season irrigated rice and wet season complementary irrigated rice. NGOs have particularly funded such projects. On the side of the government and international funding agencies, much attention has focused on the rehabilitation of the medium to big scale irrigation schemes.

The current state of irrigation in Cambodia

An important but below potential sector
Around 900 irrigation systems were listed in 1994 in Cambodia[2]. Most of them had been implemented during the 1975-79 period. They allowed in 2000, after rehabilitation programs, 277 000 ha of rice fields (Pillot, 2000). This represents only 16% of total cultivated area. Besides, double cropping in full or partial control irrigation schemes is minimal, and production in irrigated fields is pointed as too low (yield averaging 2t/ha).
The achievements in the sector lay indeed well below the potential. It is estimated that with the current existing systems, the potential irrigated area related to those systems is more than 606 000ha (of which 187 000ha for dry season). When compared with other Asian countries, the percentage of irrigated land in Cambodia appears to be far lower.

Figure 3: Regional data on irrigated area[3]

[1] FAO, Aquastat, 1999
[2] Halcrow, 1994. Some MOWRAM internal documents enlist up to 3 792 schemes in Cambodia, taking into account many small-scale schemes, and many disrupted schemes. At maximum, 800 medium scale schemes are enlisted.
[3] Pillot, 2000



In consequence, both because of its importance in the economy and because of its potential for improvement, irrigated agriculture is seen as essential to address rural poverty and promote economic growth.

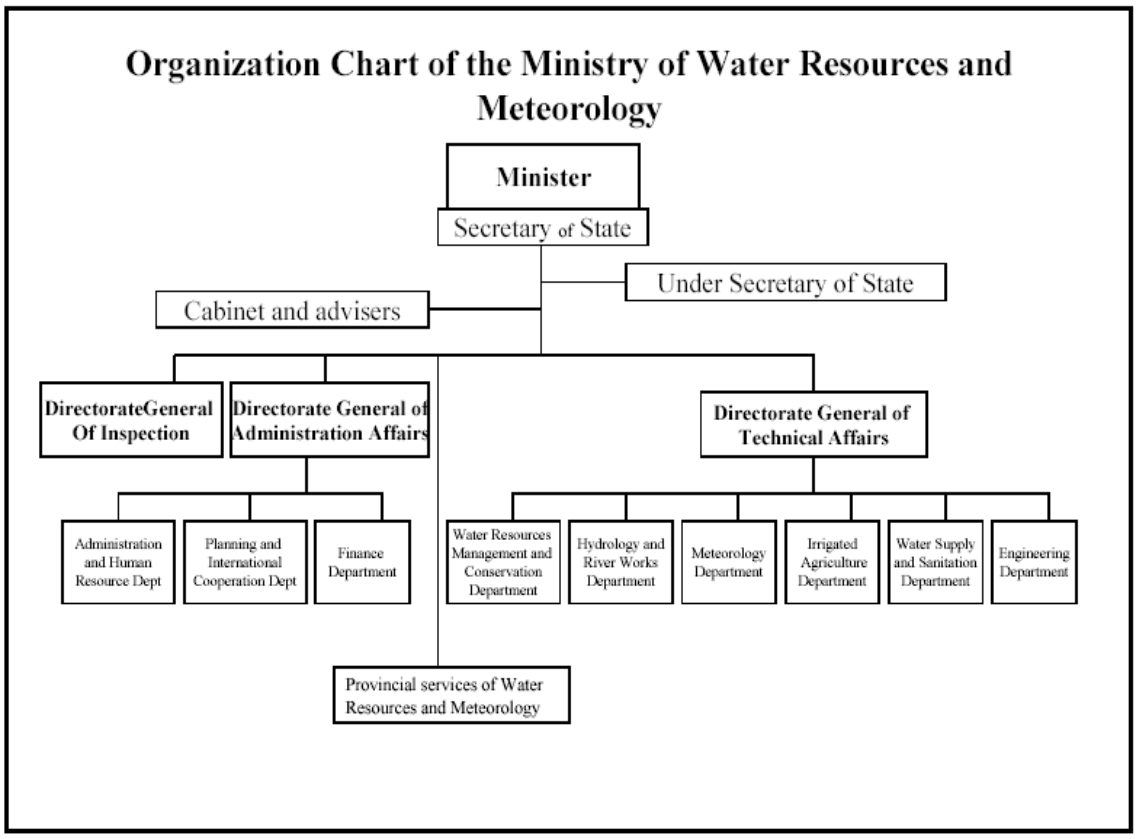
Appendix 3: List of interviews on policy-making

Date	Organisation	Resource Person	Role
Feb.	GRET, Paris	Jean-Philippe Fontenelle	
April	AFD, Paris	Vatche Papazian	Head of the Department of Irrigation Projects
25th June	IWMI, Phnom Penh	LR Perera	Representative of IWMI to MOWRAM
28th June	MOWRAM, Phnom Penh	Chann Sinath	Deputy Director of the Department of Irrigated Agriculture
28th June	MAFF, FSP, Phnom Penh	Christian Cheron	Head of the FSP French Program
08th July	GRET, Phnom Penh	Cedric Salze	Head of the GRET delegation in Cambodia
12th July	GRET/ Kosan, Phnom Penh	Frederic Naulet	Arsenic Mitigation Program
14th July	MOWRAM, Department of Irrigated Agriculture	Sebastien Balmisse	French Technical Assistant, FSP
15th July	MOWRAM, Department of Irrigated Agriculture	Leighton Williams	Consultant on design works
16th July	GRET, Stung Chinit project	Julie Guillaume	Project Coordinator
16th July *by email*	Ex-consultant to MOWRAM	Marcella Nanni	Drafting of the Law on Water Resources Management, 2000.
20th July	GRET, Stung Chinit, Kompong Thom	Julie Guillaume, Benjamin Guillaume	Stung Chinit project: Project Coordinator & Land Management
22nd July	GRET/ Kosan, Phnom Penh	Jean-Pierre Mahe	Arsenic Mitigation Program
25th July	MOWRAM, Department of Water Resources Management	Theng Tara	Head of Department
26th July	MOWRAM, Department of Irrigated Agriculture	M. Cheav, M. Visal	Members of the Core Working Group
27th July	CEDAC	M. Kadun	Project Officer, Sdau Kaong project
30th July	MOWRAM, Department of Planning and International Cooperation	M. Pich Veasna	Director
03rd August	MOWRAM, FERP	M. Jefrey Himel, Leang Solitha, Suon Vanny	Consultants on FWUCs and institutional development
04th August	MIME, Department of Potable Water Supply	M. Navuth	Deputy-Director
06th August	MAFF, Department of Planning, Statistics and International Cooperation	M. Mony	Member of the Core Working Group
12th August *by email*	FAO, Bangkok	Thierry Facon	Regional Office
20th August	PDOWRAM, Kompong Speu province	M. Rithii	Officer in charge of PIMD in the Province
20th August	MOWRAM	M. Bonn	Secretary of the Core Working Group
20th August	AFD	Julien Calas	
07th Sept.	World Bank	Steven Schonberger	Country representative
22nd Sept.	IDE	Michael Roberts	Southeast Asia Regional Director, International Development Enterprises, Ex-MCC
28th Sept.	JICA	Oguni Kazuko	Battambang Productivity Enhancement Project, Farmers' Organisation component
29th Sept.	WatSan Sector Consulting	Jan-Willem Rosenboom	Consultant
30th Sept.	DFDL Cambodia	Martin Desautels	Managing Director
04th Oct.	ADB	Ab Koster	

05th Oct.	ADB	Cameron Baden	Team Leader Agriculture Sector Development Program
08th Oct. *by email*	MRD, Department of Water Supply and Sanitation	Mao Saray	Head of Department
11th Oct.	ADB	Wolfram Jaeckel	Rural Development Specialist
19th Oct.	European Commission	Tony Felts	Delegation
19th Oct.	UNOPS	Chres Buntha	Assistant Infrastructure Adviser
20th Oct.	MOWRAM	Veng Sakhon	Secretary of State
20th Oct.	MOWRAM	Takanobu Kobayashi	JICA advisor
12th Nov. *by email*	Societe du Canal de Provence	Francois Onimus	Ex- Technical Assistant to the DIA (2001-2003)

Appendix 4: MOWRAM organisational structure

Source : Tara T., 2004.



Appendix 5: Main governmental institutions responsible for water management in Cambodia

Source: draft Water Vision to Action, Tara, 2003.

Institution	Water-related Responsibilities
Cambodia National Mekong Committee	Advise the Cambodian representative to the MRC Council on all matters relating to activities within the Mekong River basin that could affect Cambodian interests. Review proposals prepared by RGC agencies in the light of the Mekong Agreement. Liaise between MRC and RGC agencies.
Ministry of Water Resources and Meteorology (MOWRAM)	Responsibilities defined by RGC Sub-Decree on 30 June 1999 include (in abbreviated form): Define policies relating to and strategic development of water resources Research and investigations of water resources Prepare plans for water resources development and conservation Manage direct and indirect water resource use, and mitigate water-related disasters Draft water law and monitor its implementation Gather and manage hydrometeorological and groundwater data, information Provide technical advice Administer international collaboration, including that within the Mekong basin
Ministry of Industry, Mines and Energy (MIME)	Water-related responsibilities include: Planning industrial water uses and hydropower Water supply provision to provincial towns Administration of single-purpose schemes involving hydro-power
Ministry of Rural Development (MRD)	Water-related responsibilities include: Hydrogeological data collection and archiving Water supply, sanitation, land drainage in rural areas.
Ministry of Public Works and Transport (MPWT)	Water-related responsibilities include: Land drainage and sewerage in Phnom Penh and provincial towns Study, survey, construction and maintenance of river works for navigation and water transport
Phnom Penh Water Supply Authority (PPWSA) and Municipality of Phnom Penh (under the Minister of the Interior)	Water supply in Phnom Penh Water resources in the Phnom Penh region
Ministry of Environment (MoE)	The MoE is mandated to protect Cambodia's natural resources and environmental quality from degradation. The list of media for which it is responsible includes water. It is responsible for water quality and pollution control, including monitoring wastewater discharges and issuing permits. The Natural Environmental Action Plan includes six focal areas, one of which is fisheries and floodplain agriculture in the Tonle Sap region; otherwise, water receives limited mention.
Ministry of Agriculture, Fisheries and Forests (MAFF)	MAFF is engaged in development of policies and strategies for agriculture, forestry and fisheries that have significant implications for the management of the water resources required for irrigation and capture fisheries/aquaculture. MAFF responsibilities for forestry also have relevance to catchment condition, hydrological regime and water quality issues.
Ministry of Economics and Finance (MEF)	MEF is responsible for compiling the RGC's *Socio-Economic Development Programme* and *Public Investment Programme*. To the extent that water-related investments are proposed in a number of different components of the programmes, MEF has the role of harmonising proposals, and matching them against RGC investment priorities.
Ministry of Health	MoH is responsible for controlling the quality of surface and ground water used for public water supply, as well as for health education and other matters related to public health.
Provincial governments	Provincial governments have an oversight and coordinating role with regard to the provincial departments of ministries with water-related responsibilities. They provide the framework for provincial and sub-provincial development committees, some of which are engaged in water-related development (mostly water supply, sanitation, small scale irrigation).
Municipalities	Some municipalities operate public water supply systems. Municipalities are responsible for drainage and sewerage within their areas.
Development committees	Development committees at provincial, district, commune and village levels have responsibility for socio-economic development initiatives. In some, water-related initiatives may be included, particularly with regard to water supply and sanitation.

Appendix 6: Technical Assistance provided to the water sector, as listed by ADB, 2003

Source: ADB,NWISP, 2003.

	Project	Duration	Source	Type	Amount ($million)
1.	Irrigation Rehabilitation Study	1993–1994	UNDP/MRC	Grant	0.5
2.	General Technical Advisory Assistance	1999–ongoing	Japan	Grant	1.5
3.	Agricultural Productivity Improvement Project: Capacity Building under Agricultural Hydraulics Component	1999–ongoing	World Bank	Loan	0.8
4.	Capacity Building in MOWRAM (TA3292-CAM)	1999–2001	ADB	Grant	0.8
5.	Northwest Irrigation Sector Project (PPTA3758-CAM)	2001–2003	ADB	Grant	1.2
6.	Technical Adviser in Irrigation	2001–2003	France	Grant	0.6
7.	Technical Services Center for Irrigation Management	2001–2005	Japan	Grant	5.0
8.	Capacity Building in MOWRAM Dept. of Meteorology	2001–2005	Japan	Grant	0.6
9.	Kandal Stung Development Study	2002–ongoing	Japan	Grant	1.0
10.	Capacity Building in Data Management and Water Quality	2002–2008	Denmark	Grant	0.5

ADB = Asian Development Bank, MRC = Mekong River Commission, UNDP = United Nations Development Program, MOWRAM = Ministry of Water Resources and Meteorology.

[a] All project/programs indicated in Table A2.1 were implemented under the former Directorate General of Irrigation, Meteorology and Hydrology (Ministry of Agriculture, Forestry and Fisheries) before it was upgraded to Ministry of Water Resources and Meteorology (MOWRAM) in 1999 or are currently implemented under the current MOWRAM. Similarly, all technical assistance grants and loan mentioned in Table A2.2 were directed to the Directorate General of Irrigation, Meteorology and Hydrology or are currently directed to MOWRAM.

Source: Asian Development Bank and Ministry of Water Resources and Meteorology.

There has been also technical assistance from:
- AusAID in the 1990s to the Directorate General of Irrigation, Meteorology and Hydrology
- FAO from the creation of the MOWRAM
- IWMI to the DIA, since 2003.

Appendix 7: Political narrative on the formulation of national water policies, strategies, visions and laws

Date	Title	Main Content	Follow-up	Main Agencies Involved
1995	Draft Water Resources Law	Principle of ownership by the Government, allocation of Licenses, creation of an "Authorised Officer" position to centralise management, payment of water fees, creation of Water Users Associations in irrigated areas		MAFF - AusAID
July 1996	Circular of Irrigation Guidelines	The GDIMH/ MAFF have a role to organise and supervise the Farmer WUAs to manage and operate the irrigation by themselves in an effective manner		MAFF
1996	Law on Environmental Protection and Natural Resources Management			RGC
11th Jan 1999	**Circular n° 1 Appendix on the status of FWUC**	Model statute for Farmer Water User Communities, and provisions for establishment and collection of irrigation fees. FWUCs are to be democratically formed institutions, which will take over O&M on the schemes		RGC
23rd June 1999	Law 0699/98	Establishment of the MOWRAM		RGC
1999	Sub-decree on Organisation and functioning of the MOWRAM	N°58		RGC
June 1999	**Draft Law on Water Resources Management**	First Draft	Used as a basis for consultancy work to draft the Law (2000)	MOWRAM
2000	Water Supply and Sanitation Policy			MIME
1st – 3rd Feb. 2000	Regional Workshop	2 articles added to the "statute of FWUC", Appendix to the Circular n°1	Basis to draft Irrigation Policy (2000)	MOWRAM
March 2000	Draft Irrigation Policy	Provisions for Irrigation Development and Management, for the transfer of management responsibility, ISF, linkages and accountability of various agencies		MOWRAM
March-May 2000	Draft: Steps in the Formation of a FWUC			MOWRAM
May - June 2000	Draft Law	Reworking of draft water law		MOWRAM, consultancy under APIP/ World Bank
05 - 07 June 2000	National Workshop on Extending and Strengthening a National Policy for PIM and Sustainable Development in Irrigation Sector	Discussion on statute of FWUC, draft Irrigation Policy/ Steps for formation of FWUC.	Subsequent adoption of the Irrigation Policy and Steps in the formation of FWUC	MOWRAM, participation of provincial departments, main international agencies: ADB, FAO, PRASAC, ASP, JICA, AusAID, AFD, German Cooperation, NGO: GRET

June 2000	**Policy for sustainability of Operation and Maintenance of irrigation Systems**	Basic principles are set: Legal framework for FWUC Involvement of FWUC in system development Obligation of farmers to pay for O&M cost and emergency cost of O&M Permanent maintenance and improvement of existing irrigation systems Water delivery in an equitable and effective manner Technical and human support from the MOWRAM		MOWRAM
June 2000	Steps in the Formation of a FWUC	8 steps to follow, including information, elections, adoption of statute		MOWRAM
20th july 2000	Prakas n°306	Requires implementation of the Circular n°1		MOWRAM
August 2000	Seminar on a National Water Sector Profile for Cambodia		Used for defining the Strategic Framework of March 2001.	MOWRAM, ADB
Oct. - Nov. 2000	Draft Law	Reworking of draft water law		APIP, MOWRAM
Oct. - Nov. 2000	Draft sub decrees	Draft sub-decree on FWUCs .		MOWRAM, consultancy under APIP/ World Bank
Dec 2000	National Conference on Cambodia's Water Resources: An Agenda for Action	National Water Sector Profile and Agenda for action discussed. Draft law presented to main actors		MOWRAM
2001	Second Socio Economic Development Plan (SEDP-II)	Three policy objectives towards poverty alleviation through high and sustainable economic growth and equitable sharing of the benefits of growth: - Foster broad based, sustainable economic growth with equity, with the private sector playing the leading role. - Promote social and cultural development by improving access of the poor to education, health, water and sanitation, power, credits, markets, information and appropriate technology - Ensure the sustainable management and use of ntural resources and the environment And improve the governance environment through effect tive implementation of the governance action plan		RGC
Jan-Feb 2001	Seminar on FWUC and O&M of irrigation facilities	Bilateral cooperation between JICA and MOWRAM.	No follow up	MOWRAM, JICA
Feb. 2001	Draft Law	Rewriting of draft water law by the MOWRAM only.		MOWRAM
5th March 2001	Draft Law	Draft law submitted to the Council of Ministers		RGC
March 2001	**Strategic Framework for the Water Sector in Cambodia**	Stress the need to develop a comprehensive strategy for irrigation and drainage including: Promotion of farmer managed schemes Encouraging private sector involvement Improving sustainability Ensuring property rights to land and water Stakeholder participation in O&M of irrigation and drainage Predicting environmental impacts	Used to build the National Water Sector Profile and Agenda for Action, 2001	MOWRAM, ADB

		Water use rights		
March 2001	National Conference – Cambodia's Water Resources: the Next Steps	Discuss the National Water Sector Profile to initiate a debate on the National Water Policy. .		MOWRAM
April 2001	Draft Law	Report of MOWRAM - APIP on draft law and changes		MOWRAM - APIP
May 2001	Socio-Economic Development Requirements and Proposals (SERDP)	Water is seen as contributing to the RGC's priority area of poverty alleviation and economic growth principally in terms of irrigated agriculture		RGC
May 2001	**National Water Resources Strategy, draft**	Extensive list of proposed objectives, strategies, and actions in all areas of the water sector.		MOWRAM, consultancy under APIP/ World Bank
July 2001	**National Water Sector Profile and Agenda for Action**	Comprehensively summarises the status of the water sector and proposes an "agenda for action".		MOWRAM, ADB
Mid 2002	Draft Law	Draft approved by the Council of Ministers. Transmitted to the Assembly	For adoption by the National Assemble	RGC
2002	National Workshop on water, public awareness and sustainable development.	Water resources are on the Government's policy agenda for food security and economic growth, responding to climate change, and providing clean water and healthful sanitation. The wide range of needs pointed at included: • Improve and expand medium and large scale irrigation systems after institutional capacity building has enabled sustainable management • Establish community capability to manage water, through Farmer Water user Communities		MOWRAM, National Assembly
March 2002	Celebration of World Water Day 2002: Water for Development			MOWRAM
May 2002	Tentative Action Plan for Irrigation and drainage Management and Development	Draft	For PRSP formulation	MOWRAM
May 2002	Tentative Action Plan for Water Resources Management and Conservation	Draft	For PRSP formulation	
May 2002	National workshop on PRSP			RGC
Aug. 2002	National Workshop on defining water resources management issues in Cambodia			MOWRAM
Oct. 2002	Workshop on the National Water Resources Policy			MOWRAM
2003	Rural Water Supply and Sanitation Policy			MIME

8 – 9 Jan. 2003	National roundtable workshop on the formulation of national water vision to action	Formulate a national water vision to action: Integrated Water Resources Management, various priority action towards four priority areas: Poverty reduction and rural development Economic development and nature conservation Pilot basin management for the Prek Thnot River Basin Framework to turn the national water vision into reality Two pronged approach: one overall coordinated by MOWRAM Sectoral approach to assist the related subsectoral agencies. 39 participants		MOWRAM, UNESCAP, FAO
April 2003	**National Water Vision to Action, Draft**	Different sets of issues are considered:• Competition for water: sharing the resource• Sustaining the resource: water quality and aquatic ecosystems• Extreme events: mitigating the effects of flood and drought• The knowledge base: knowledge, information and technology• Institutional arrangements and management capacity		MOWRAM, UNESCAP, FAO
May 2003	Water sector "roadmap" in the Kingdom of Cambodia	Targets for the key issues identified: • Legislation and policy • Institutional arrangements • Institutional capacity • Providing data and information • Managing irrigation and drainage systems and other water-related infrastructure • Mitigating the impacts of water-related hazards • Managing competition for water and deteriorating water quality • Conserving aquatic ecosystems and fisheries • Managing international water resources • Managing the coastal zone • Financing water resources development and management		MOWRAM
16th Jan. 2004	**National Water Resources Policy**			RGC
August 2004	**Strategic Plan on Water Resources Management and Development 2004 – 2008 Draft**	Areas covered include: • Improvement of Administration Management and Human • Resources Development • Water Resources Information Management • Water Resources/ Management and Development • Flood and Drought Management • Promoting of Water Irrigation and Sustainability		MOWRAM
14th-15th Sept. 2004	**National Workshop on PIMD**	Creation of a National Secretariat for PIMD examined.		DIA, PDOWRAM, IWMI

Appendix 8: Content of the main texts regulating the water sector – with a particular focus on PIMD

The Circular n°1, enacted in 1999, describes the founding principles for FWUCs:
- *FWUCs are to take over O&M management*
- *Standardise the statute of FWUCs*
- *Water fee collection, to cover the full O&M costs*
- *Phasing out for financial support from the government (over 5 years)*

The draft Law on Water Resources Management, which writing began in 1999, emphasises:
- *Inventory of water resources and uses by MOWRAM*
- *Registration of users by MOWRAM*
- *Allocation of water rights with a licence agreement*
- *Payment of water fees*
- *Integrated water resources management (IWRM) and Watershed Management*
- *Central role of the MOWRAM in managing the resource*
- *Definition of priority areas of implementation*
- *Promotion of FWUCs establishment*

The Policy for Sustainability of O&M Irrigation System (June 2000) is based on the following basic principles:
- *Legal framework of FWUC*
- *Involvement of FWUC in system development*
- *Obligation of farmers to pay the O&M cost and emergency cost of O&M*
- *Permanent maintenance and improvement of existing irrigation systems*
- *Arranging the water delivery in an equitable and effective manner*
- *Human and technical support from the MOWRAM*

The draft Decrees and Sub-Decrees on PIMD, drafted from 2000, include:
- *Decree on PIMD: FWUCs should be created prior to construction projects. The government shall withdraw from direct management of the scheme, and the FWUC is to take over O&M. Structure and obligations of the FWUC, establishment principles and empowerment are also listed.*
- *Sub-Decree on FWUCs, specifying the basic principles for development and operation of the FWUC, the rights, authority and obligations of the FWUC, the essential content of statute,*
- *Sub-Decree on Irrigation Management Transfer and Certification of Management Authority: it specifies the necessary elements in the transfer agreement that is to be signed between the FWUC and the government, in particular including the basic roles and functions of the FWUC, government, third parties.*

The Strategic Framework for the Water Sector (2001) promotes the development of a comprehensive strategy for irrigation and drainage including:
- *Promotion of farmer managed schemes*
- *Encouraging private sector involvement*
- *Improving sustainability*
- *Ensuring property rights to land and water*
- *Stakeholder participation in O&M of irrigation and drainage*
- *Predicting environmental impacts*
- *Water use rights.*

The National Water Sector Profile and Agenda for Action (2001) is both a status report and a plan for action for the water sector. It contains chapters on: National Policy Environment, Capacity for Water Resources Management, Water Resources Status, Financial Resources, Appraisal, and Agenda for Action. It promotes:
- *Devolvement of responsibility for all aspects of irrigation to FWUCs*
- *Development of a comprehensive strategy for irrigation and drainage management*
- *Develop a set of complementary measures for achieving financial sustainability in the water sector in Cambodia*
- *Develop a set of complementary measures for funding water resources management in Cambodia*

The National Water Resources Strategy was drafted in 2001. The main issues related to FWUCs in the document are lack of government funds to operate and maintain irrigation infrastructure, resulting in unsustainable

irrigation facilities. Hence O&M relies heavily on external financial support. The strategy proposed to address this is:

- *Cost recovery through formation of FWUCs;*
- *Introduction of cost recovery mechanisms by introducing an ISF covering costs for service delivery and O&M;*
- *Enhance community participation by: Establishment of FWUCs; Ownership and water use rights; Transfer of irrigation management gradually to FWUCs; Capacity building at local levels; Crop diversification; Rural Credit Facilities; Issue of land titles.*
- *Promotion of Private Sector involvement.*

The draft National Water Vision to Action (2003) considers the sets of issues:

- *Competition for water: sharing the resource, particularly between safe water supply and waste water disposal*
- *Sustaining the resource: water quality and aquatic ecosystems: the constraints on completing the task are financial and social, rather than hydrological.*
- *Extreme events: mitigating the effects of flood and drought, with the need for effective implementation of a comprehensive flood mitigation strategy will be required effectively to implement its provisions.*
- *The knowledge base: knowledge, information and technology*
- *Institutional arrangements and management capacity, particularly relationships between agencies in charge (weak yet) and capacity of MOWRAM and other relevant institutions to carry out their responsibilities, at both the national level and the provincial level*

The following four themes were identified as priority activities required:

- *Water for people: poverty reduction and rural development, with establishment of FWUCs*
- *Water for economic development and nature conservation, with expansion of the irrigated area, development of capacity building, and increase in water use efficiency*
- *Pilot river basin management – Prek Thnot River Basin*
- *Framework to turn national water vision into reality.*

An important principle emphasised is integrated water resources management.

The draft National Water Strategy and Action Plan (2003, ongoing) builds on the National Water Vision to action and promotes:

- *Management improvement on human resources development*
- *Water resources information*
- *Water resources/ irrigation development, with IWRM and river basin management, participation of farmers water users, investment by funding agencies and private sector*
- *Flood and drought management*
- *Water resources management and sustainability, with promotion of environmental measures.*

The National Water Resources Policy (2004) finally sets the general framework within which sub-policies are to be defined. It promotes:

- *Fundamental principles for water resources management: responsibility of the government, plans to be prepared following available data, and in accordance with other plans, rights to individual uses, and utilisation must be made in a sustainable and environmentally friendly way*
- *River Basin Management and development*
- *Appropriate development of freshwater resources: notably water for agriculture, for energy, for industry, water for domestic use*
- *Promotion of licences and fees for adequate allocation of the resources*
- *Priority uses in case of shortage: domestic uses, irrigation, hydropower*
- *Mitigation of water-related hazards*
- *Data collection and forecasting*
- *Financial sustainability: encourage private investment, establishment of FWUCs, seek foreign aid*

Appendix 9: Chronology of formulation of the draft Law on Water Resources Management Main steps

From World Bank/ APIP comments (2001), April 2001 draft, and March 2002 draft.

Actors involved	Main elements introduced and/or modified	Date
MOWRAM	First draft. It promoted notably: Licences and water fees, FWUCs establishment, Central role of the MOWRAM	1999
Consultancy funded by World Bank APIP: one FAO consultant collaborating with MOWRAM staff.	• RBM and IWRM introduced • Goal of "ensuring a sustainable environment" suppressed (considered that the Law on Environmental protection and Natural Resources Management of 24 December 1996 has better grounds for this) • On licences: more universal application of uses subject to licensing and fees levying, adding notably the licensing of professional drillers, and need to pay a waste water discharge fee. Modification of some provisions on procedures, transfer modalities or claims by third parties. • MOWRAM shall maintain a register of water use and wastewater discharge licences • Suppression of the distinction made between medium scale and large scale water utilization • Transitional period of 5 years instead of 2 years for registration after adoption of the Law. • Need for coordination with other Ministries. • Introduction of participation by the public in certain aspects of water resources management (planning, for instance) • Introduction of the concept of Water Law Implementation Area (corresponding to a basin, sub-basin or aquifer) to enable progressive implementation of the Law • Emphasise water resources planning (it is one of the core functions of MOWRAM according to sub-decree 58).	May-June 2000 and Oct. - Nov. 2000
Other stakeholders	*Only presentation of the draft, not for comment*	National Workshop, Dec. 2000
MOWRAM	• Transitional provisions on registration of existing water users suppressed (the 5 year initial implementation period). • Article devoted to coordination between the MOWRAM and other institutions suppressed.	Feb. 2001
Interministerial Committee	• On prerogatives of Ministries: It does not entail anymore which institution licences shall be granted (MOWRAM previously). Professional drillers have to report to the MOWRAM, but they do not have to obtain a driller's licence anymore from MOWRAM. Imposition of fines for the supply of unclean water is abandoned, as well as the need to demand written permission to MOWRAM for extraction of petrol and gas. Servitudes for pipes and conduits for water supply are suppressed. • Ministries do not have to pay to use MOWRAM's database. • Record of all licences by MOWRAM is abandoned. • Preparation of a national water resources plan by MOWRAM imposed. • Cases of exemptions from payment of the fee: uses licensed and exempted from a fee to be determined by sub-decree (instead of annually in the previous document) • Fees paid to FWUCs: in the previous document, water fees were collected by MOWRAM except in areas where a FWUC was established (direct fee collection and use). In the new text, although creation of FWUCs is encouraged, it is imposed that "Water use fees shall be collected by the MOWRAM".	March 2001 - Feb. 2002

Appendix 10: Draft Law on water Resources Management, March 2002

CHAPTER I
GENERAL PROVISIONS

Article 1
The general purpose of this Law shall be to foster the effective management of the water resources of the Kingdom of Cambodia to attain socio-economic development and the welfare of the people.
This Law shall determine:
- the rights and obligations of water users,
- the fundamental principles of water resources management,
- the institutions in charge of its implementation and enforcement, and
- the participation of users and their associations in the sustainable development of water resources.

Article 2
In this Law, unless the context otherwise requires,
"water" and "water resources" means surface, underground and atmospheric water;
"groundwater" means water held within a saturated soil, rock medium, fractures or other cavities within the ground;
"aquifer" means a geological formation where underground water accumulates;
"basin" means a geographical area determined by the watershed limits of the system of waters, including surface and underground waters;
"sub-basin" means part of a basin;
"international rivers" means rivers geographically situated in the territory of two or more states;
"banks" of a river, stream, canal, lake and reservoir shall mean the land normally inundated by the water contained in such river, stream, canal, lake or reservoir, together with such soil, rock or any other material immediately adjacent thereto, but does not include any land beyond that land, soil, rock or other materials, which is occasionally inundated by such water;
"shore" means the land covered with sand or soil, and declining towards the water in a body of water, occasionally inundated by such water;
"beds" means the portion of land delimited by the banks of a river, stream, lake, canal or reservoir, and normally covered by water;
"public purpose" refers to urban and rural water supply, food production, hydro-power generation, navigation, industrial development and the maintenance of minimum flows for ecological, cultural and religious purposes and the preservation of aquatic life;
"waterworks" means dams, weirs, canals, drains, reservoirs, tanks, cisterns, intakes, dykes, embankments, wells, boreholes, tunnels, conduits, pipes, sluices, plants, pumps, and such other structures or installations as are constructed or used for the purpose of diverting, storing, conveying, abstracting, using, conserving and protecting water resources, for land drainage purposes, or for the prevention and mitigation of the effects of floods and of other water-related emergency situations.
"person" means any physical or juridical person, whether private or public;
"licence" means the permit document issued by the MOWRAM, which confers to a person the right to exploit and develop water and water resources;
"MOWRAM" means the Ministry of Water Resources and Meteorology.

Article 3
All water and water resources, the beds, banks and shores of rivers, streams, lakes, canals and reservoirs are owned by the State.

Article 4
The MOWRAM shall be responsible for implementing this Law.

Article 5
The MOWRAM may declare any basin, sub-basin or aquifer as Water Law Implementation Area when within that basin, sub-basin ,ground water or aquifer there are likely to be conflicts among water users, problems of water pollution or watershed degradation.

CHAPTER II
WATER RESOURCES INVENTORY AND PLANNING

Article 6
The MOWRAM shall keep a centralized inventory of the water resources of The Kingdom of Cambodia. This inventory shall indicate the location, quantity and quality of the resources during the year, each year.
Data on quantity and quality, and any other water-related information collected by other institutions, whether at the national, provincial or district level, shall be submitted to the MOWRAM in a technically standardized format.

The above data and information, to the exception of confidential data and information, may be provided to any person requesting them, subject to the payment of fees. For the Government institutions there will be not to pay .
Article 7
The MOWRAM has a responsibility for preparing a national water resources plan.
Water resources projects shall be prepared based on the data and information resulting from the water resources inventory, in accordance with the national water resources plan, the economic development plan and the national and regional environmental plans, and by maintaining the balance between water availability and present and foreseeable demands.
The public may participate in water resources projects, according to procedures that shall be established by sub-decree.

CHAPTER III
WATER RESOURCES USE AND DEVELOPMENT

Article 8
Everyone has the right to use water resources without a licence for drinking, washing, bathing and other domestic purposes, the watering of domestic animals and buffaloes, fishing and the irrigation of gardens and orchards, in an amount not exceeding that necessary to satisfy the individual and family needs of the user, and for the purpose of extinguishing fires, testing fire-extinguishing equipment and training people in the use of such equipment.

Article 9
The diversion, abstraction and use of water resources for purposes other than those mentioned in Article 8, and the construction of the waterworks relating thereto, are subject to a licence .
The diversion of water from the Kingdom of Cambodia territory shall be permitted and agreed by the Royal Government of Cambodia with the authorization from National Assembly.
The extraction of sand, soil, stones, gravel, petroleum and gas from the beds and banks of watercourses, lakes, canals and reservoirs also subject to a licence .
The filling of river stream rivulet canal natural lakes and reservoirs shall be permitted by written statements from MOWRAM.

Article 10
The modalities and procedures for the granting transfer cancellation and suspension of water use licences shall be determined by sub-decree.

Article 11
Before granting a water use licence to a person, the MOWRAM may consult with the other institutions concerned on the water utilisation and the construction of waterworks relating to such use that proposed by person .
The construction of bridges over rivers stream or the construction of ports and the building of structures on the beds, banks and shores of rivers, streams, lakes, canals and reservoirs, are subject to prior technical approval by the MOWRAM as regards the hydrological regime.

Article 12
Water use licences have a specified duration that shall be based on actual requirements for each water use, as shall be determined by sub-decree .
Before the expiry of a water use licence, the licence holder may apply for the licence's renewal to the MOWRAM.

Article 13
A water use licence may be transferred by its holder to another user, whether totally or in part, subject to the prior approval of the MOWRAM.

Article 14
A water use licence may be modified or cancelled by the MOWRAM at the request of the licence holder.
A water use licence may be modified, suspended or cancelled by the MOWRAM in the following cases:
- violation of the conditions imposed in a licence;
- violation of the provisions of this Law and of the regulations made thereunder;
- use of the water for purposes other than those authorized;
- non use of the water for a period of two consecutive years;
- transfer of the licence without prior approval;
- causing of a negative impact on public health or the environment;
- refusal, without justification, to pay the water fee.

The licence holder shall be afforded an opportunity to present a written statement or to appear before the MOWRAM to explain the reasons of the default.
The MOWRAM shall determine the time frame for the compensation, by the licence holder, of any damage that may be produced as a result of the above defaults.

Article 15
in the case of any person aggrieved by a decision of the competent official *of the MOWRAM* may appeal to the Minister of the MOWRAM within thirty days from such decision.

The notice of appeal shall specify the reasons for the appeal.
The decision of the Minister is the last decision. If any person aggrieved by a decision of the Minister under this Article may file a petition for a review of such decision with the competent court.

Article 16
In the case of controlling that any waterworks which are likely to collapse as unsafe or to cause damage to life or property of the national society, the MOWRAM in consultation with the other institutions concerned shall emergency prohibit according with the own duties.

Article 17
A water use licence may be modified or cancelled by Royal Government for a public purpose.
In this case, however, the licence holder may receive available compensation .

Article 18
The use of water on the basis of a water use licence is subject to the payment of water use fees and the use of water on the basis of a water use licence is subject not to pay of water use fees shall be determined by sub-decree.
Water use fees shall be collected by the MOWRAM.

CHAPTER IV
Farmer water user community

Article 19
All farmers using water from the same irrigation system or part thereof may form a Farmers' Water User Community.
A Farmers' Water User Community may be established upon the initiative of the MOWRAM when the interest in the efficient and sustainable management *(operation and maintenance)* of the irrigation system, or part thereof, so requires.
The statutes of a Farmers' Water User Community shall be registered with the MOWRAM.
As of the date of registration the Community shall acquire juridical personality.
The procedures for the establishment, functioning and dissolution of Farmers' Water User Communities shall be determined by way of sub-decree.

CHAPTER V
GROUNDWATER

Article 20
The drilling and digging of wells that has intended for a professional basis or for commercial
purposes shall supply the MOWRAM with a detailed report on the drilling operation and the technical specifications and other information on the well.
The modality and procedures for the registration granting of drillers' licences shall be established by sub-decree.
In the event of violation of the provisions of this Article, the drillers' licence may be suspended or cancelled, and the provisions of Article 36 shall be applicable.

Article 21
Whoever finds groundwater in the course of mining, construction or other activities, shall report his discovery to the MOWRAM.

CHAPTER VI
PROTECTION OF WATER RESOURCES

Article 22
The discharge, disposal or deposit of polluting substances which are likely to deteriorate the quality of water or to endanger human, animal and plant health into water, the soil or the sub-soil shall be subject to a wastewater discharge licence in consultation with the other institutions.
The polluting substances provided for in this Article shall be determined by the MOWRAM in consultation with the other institutions.
The wastewater discharge licence shall indicate treatment requirements, shall be subject to the payment of pollution fees whose rates are set by way of regulations.
The MOWRAM shall set technical standards of wastewater discharge in consultation with the other institutions.

Article 23
When the applicant for a water use licence is also the author of a wastewater discharge, the wastewater discharge licence shall be part of the water use licence.

Article 24
The MOWRAM may declare protected "water use" zones or areas in the following cases:

- when surface or underground water sources are seriously threatened in their quantity, quality or ecological balance;
- when a watershed is undergoing degradation;
- When there is a risk of spreading of human and other diseases.

The limits and legal regime of protected "water use" zones or areas shall be established on a case-by-case basis by way of regulations.

Article 25
The MOWRAM shall be responsible for watershed management, in cooperation with the other institutions concerned. Procedures for the implementation of the above measures shall be provided for by way of sub-decree.

CHAPTER VII
FLOOD CONTROL

Article 26
The MOWRAM, together with the other institutions concerned, may designate any flood prone area in the Kingdom of Cambodia as a Flood Control Area.
Within a Flood Control Area, the MOWRAM, together with the other institutions and the local authorities, shall plan flood control measures and may impose such limitations as may be necessary to ensure the safety of persons, animals and property.
The MOWRAM has the right to prohibit activities that are likely to damage flood protection works or to obstruct the natural flow of rivers.

Article 27
In the event of floods and draughts, the MOWRAM is the Chief of Staff of the Royal Government of Cambodia in the execution of emergency works.

CHAPTER VIII
SERVITUDES

Article 28
The owner or occupier of upstream land is entitled to collect and use rain water and the water accumulating or flowing naturally on his land for the purposes enumerated in Article 8, but in so doing he shall not hinder the natural flow of the water to the prejudice of downstream water users.
The owner or occupant of downstream land is entitled to receive the water flowing naturally from upstream land. However, he shall not obstruct the flow through the construction of roads, dykes, dams or other structures to store water, except with a licence granted by the MOWRAM.
The damage suffered by a land owner or occupier as a result of the violation of the provisions of this Article shall be subject to compensation by its author.

Article 29
The owners or occupiers of agricultural land shall allow the water flowing on such land to flow naturally to neighboring agricultural land to meet that land's irrigation needs.

Article 30
Servitude for public purposes may be established by special legislation that shall be complied with by the owners or occupiers of land.
The holder of a licence under this Law may obtain the establishment of a servitude for the passage of water through neighboring land by means of underground or surface conduits, provided that the laying of such conduits takes place in the least harmful manner.
The same servitude may be obtained, at the same conditions, for the disposal of wastewater, sewage water and drainage water.
In the case of damage, the beneficiary of a servitude under this Article shall be liable to pay compensation to the owner or occupier of the land on which the servitude is established.

Article 31
The holders of intervening or neighboring land are entitled to use the works provided for in Article 30 under this law .
In such case, they are required to contribute, in proportion to their utilization of the works, to the cost of construction, operation and maintenance of those works, and to bear the costs relating to the modifications that the exercise of the right provided for in this Article may render necessary.

Article 32
A servitude cease to exist when the exercise of the right ceases.

Article 33
All disputes relating to the establishment of servitude in water use shall be facilitated by the MOWRAM and other institution concerned . In the case of aggrieve may appeal to the competent court.

Article 34
Any competent officer authorized by the MOWRAM to such effect has the power to enter any land to control technical matters relating to water upon prior notice in writing given to the owner or occupier of the land.
During his mission, the officer shall hold his identity card and mission order signed by the MOWRAM.

CHAPTER IX
INCENTIVES AND PENALTIES

Article 35
The Royal Government may grant incentives to those who engage in research on, or the development of, new technologies, installations and equipment, or apply low-waste
technologies, leading to an increase in the efficiency of water use or to a reduction of water
pollution.
The criteria and modalities for the granting of incentives, and the amount thereof, shall be defined by regulations.

Article 36
Whoever
- uses water without a licence when a licence is required;
- extracts sand, soil, stones or gravel from the beds and banks of water bodies without a licence
- fills a lake or reservoir without a licence;
- discharges wastewater without a licence [when a licence is required *has been omitted*];
- constructs waterworks without a licence [when a licence is required *has been omitted]*;
- provides false information when applying for a licence under this Law or declaring an existing use;
- having obtained a licence under this Law, violates the conditions attached thereto;
- carries out drilling and digging activities on a professional basis without a drillers' licence;
- obstructs the natural flow of a river, stream or canal without a licence from the MOWRAM;
- violates the provisions of Articles 20 and 25;
- obstructs the officers of the MOWRAM in the exercise of their functions

is punished with a fine from 100,000 to 5,000,000 Riels.
In case of repeated offence, the penalty shall be double.

Article 37
Whoever intentionally destroys or alters waterworks of any kind constructed or installed by the Government is punished with a fine from 1,000,000 to 5,000,000 Riels, or with a term of imprisonment of 6 months to 1 year, or with both such fine and imprisonment.

Article 38
In addition to the above provisions on offences and on the cancellation of licences, the violator may be condemned to remove all kinds of works constructed in violation of this Law, and to restore the things to the former state.

Article 39
Any official of the MOWRAM who is negligent, violates the regulations of the MOWRAM, conspires with an offender or facilitates the commission of an offence, shall be subject to administrative sanction or to prosecution before the competent court.

CHAPTER X
INTERNATIONAL RIVERS

Article 40
The Kingdom of Cambodia has the right to use, develop and manage international river basins on its territory within its reasonable and equitable share, consistent with the obligations stemming from the international agreements to which Cambodia is a Party.

CHAPTER XI
FINAL PROVISIONS

Article 41
All legal provisions inconsistent with this Law are hereby repealed.
This Law was adopted by the National Assembly of the Kingdom of Cambodia on ……,

During the ……. session of its ….legislature.
Phnom Penh, ……., 2002..

Appendix 11: Recommendations on draft Decree and Sub-Decrees on PIMD

The legal framework is in the process of changing, as Decrees on implementation of the PIMD policy should be adopted when the Water Law on Water Resources Management is enacted. I will therefore particularly focus on recommendations to improve the draft texts. These recommendations are based on the study of O'Treng irrigation scheme, Stung Chinit experience, and on information available on other schemes experience (Prey Nup, other pilot schemes). The analysis proceeded mostly along three lines: institutional, legal and financial analysis.
Draft documents include: Decree on PIMD, sub-decree on FWUCs, sub-decree on Irrigation Management Transfer (IMT) and Certification of Management Authority (CMA).

Contrary to the existing documents, the draft texts recommend a flexible approach to implementation. In particular, it is emphasised that statute and by-laws shall be defined in accordance with the local setting, and much latitude is left as to their content. The draft texts also abandon some major provisions of the existing texts, which have not been applied insofar, ie the formula for calculation of the water fee, and the phasing out of financial support from the government over 5 years[1].

Then, draft texts introduce additional elements widely considered to be needed:

- As said earlier, flexibility in the approach is put forward by the draft texts: for implementation of PIMD (PIMD, Art. 3.2), formulation of the statute (FWUC, Art. 10.1), or of the annual irrigation service plan (FWUC, Art. 5.2).
- The Community area shall include both water service and drainage areas (PIMD, Chapter 1. FWUC, Chapter 1)[2].
- They impose compulsory membership of all water users in the Community area (FWUC, Art. 6.2).
- They promote establishment of support and coordination entities -such as a Provincial Working Group (PIMD, Art. 4.2).
- They promote information of local authorities on important decisions for the area (FWUC, Art. 12.2).
- Statute and by-laws shall be scheme specific and adapted to the local context. Offences and fines shall also be determined specifically (PIMD, Art. 3.2. FWUC, Art. 10.1).
- Regarding official recognition of the schemes, draft texts provide for the signature of an official Transfer Agreement between the Community and the Ministry, and supply the basic content of this Agreement (PIMD, Chapter 7. Sub-Decree on IMT and CMA).
- Cost sharing mechanisms are introduced between the Communities and the MOWRAM, depending on the type of expenditure. It guarantees that the FWUC would receive sufficient support in case of major need (PIMD, Chapter 14. FWUC, Chapter 11).
- Provisions promoting transparency. Periodic Irrigation Management audits are to be conducted by representatives of Provincial authorities and the FWUC. In addition, members or officials shall have the right to inspect financial and other records of the FWUC (FWUC, Art. 8.4 and 11.6).

Particular remaining problematic areas or lacks in the draft texts can be highlighted:
For institutional arrangements:

- Some flexibility should be kept for the definition of sub-levels[3] (following administrative or hydrological structure), recommending that there should be consistent units for operation. Recommendations for definition of responsibility for drainage structures could also be issued (FWUC, Art. 7.2).
- Regarding roles of entities, a distinction between major tasks (planning and decision-making versus implementation) could be kept between higher and lower levels of management. Duties of representatives should not be precisely set in the texts, so as to leave room for adaptation. In any case, there is an inconsistency at present between titles of positions as put in the Decree on PIMD and in the sub-decree on FWUCs (PIMD, Art. 5.1. FWUC, Art. 7.3).
- External entities to be established include a National Secretariat for PIMD (PIMD, Art. 4.2, Chapter 8), FWUC support teams at provincial level (PIMD, Art. 4.1. FWUC, Art. 12.1) to plan and implement FWUC formulation and empowerment, and Provincial Working Councils as consultative bodies (PIMD,

[1] This provision is implemented only in pilot schemes of the Department of Irrigated Agriculture, under ADB funding.
[2] Code:
"PIMD (respectively FWUC or IMT/CMA), Chapter *X*" refers to the Chapter *X* of the draft Decree on PIMD (respectively FWUC or IMT/ CMA).
"PIMD (respectively FWUC or IMT/CMA), Art. *X.Y*" refers to the Chapter *X*, Article *Y* of the draft Decree on PIMD (respectively FWUC or IMT/ CMA).
[3] In Stung Chinit for example, there are structures at the sub-levels of both types.

Art. 4.1). Creation of these bodies, which involve representatives from different agencies, shall be subject to approval from relevant Ministries. An agreement should be reached by all concerned parties (including particularly other agencies within the MOWRAM, and other Ministries) on exact tasks and activities of these.

- Texts could enlist possibility for FWUC to call upon local authorities for assistance in enforcement[1].

For legal arrangements:

- Regarding membership, the option could be left open to have tenants members or not, with requirements for definition of sharing of responsibilities with owners if they are not members (PIMD, Chapter 6. FWUC, Art. 6.2).
- Voting rights are to be given per allotment, although modalities for definition of allotments are not specified. It is debatable whether the preferable formula shall be per household, per allotment, per plot or per surface (FWUC, Art. 8.4. Art 8.5).
- A simplified procedure shall be established for renewing of registration, as MOWRAM expects FWUCs to register again after each election (even though it is not imposed by existing or draft texts) and changes brought to the Statute.
- Legal texts should include transfer of legal ownership to the FWUC.
- Other legal texts, such as Decrees of implementation of the Law on Water Resources Management (upcoming), should precise how water rights will be allocated to the FWUC (PIMD, Chapter 10). These or texts on PIMD should precise if the Community will have to pay a fee for its water right. It should be guaranteed that members of the FWUC should not pay a fee to MOWRAM in addition to the fee they pay to the FWUC.

For financial arrangements:

- Texts could specify that if a target of revenue is to be set up, it should be locally appropriate.
- Texts could recommend that the fee level be calculated in relation to estimated operation maintenance expenditures -in addition to being based on budgetary requirements and being debated with members (FWUC, Art. 5.2. Art. 11.1).
- A compensation to leaders might be referred to, with modalities to define in the statute and by-laws (FWUC, Art. 11.5).

Others:

- Irrigation Management Transfer and Certification of Management Authority are the legal documents to be signed between the FWUC and the government to acknowledge official transfer (PIMD, Chapter 7.Sub-Decree on IMT and CMA). The distinction drawn between transfer of management responsibility of existing irrigation schemes (IMT) and establishment of management responsibility for new irrigation schemes (CMA) can be considered useless. The regime applicable to these two types of PIMD is indeed the same.
- Roles of the FWUC: the draft texts forbid the FWUC to take over other responsibilities and activities than irrigation management – for example agricultural production, agri-business or marketing, lending (PIMD, Art. 4.1. FWUC, Art. 4.1. Art 11.5). Actors however generally disagree with such limitations.
- Overlap between the different draft texts. Articles in the different (sub)-decrees relate to the same subjects. There is particularly a great amount of overlap (or repetition) between the Decree on PIMD and the Sub-Decree on FWUCs (for example, PIMD, Chapter 14 and FWUC, Chapter 11). Areas covered in the different texts should be more clearly delimitated, so as to ease understanding, and avoid risks of contradictory statements.

[1] As it has been noted in many schemes that enforcement is an area where support of local authorities is the most needed.

Appendix 12 : Recent and current PIMD projects undertaken or funded by IOs in Cambodia

Source: F. Onimus, 2001 and ADB, 2003

Funding	Project name	Main outputs (irrigation component)	Duration and status
European Union	PRASAC I	• Rehabilitation and PIMD in 11 schemes, totalising 13 000 ha.	1994 - 1999
ILO		• Bovel in Battambang Province and Barai in Siem Reap province	1990s
IFAD		• 16 schemes	
UNDP/ CARERE	SEILA	• 23 schemes	
Italy/ JICA	Integrated Development Project/ Battambang Agricultural Enhancement Project	Rehabilitation and PIMD in Kamping Puoy, a 2 200ha irrigation scheme in Battambang province, • Associazione per la Participazione allo Sviluppo (APS) • JICA in collaboration with PDOWRAM	1998-2002 for Italy From 2003 for JICA
AFD	Prey Nup Polders Rehabilitation	• Rehabilitation of hydraulic facilities on 12,000 ha • Implementation of FWUC	From 1998
JICA	Colmatage canals in Kandal Province	• Rehabilitation of 4 colmatage canals • Implementation of FWUC	1999 - 2002
AFD	PADAP Kandal	• Rehabilitation and PIMD on 2 colmatage canals in Kandal province	On-going
WB	APIP – Agricultural Hydraulics Component	• Capacity building in MOWRAM • 20 small scale rehabilitation projects in Kratie and Kg Thom (total: 4,300 ha) • 1 medium scale rehabilitation project in Prey Veng (2,000 ha)	2000 – 2001
EU	PRASAC II	• Rehabilitation and PIMD in 19 schemes (including schemes from PRASAC I)	2000 - 2003
FAO	Special Program for Food Security	• FWUC establishment in 5 schemes in 3 provinces	2001 – 2003
ADB	Emergency Flood Rehabilitation Program (EFRP)	• Rehabilitation of 11 schemes in 7 provinces, with PIMD	2001 – 2003
WB	Flood Emergency Rehabilitation Program (FERP)	• Rehabilitation of 33 schemes in 16 provinces, with PIMD	2001 – 2004
ADB + AFD	Stung Chinnit Scheme Rehabilitation	• Rehabilitation of hydraulic facilities on 3 000 ha • Implementation of FWUC by GRET/ CEDAC	From 2001
ADB	Formulation of 11 FWUC	• Implementation of 11 FWUC in 11 Provinces on medium scale irrigated schemes (about 500 ha each) • Training of MOWRAM staff	From 2002
AFD	Sdau Kong, Prey Veng	• Rehabilitation • Institutional development by CEDAC	From 2002
ADB and AFD	Northwest Irrigation Sector Project	• Water use studies in selected basins. • Selection of 10 – 12 irrigation schemes in Battambang, Siem Reap and Banthey Meanchey, rehabilitation and PIMD.	From 2004

Funding	Project name	Main outputs (irrigation component)	Duration and status
German Cooperation		• Support for investigation and study of small- and medium-scale irrigation schemes in Kampot and Kompong Thom	
European Union	ECOSORN	Economic and Social Relaunch of Northwest Cambodia: credit, agricultural extension, PIMD	Upcoming

Appendix 13 : List of FWUCs registered to MOWRAM - 2004

Source: MOWRAM, Department of Irrigated Agriculture- unofficial translation

	Location					Area(ha)			
Inventory No	***Commune***	***District***	***Province***	***Date of Registration***	***Number of members***	***Dry season***	***Wet season***	***Name of the scheme***	***Supporting organisation for PIMD***
01	PREY NOP	PREY NUP	KAMPONG SOM	27\10\2000	6,655		8800	PREY NUP	AFD - GRET
02	CHUNG ROK	KANG PISEY	KOMPONG SPEU	05\12\2000	640	500	200	O TRENG	pilot scheme from MOWRAM
03	SLA	SAM RONG	TAKEOV	12\06\2000	471	500	50	BUT ROKA	
04	ROHAT TUK	MANGKUL BOREY	BANTEY MEANCHEY	04\02\2001	560	300	4000	PAU PIDAM	
05	BANTAY DEIK	KEAN SVAY	KANDAL	7\01\2000	667				JICA
06	RONG CHEY	THMAR KOL	BATTUMBANG	12\06\2000	2000	500	6000	BOVEL	ILO
07	CHEA LEA	BATHAY	KAMPONG CHAM	5\09\2002	960	1600		7 MINEA	prasac II
08	BOENG NAY	PREY CHHAR	KAMPONG CHAM	5\09\2002	966	3200		TOEK CHHA	prasac II
09	CHROY CHEK	KAMPONG SEAM	KAMPONG CHAM	5\09\2002	525	600		CHROY CHEK	prasac II
010	PREY VENG	PREY VENG	PREY VENG	23\09\2002	2149	286		OH PUMPUN	prasac II
011	THMEI	KAMPONG RO	SVAY REANG	18\09\2002	2558	1500		CHUB PRING	
012	KRANG CHEK	OUK DONG	KAMPONG SPEI	1\10\2002	2347	1100		CHAN THNAL	prasac II
013	KRARPUM CHHUK	KOH ANDEIK	TAKEOV	1\10\2002	13652	1010		BANTAY THLAY	prasac II
014	ANGKOR BOREY	ANGKOR BOREY	TAKEOV	1\10\2002	3996	519		ANGKOR BOREY	prasac II
015	KIRY CHUNGKOH	KIRY VONG	TAKEOV	1\10\2002	4512	2005		PHLOV TUK	prasac II
016	TUK VIL	SAGNANG	KANDAL	5\07\2002	133	43		PREK TAKHUT	
017	SVAY TEAP	SAGNANG	KANDAL	5\07\2002	286	53		PREK ANGPANG	
018	KAMPONG TRARBEK	KAMPONG TRABEK	PREY VENG	22\11\2001	100	73		PREK PHTAV	
019	CHHE KACH	BAPHNOM	PREY VENG	22\11\2001	150	110		PREY KTUCH	
020	CHUMREON PHAL	SAMPOV MEAS	PURSAT		1200	300	3000	O ROKAR	pilot scheme from MOWRAM
021	THLEA BRACHUM	BOREY CHULSA	TAKEOV	25\03\2003	3108	871		KAMPONG KRASANG	prasac II
022	TATRAM	BANAN	BATTUMBANG	27\10\2003	3000	300	9000	KAMPING POY	Italy then JICA. Also pilot cheme from MOWRAM
023	SEB	KAMPONG TRALACH	KOMPONG CHHANG	10\01\2003	1182	540	1200	KAP SEH	pilot scheme from MOWRAM, previsouly

									PRASAC I
024	ROLEANG CHEK	SAMRONG TONG	KOMPONG SPEU	25\03\2003				RLEANG CHREY	prasac II
025	KOK BALANG	MANGKUL BOREY	BANTEY MEANCHEY	under preparation	500	229	700	KOK BALANG	
026	SRAR YOV	STEONG SEN	KOMPONG THOM	15\08\2003	200	350		ANGLONG KRA	
027	SRAR YOV	STEONG SEN	KOMPONG THOM	15\08\2003	1500		300	KHEK PUL	
028	SREI HOV	STEONG SEN	KOMPONG THOM	NO STATUS	100		200	O SNAU	
029	CHUN BAK	SVAY CHRUM	SVAY REANG	15\08\2003	90		150	DEM SAMRONG	
030	CHUN BAK	SVAY CHRUM	SVAY REANG	15\08\2003	90		100	METANO	
031	SENA RACHOUKDAM	PRAS STACH	PREY VENG	15\08\2003	214	203,1	0	PREK SANDEIK	
032	PEAM RAR	PEAM RAR	PREY VENG	15\08\2003	100	104,2	0	CHAK KNA	
033	BANTAY CHAKREY	PRAS STACH	PREY VENG	NO STATUS	100	66,8	0	O CHHAT	
034	SNA ANSNA	KRAKOR	PURSAT	15\08\2003	400		932	DAMNAK KRA	
035	ANSA CHUMBUK	KRAKOR	PURSAT	15\08\2003	100		300	ANG KUN	
036	METEUK	BAKAN	PURSAT	NO STATUS	300		503	METEUK	
037	CHIRO 2	TBAUNG KHUM	KAMPONG CHAM	15\08\2003	104		54,07	SANTESOK	
038	ANG CHEOM	TBAUNG KHUM	KAMPONG CHAM	15\08\2003	278		169,5	USEY DACH	
039	BARAY	PREY CHHAR	KAMPONG CHAM	15\08\2003	998		376,81	ANGDONG ANG	
040	PREY KABAS	PREY KABAS	TAKEOV	15\08\2003	928	571,38	0	PREY KABAS	
041	KAMPONG REAP	PREY KABAS	TAKEOV	15\08\2003	310	571,38	0	KOK PRING	
042	ANGKA	PREY KABAS	TAKEOV	15\08\2003	248	194,58	0	ANGKA	
043	SAMRONG	SONIKUM	SEAM REAP	15\08\2003	131		202,32	OMAO	
044	BAKONG	PRASAT BAKONG	SEAM REAP	15\08\2003	60	88,9		TA KROCH	
045	USEY LOK	CHY KRENG	SEAM REAP	15\08\2003	89	38		ANG PHUMBEONG	
046	TAK RAM	BANAN	BATTUMBANG	27\03\2002	148		170	M11	
047	KOK KHUM	THMAR KOL	BATTUMBANG	29\03\2002	96		115	N0 5	
048	TA KRAM	BANAN	BATTUMBANG	28\03\2002	117		103	N2-3	
049	BANTAY NANG	MANGKUL BOREY	BANTEY MEANCHEY	15\08\2003	150	124,64		500	
050	ROHAT TUK	MANGKUL BOREY	BANTEY MEANCHEY	15\08\2003	134		94	KHUM CHRUM	
051	ROHAT TUK	MANGKUL BOREY	BANTEY MEANCHEY	15\08\2003	90		97,37	PREK SAMRONG	
052	BAPAUNG	PEAM RAR	PREY VENG	15\08\2003	962	500	500	SNE	pilot scheme from

									MOWRAM
053	SVAY TEAP	CHAM KALER	KAMPONG CHAM	15\08\2003		500	500	5 KUMPHAK	pilot scheme from MOWRAM
054	PUT SAR	BATY	TAKEOV	15\08\2003	540	350		KAMPONG DAMREY	pilot scheme from MOWRAM
055	KHAT	POUK	SEAM REAP	15\08\2003			8000	BARAY	pilot scheme from MOWRAM, previously ILO scheme
056	REACH MUNTEY	KAMPONG RO	SVAY REANG	under preparation	4000	300	700	KAMPONG ROTES	pilot scheme from MOWRAM
057	PUN LEY	PHNOM SROK	BANTEY MEANCHEY	under preparation		7000	3000	TRAPEANG	pilot scheme from MOWRAM
058	TA KAU	KAMPONG LEAV	PREY VENG	09\12\2003	300	400		TOUL SLA	
059	SVAY CHACHEP	BASETH	KOMPONG SPEU	09\12\2003	500	300	500	STUK	prasac II
060	BOENG NAY	PREY CHHAR	KAMPONG CHAM	09\12\2003	700	300	500	THMAR DA	
061	PREY CHA	CHAUNG PREY	KAMPONG CHAM	09\12\2003	700	400	400	KBAL CHROP	prasac II
062	SOTANG	KANG MEAS	KAMPONG CHAM	09\12\2003	500	500		VEAL LEING	prasac II
063	CHRES	CHAN TREA	SVAY REANG	09\12\2003	500	500		SVAY YEA	prasac II
064	SVAY CHRUM	SVAY CHRUM	SVAY REANG	09\12\2003	700	500		KRANG LEAV	prasac II
065	KOK BANTAY	ROLEA PHNEA	KAMPONG CHHANG	09\12\2003	400		300	KANG MEAS	prasac II
066	TANG KRASANG	TUK PHUS	KAMPONG CHHANG	09\12\2003	700		700	TANG KRASANG	prasac II

Note

Credit of ADB 1445 CAM (SF) 11 sites for the period 2001-2005	1.1 Million US$
PLG-UNDP\Seila Program, 26 sites for the period 2001-2004	105 000 US$
PRASAC-EU in 20 sites for the period 2001-2003	100 000 US$
Government buget under Prakas 306 and Circular N°1 t o support FWUCs for the period 2000-2003. This amount includes the training of trainers (TOT) in 24 provinces.	180 Million riels (about 45 000 US$)

Appendix 14 : Field activities – general planning

Date	Scheme	Persons met	Activities	Main characteristic of the scheme
27th June 2004	O'Treng, Kompong Speu Province	FWUC Board	Visit	Pilot scheme from MOWRAM
21st -22nd July 2004	Stung Chinit, Kompong Thom	GRET project officer	Visit, review of documentation	Institutional development is NGO-led
28th July 2004	Sne, Prey Veng Province	MOWRAM/ PDOWRAM officers, FWUC chairmen, 1 Chief village	Visit	Pilot scheme from MOWRAM
29th July 2004	Kap She, Kompong Chnang Province	MOWRAM officer, FWUC chairmen	Visit	Pilot scheme from MOWRAM
09th – 20th August 2004	O'Treng, Kompong Speu Province	Project officers, local authorities, farmers' representatives, farmers	Collection of primary information	Pilot scheme from MOWRAM
23rd – 27th August 2004	Stung Chinit, Kompong Thom	Project officers, local authorities, farmers' representatives, farmers	Collection of primary information	Institutional development is NGO-led

Appendix 15: Background information on O'Treng irrigation scheme

O'Treng irrigation scheme was originally built under the Khmer Rouge Regime. Until 1998, villagers and local authorities undertook small repairs and basic operation to irrigated about 30ha in wet and dry season. Following rehabilitation in 1998, the District Authority set up a Community to manage and maintain the scheme. Collective action was then formally organised following national guidelines in 2000, with the involvement of the DIA/ PDOWRAM.
In 2002, the scheme was selected to become a Pilot Scheme of the DIA. The MOWRAM/ PDOWRAM have since then undertaken capacity building activities, and provided human, technical and financial support to the scheme.
Irrigated areas amount currently to more than 400ha in wet season and 250ha in dry season, and the scheme is providing water to almost 900 families.

1. Local environment

O'Treng irrigation scheme is located in Kong Pisei District, and comprises Prey Nheat and Chongruk communes. 9 villages overall are located in the irrigated area – and a few farmers from 2-3 additional villages could received irrigation water last dry season.

The population in the District has been very stable. According to District authorities, although all the population had been displaced under the Pol Pot regime, inhabitants came back to the area in 1979. No migrants came to settle down, and the population has since then grown endogenously. Interviewees explained that one of the constraints in the area is that it is population growth, with too little land available or employment opportunities for the new generation.

The level of poverty in the area is quite high according to governmental officers. Although access to health services and education facilities is usually possible, some villagers even lack basic facilities such as access to clean water through wells.
85% of families in the District are farmers. Households own on average 1ha of land. In the wet season, people cultivate rice, with a mixture of early-, medium- and late- varieties. Rainfed rice yields average 1.5 tons/ha (Cham, 2002). In the dry season, families in the irrigated area cultivate water melon or vegetables. A few families also cultivate water melon in April-May, without irrigation water.
Most families also undertake cattle raising, and another important livelihood activity is pig raising. Regarding the exploitation of natural resources, many families are fishing in the reservoir (because of intensive fishing, captures are very limited), and a few families are exploiting palm trees or the wood from the mountains (15km) – there is a scarcity of wood fuel in the area.
There are generally few employment opportunities in the District. For agriculture, most families share labour in times of transplantation and harvest. There is some seasonal labour migration to Phnom Penh, to work in the garment industry, or to drive motorcycles, but interviewees quoted it as a rare occurrence.

There are other development activities undertaken in the area:
- Health promotion, by Children and Development and UNICEF
- Credit by some NGOs
- Agricultural extension by CEDAC
- SEILA: roads, small reservoirs, and also promotion of natural fertiliser

These activities usually concern a few of the villages of the area, and only some of the villagers.
It appears there are very few local associations, according to interviewees. The main one is a fertiliser-credit organisation, operating in about half the villages of the scheme. This organisation was first set up through the intervention of the Ministry of Rural development, and was then handed over to farmers in 2003.

2. History of the scheme and past collective action in irrigation

Before 1998: collective action under impulsion of some village authorities
The scheme was built under the Pol Pot regime, between 1975 and 1978. In the early 1980s, the scheme was operated to irrigate about 50ha of land. In 1986 a flood destroyed the reservoir and, as no action was taken by Commune authorities, the Chief and Vice-chief (present leader of the FWUC) of Angk Sangkream village organised villagers to share labour and repair small parts of the reservoir. 30ha could then be irrigated at the head

of the main canals I and II. M. Pum (FWUC leader) estimates that 100 families could get irrigation water at the beginning of the 1990s.
In 1995 another flood damage disrupted the reservoir and the gates. M. Pum, vice chief of Angk Sangkream, again organised his villagers to repair the gate on the main canal II (with local material such as wood). Villagers not participating in the works could get water at the condition that they paid 20 000riels/ ha. The money collected was used to feed in the village budget. The World Food Program supported at the same time through a food-for-work program rehabilitation of the main canals I and II.

1998 – 2000: rehabilitation and early form of Community
In 1998, the Social Fund of Cambodia (governmental agency) repaired the dyke. It also installed a new gate. Farmers were not consulted on rehabilitation, and no particular provisions were taken for subsequent management of the scheme by the Social Fund.
However, at the same period the District chief had been invited to a meeting in Phnom Penh about the promotion of management of irrigation scheme by farmers. In 1998, he organised a meeting with the local authorities (Chiefs of villages and communes) to set up a Community. A water fee was set: 10 000riels/ ha for gravity irrigation, and 5 000 riels/ ha for pumping. Chiefs of villages then transmitted the information to farmers, who agreed on the principle.

The dry season 1999 was therefore the first dry season of the early form of Community. The Community leaders were composed of the chiefs of communes (2), the chiefs and vice-chiefs of villages (12 in total), and an agricultural adviser for each Commune (2).
100 ha were irrigated, with more than 300 families receiving irrigation water in the dry season. Farmers, when they needed water, had to go and see directly the persons responsible for opening the gate (one village Chief for the main canal I, and one Commune chief for the main canal II).

In 2000, the MOWRAM intervened to formalise the Community, with elections of representatives, adoption of statute (following the Circular n°1), and registration to the MOWRAM.
In 2003, the MOWRAM intervened to reconstruct the spillway and thus protect the structure from further flood damages. It also rehabilitated the beginning of the three main canals. The World Food Program sponsored in parallel the rehabilitation of the full length of the three main canals and other subsidiary canals. Canals were rehabilitated down to the national road, at the far-east of the scheme, which is not irrigated yet, in the expectation that these areas would receive irrigation water soon.

3. Water resources and infrastructure

According to M. Rithii, PDWORAM Deputy Director, there is no possibility of irrigation with underground resources: water resources are limited and too deep. Wells are used only for family needs. Rainfall is on average 1 200mm, with a high annual variability – and with a tendency to frequent drought events for the last three years. Another source of water lies with Roleang Kaen reservoir, 4 km North of the scheme. The possibility of linking O'Treng scheme to this reservoir will be investigated at the end of 2004.

The reservoir is delimited by a long dyke (around 4 km) and filled up only through rainfall water. There is a very small stream flowing to it, which often dries up. Small mountains are located west of the reservoir (which has a North-south orientation) and rainfall falling on the mountains then runs into the reservoir. The maximum capacity of the reservoir is 2.5 million m3. It spills at the end of the wet season (October). However, after long period of droughts, it is empty (high evaporation, leakages and use for irrigation).
There are three main gates on the reservoir, leading to the main canals I, II and III. There is also one spillway (47m long) on the dyke, emptying in the area between main canal I and II.

Tab. 4: Irrigation canals in O'Treng scheme[1]

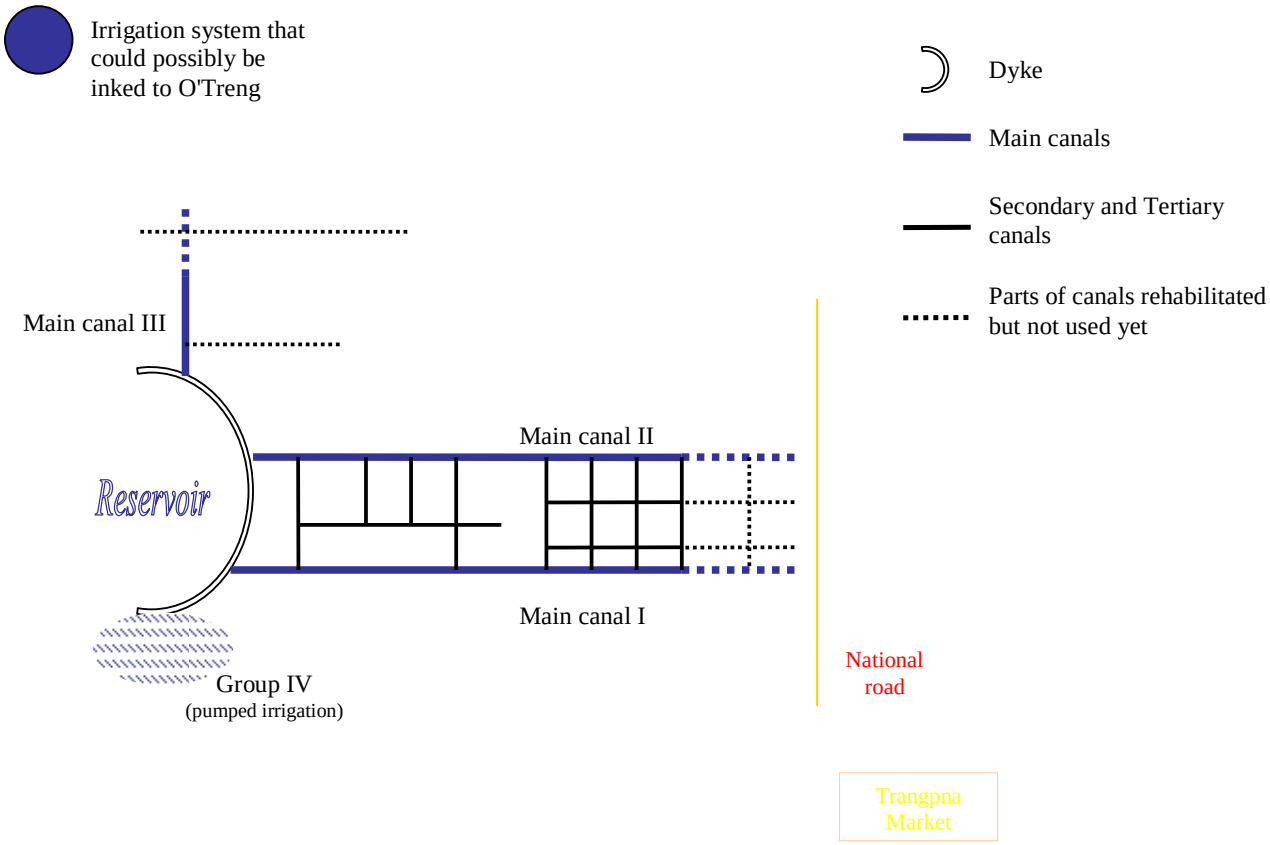
Canal	Length	Total
Main canal I	4.7 km	11.1 km
Main canal II	4.8 km	
Main canal III	1.6 km	
Secondary canal 1	1.1 km	9.3 km
Secondary canal 2	2.3 km	

[1] Source : O'Treng FWUC

Secondary canal 3	1.6 km	
Secondary canal 4	0.45 km	
Secondary canal 5	2 km	
Secondary canal 6	1.9 km	
Tertiary canals		

There are three main canals, 6 secondary canals and 9 tertiary canals used. They are however not used to the full of their length, as irrigation water is not brought to the end of the rehabilitated structures.
Intergates are not available on the canals, which cause serious problems for water management.
Irrigation is mostly plot-to-plot. There can be between 3 to 8 plots in a row receiving water one after the other.
According M. Rithii, from the PDOWRAM, about 70% of farmers[1] have access to gravity water, and the others have to pump water from the reservoir or the canals to their field either irregularly (depending on the water level in the reservoir and in the canals), or systematically.
Finally, soils have a good capacity to hold water, as underneath the sandy surface there is a layer of clay.

Figure 4: Map of O'Treng Irrigation scheme



4. Irrigated areas

The command area of the scheme is estimated generally at 1 500ha (Cham, 2002), but there are no details as to how such a figure was actually calculated. Jinapala (2004) estimated that the capacity of the reservoir should be 7million m3 to irrigate such a surface, whereas its is only 2.5million m3 yet.

Tab. 5 : Irrigated areas and beneficiary families[2]

[1] No confirmation of this figure could be obtained
[2] Source: FWUC

Year	Wet season cultivation (June - December)	Dry Season cultivation (January-March)	Number of families	Estimate Of Number of beneficiaries[1]
Before 1998	About 30 ha	About 30 ha	Around 100	550
1998 – 1999	?	100 ha	About 300	1650
1999 – 2000	?	45 ha	?	
2000 – 2001	?	210 ha	653 registered, more obtained water	3600
2001 – 2002	?	211 ha	?	
2002 – 2003	?	172 ha	?	
2003 – 2004	389 ha	279 ha	867 members, About 20 families outside the Community	4760 in the Community

Annual variations in dry season irrigation were, according to farmers' leaders, due to variations in the number of families attempting watermelon cultivation. Families apparently dissatisfied with the dry season 1999 results, abandoned watermelon, or reduced the area planted, in 2000, and increased it again in 2001. In the dry season 2002, a scarcity of water led to poor results for water melon crops, and families the following year again spontaneously decreased cultivated areas.
Limitations on areas cultivated in the dry season were linked by interviewees to the constraints on labour availability and on cash for investment.

The plan in the future is to irrigate 500 ha in the wet season. For the dry season, extension irrigated areas is constrained by the limited capacity of the reservoir.

5. Steps followed in the formation of FWUC

1998 – 2000 Early form of Community

Organised by the Chief of the District, and managed by village and commune authorities.
The PDOWRAM then applied to the MOWRAM for help in organising a formal Community.

2000 First meeting of formalisation

The MOWRAM organised a meeting with about 300 villagers to formalise the Community. Officers explained about procedures for selection of representatives. Elections were organised for the Groups (main canals) and for the FWUC.
There are 4 Groups, on each main canal and for the area South-West of the reservoir (pumping irrigation).

2000 General meeting at the Pagoda

After elections, another meeting was held by the MOWRAM, at a pagoda, to present the principles of maintenance and repair, and to decide on the water fee. About 600 families attended. Statutes were reviewed, Groups and FWUC leaders elected, and, on the same day, farmers were invited to register to the Community.

2000 The FWUC and the MOWRAM organised the sub-groups in villages

There are 1 to 4 sub-groups per village, with 4 leaders each. Each sub-group is under the control of a Group. There are 15 sub-groups in total.

2000 Official registration to the MOWRAM

2002 Identification as a pilot scheme
Training on FWUC formulation procedures and PRA in the scheme (results unavailable) in 2 days.

Jan.- Feb. 2003 FOs[1] elections, collection of general information

[1] On the basis of 5.5 people/ family - average figure in Chongruk Commune.

28th Feb. 2003	Re-election of the FWUC, of Groups Discussion on new statute with farmers
March-April	The FWUC organised elections of sub-group leaders in villages
April-July 2003 7 days	Statute reviewed by the FWUC and local authorities Establishment of 5-year work plan + training of representatives by MOWRAM officers
July 2003 2 days	Review of statue with 30 sample families + training of representatives
September 2003	Official registration procedures at MOWRAM
October 2003- June 2004	Trainings of representatives, about 2 days every 1 or 2 months

[1] Farmer Organisers, in villages. They are calling people to meetings.

Appendix 16 : Background information on Stung Chinit scheme

The Stung Chinit Irrigation and Rural Infrastructure Project is located in Kompong Thom province, Cambodia, and began in 2001. The project is designed to increase agricultural productivity and stimulate the rural economy in the province.
The Stung Chinit irrigation scheme was originally built under the Pol Pot regime, and became dilapidated in the 1980s. It was operated on an individual basis to provide some water for supplementary irrigation during the wet season subsequently, but not managed or maintained.
The NGOs GRET/ CEDAC are in charge of institutional development, under supervision by the MOWRAM. The aim is to provide wet season supplementary irrigation to 3 000ha, and irrigate 1 800ha in the dry season. By August 2004, a temporary reservoir is operational, and construction of Secondary Canal 1 (SC1) is almost completed. Irrigation of a pilot block of 56ha has been possible since October 2003.
Collective organization of farmers first began with consultation on the design of the infrastructure, and representatives were elected in 2002- 2003. The experience of irrigation in the pilot block has been used to test the arrangements for collective management of irrigation.

1.Local environment

The Stung Stung Chinit Irrigation and Rural Infrastructure Project is located in the districts of Santuk and Baray, in Kompong Thom province. Although province specific data on poverty is not readily available, in 1999 the Cambodia Human development report noted that the poorest villages were located along the Tonle Sap, an area including Stung Chinit scheme (Memorandum of understanding, ADB, 2000). The area is not homogenous. The South of the scheme is neighbouring the national road, which means that standards of living are higher, and livelihood activities more diverse. The North however, at proximity of the main canal, is poorer.
In the wet season, the main livelihood activity is rice cultivation. The project area comprises a mixture of early-, medium and late varieties. Yields average 1.5 tons/ha, as noted in the Memorandum of understanding (ADB, 2000), with variations between 0.5 and 2 tons/ha.
In the dry season, most villagers are involved in forest exploitation. Wood cutting is now forbidden, but the practice persists to day, and there is also rubber exploitation.

The Chief of Prasat Commune noted that there are many other development activities undertaken in the area, led by bilateral agencies or NGOs. None however is involved with irrigation, apart from the SEILA program sponsoring small reservoirs, South of the national road.

2. Project

The project was built on rehabilitation of the existing irrigation infrastructure with creation of drainage infrastructure, and upgrade of elected rural roads and markets to enhance conditions of marketing of the crops harvested.
The project comprises the following components:
Component 1 (Gret/Cedac – MOWRAM)

- Water Users organisation
- Agriculture development and research
- Land registration and titling
- Environmental research
- Institutional support

Component 2 (Lahmeyer/Smec[1] – MOWRAM)

- Design and construction of irrigation and drainage infrastructure
- System management

Component 3 (Smec – Ministry of Rural Development)

- Improvement of rural infrastructure (150 km roads and 6 markets)

The original project was to provide wet season supplementary irrigation to 7,000 ha – and about 2 500ha in the dry season. After one year and half of activities, at the completion of the infrastructure design, it was found that the overall cost for the infrastructure work would be almost three times higher than estimated. The ADB decided

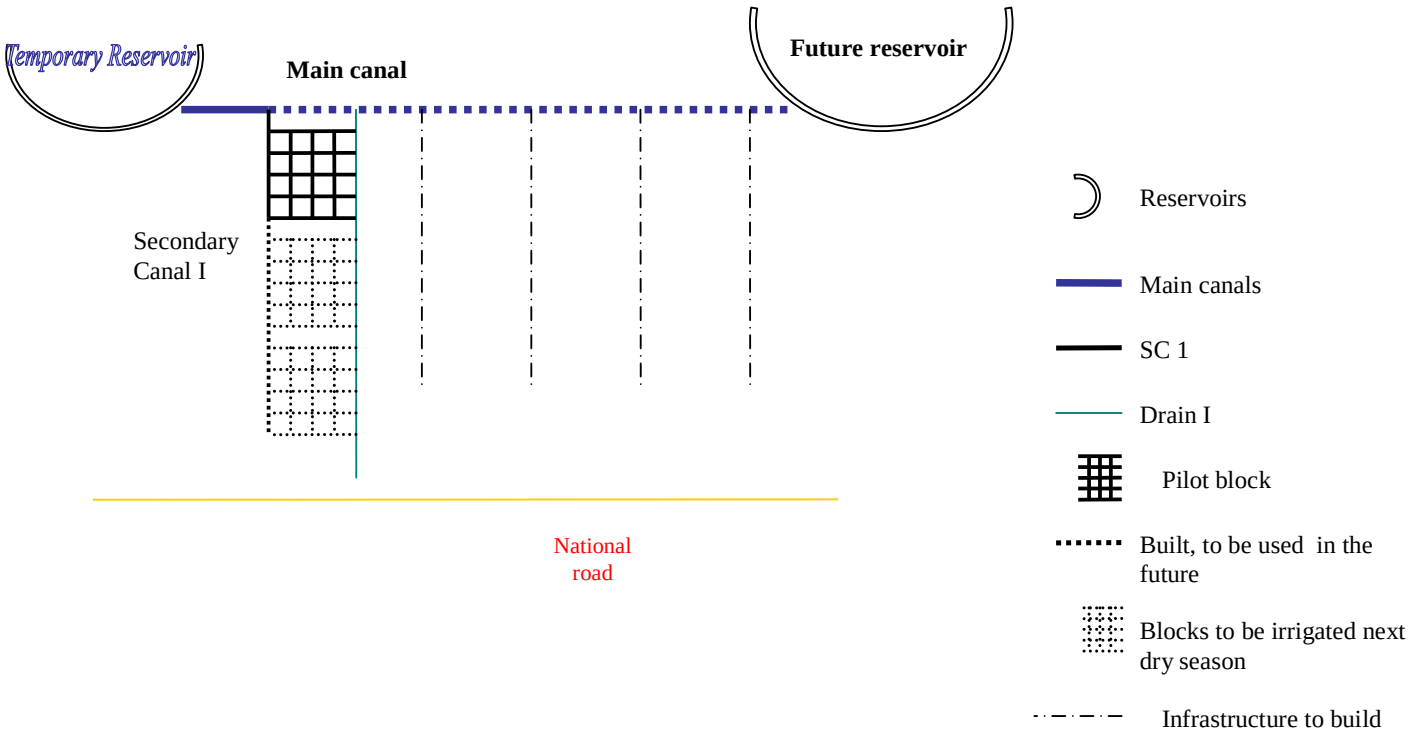
[1] Consultants

to review the project accordingly. The new option is to provide supplementary irrigation to 3,000 ha and 1,800 ha of dry season irrigation. The construction of tertiary and quaternary systems is to be supported through food-for-work.
At completion of the project, there should be 2 600 households benefiting from irrigation, and 3200 from agricultural extension services (representing respectively 14 300 and 17 600 persons).

3. Water resources and infrastructure

Underground resources were investigated during the feasibility study, and the Memorandum of understanding (ADB, 2000) notes that "prospects of irrigation from groundwater resources are very limited". Many households have private wells but groundwater based irrigation during the dry season from high yield wells does not seem to have much scope. Rainfall varies between 1750 and 2000 mm, the majority of rainfall events being short storms of high intensity on a very small area.
The main water resources are Tang Krasang river (West of the scheme), and Stung Chinit river (East). In the future, the reservoir is to be located on Stung Chinit river, from which the main canal will flow through the scheme to reach Tang Krasang river.

Figure 5 : Map of Stung Chinit scheme



The project is to construct one system of irrigation, and in parallel a drainage structure. The main canal will function in continuous flow, to provide a permanent flow to SCs – it is a unique case in Cambodia as stressed by Julie Guillaume. 5 SCs will be built, mostly on the pre-existing infrastructure, and new drainage canals. Tertiary and quaternary canals will ensure that all plots have access to the resource, and can drain directly into a canal.

By August 2004, the reservoir used is located on Tang Krasang river. Water flows through the beginning of the main canal to the upper part of SC1. Construction of the infrastructure for SC1 and its attendants lower level canal is almost complete.

4. Irrigated area

The total command area of the scheme will be 2 970ha.
The plan for implementation is:

Dry season 2004	56 ha (Pilot Block)
Dry season 2005	150 ha (3 Blocks of SC1)
Dry season 2006	1 200 ha
Dry season 2007	2 970 ha

There are 128 landowners in the pilot block, from 8 villages. Half of them chose to work in the forest instead of cultivating rice last dry season, and they rented their plots. In consequence, about 100 families undertook dry season rice cultivation in early 2004 (from a total of 13 villages).
For next dry season, 215 landowners will benefit from irrigation, in the three blocks B2 - B3 - B4 of SC1 (B1 is on high land, no irrigation planned yet).

5. Steps followed in institutional development

Starting field activities in November 2001, the Gret/Cedac team first focused its activities on users consultation and layout approval (as urged by Lahmeyer/Smec[1]). Village facilitators (CEDAC) were recruited and collaboration with population started in end-2001.
All efforts were concentrated on farmers' information, definition of the limits of irrigable area, selection and training of farmers' representatives in order to organise farmers consultation on the layout proposed by Lahmeyer/Smec. Meanwhile, definition of blocks[2] was implemented by the team.

Dec. 2001 – Feb. 2002	Information campaign
Jan. - March 2002	Collect of information in villages – Boundaries of the irrigation system
March- April 2002	Map of village boundaries, map of blocks
March 2002 – Nov. 2003	Consultation and collect of owners approval on the infrastructure layout
May – Dec. 2002	Establishment of WUGs
May-June 2002	Land holding survey in the north zone
	The objectives of this survey were to validate village rice field boundaries of village and also to collect list of owners in the area.
Jan. 2003 – ongoing	Establishment of WUCs[3].
Early 2003	Stopping of construction activities because review of the scope of the project by ADB.
	GRET/ CEDAC had to decrease field activities. Activities focused only on WUC1 and WUC2 (on the 2 first secondary canals).
November 2003	Official approval by landowners on the secondary and tertiary layout
	More than 80% of owners gave their approval.

The setting up of Water User Groups (WUGs) at the block level was undertaken from May 2002.

- Election of WUG representatives (May to June 2002)
  They represented ideal representatives to simplify the consultation, as intermediary person in villages. The first selection of WUG representatives was organised through election among landowners of each village for each block. Election was organised for the most important villages in each block only.
  As result of the election, 132 WUG representatives were elected for 63 irrigated blocks. More block representatives than needed were selected, in order to consider resignation, departure of unmotivated persons or lack of capacities for some of the "elected" trainee.
- First training session for WUG representatives (June 2002)
  After this training, 35 representatives officially resigned from their function.
- Second training session for WUG representatives (December 2002)
  Only 73 representatives participated.
- New election in early 2004 for some blocks

[1] Consultant component 2
[2] Irrigation units (40 to 60 ha)
[3] In the first structure proposed, WUGs were to be established for tertiary canals, WUCs for secondary canals, and a federation of WUCs for the whole scheme. This structure will be modified for registration at the end of 2004 (see below).

Indeed, some block representatives changed their mandate to become FWUC representatives, some resigned after trainings, some resigned after 2 or 3 months, as the delay of the irrigation was considered as too long (especially for canals SC3, 4 and 5), and finally some blocks were created at the final stage of consultation on layout, due to division of 1 block in 2.

Water User Communities (WUCs) were established on secondary canals from January 2003.

- Election of WUC representatives (January to April 2003)
  1 representative was to be elected in each village for each SC (in villages where more than 5-10 people had plots in the SC).
  The 5 members of the WUCs board for each secondary canal were then elected by village representatives and block representatives (of the SC).
- Training of WUC representatives[1] – from May 2003
  Due to delay in construction of infrastructure and consequences on the calendar of irrigation, it was decided to start this activity only with the management committee of Canal 1 and 2.
  General objectives of this capacity building trainings are to build representatives capacities in facilitation and organization skills, but also to progressively support them for definition of WUC statute and internal regulation. For this purpose, sessions of 3 days are organised 2 times per month.
- Registration of WUC members

Despite the scaling down on activities due to delays in construction, the construction of the pilot block was then the opportunity to start the support to WUG by organising the irrigation first during the wet season 2003 (3 days actually of irrigation in October 2003), and in the dry season 2004.
The main activities in the wet season 2003 were the organisation of a water turn, the approval of the principle of a water fee payment, the organisation of exchange visits for other representatives, and meetings with owners for assessment of the wet season cultivation.
In the dry season 2004, main activities were: registration of cultivators, organisation of maintenance, establishment of a contract between land owners and WUC, validation by local authorities and farmers of internal regulations, exchange visits, and meetings for assessment of cultivation.

[1] Capacity building is also provided to MOWRAM, Provincial Department of Agriculture (PDAFF) and PDOWRAM officials involved in the project.

Appendix 17 : Planning of activities for data collection in O'Treng and Stung Chinit

Tab. 6 : Activities in O'Treng

Date	Activity
27/06/04	Interview with FUWC Board.
	Field visit with the leader of FWUC.
09/08/04	Interview with FWUC board
	M. Bonn, MOWRAM project officer
	M. Rithii, PDOWRAM Deputy Director
10/08/04	Interview with Leaders Group I
	Leaders Group II.
	Chief of District
	Vice-Chief of the Agricultural Office of the District
11/08/04	Interview with Leaders Group II
	Leaders sub-group II-2.
	Group discussion with farmers from sub groups II-2 and II-3
	Interview with Accountant of FWUC
12/08/04	Interview with 4 farmers from sub-group II – 2
13/08/04	Interview with 1 Farmer from sub-group II-2,
	Leader of FWUC
	Leaders of sub-group I-5
14/08/04	Interview with 4 farmers from sub-group I-5
16/08/04	Interview with Leader of sub-group I-5
	1 farmer from sub-group I-5,
	Chief of Kayiev Village
	Leader of FWUC
17/08/04	Interview with 1 Farmer from group IV
	Vice-chief 1 of FWUC, in charge of maintenance
	Leader of FWUC
18/08/04	Interview with Vice-chief 2 of FWUC, in charge of water supply
	Chief of Chongruk Commune
20/08/04	Interview with: M. Rithii, PDOWRAM Deputy Director
	M. Bonn, MOWRAM officer

Tab. 7 : Activities in Stung Chinit

Date	Activity
20/07/04	Interview with GRET Project coordinator (Julie Guillaume).
	Field visit with GRET staff.
21/07/04	Documentation, interview with Julie Guillaume.
	Interview with GRET trainee.
24/08/04	Documentation.
	Interview with CEDAC project officer.
25/08/04	Interview with Chief of Prasat Commune.
	Leader of WUC 1.
	MOWRAM officer (M. Karona).
	Assistant to GRET project coordinator.
26/08/04	Interview with Pilot block representative.
	2 farmers of the pilot block.
	Chief of Tbaeng village.
	Srae Ta Kao village representative (also member of WUC1 Board).
27/08/04	Interview with 2 farmers
	CEDAC project officer. (M. Sophak).
	GRET trainee
28/08/04	Interview with: 2 farmers
	Responsible for Maintenance in WUC2.

Appendix 18 : Methods and limitations for data collection on O'Treng and Stung Chinit schemes.

Methods for data collection

⇨ Secondary data review: Existing documentation on the schemes

For O'treng project, mainly one feasibility study on rehabilitation and a draft assessment of the process used for promoting PIMD were available[1].
For Stung Chinit scheme, contracts between the ADB, the MOWRAM and GRET/ CEDAC and a pre-feasibility study gave useful information on the context of the project. The draft report on 2001-2004 activities from GRET/ CEDAC and a consultancy-reports on legal aspects proved highly valuable[2].

⇨ Primary data collection: Interviews

Collection of primary information was undertaken over June and August 2004, employing a case study methodology. No direct observation of irrigation was possible at that time in the schemes.
Primary information was collected through interviews with project leaders and farmers. Getting information about past events and actual arrangements, and cross-checking it, was paramount. Investigation of potential divergence in the viewpoints of different actors was also important.
Not all issues relevant to both schemes could be explored in depth, due to lack of time. In O'Treng particularly, a very general understanding for arrangements on aspects of irrigation management, such as legal, institutional and financial, but also aspects for enforcement, conflict resolution, maintenance activities was developed, from which most relevant issues were retained and explored more in depth.
The guidelines for interviews in Stung Chinit were inspired by my previous work on O'Treng irrigation scheme, reducing the scope of the analysis and adapting it to the local context of: institutional development in process and limited irrigation activities yet.
Questionnaires were used as a basis for discussion, to ensure that all important points identified were reviewed with the interviewee. As interviews proceeded, questionnaires were adapted to better reflect the set of issues relevant to O'Treng and to the analysis.

- Interview with key informants on the project

Key informants include the project officers from MOWRAM and PDOWRAM, and from GRET/ CEDAC and MOWRAM for Stung Chinit project. Officers are knowledgeable about the steps followed and all existing arrangements and plans. The main points reviewed with them include: history of the projects, steps undertaken for institutional development, existing arrangements legal, institutional and financial arrangements, links with the policy process and major difficulties experienced. In addition, I reviewed achievements in O'Treng with the project officers.

- Interviews with local authorities

Chiefs of District, Commune and Village were interviewed to get background information about the area (history, livelihoods, other collective actions in the area). They were also interviewed on the history of the scheme and of collective organisation for management, and on their current and future role.

- Interviews with farmers

Both farmers' leaders and farmers were interviewed. All lines of analysis were reviewed with them, so as to cross check information obtained, and to get indications on the level of awareness of different actors.
Leaders were selected from different entities, and different levels. Many leaders were interviewed particularly at the beginning of the field work in O'Treng, so as to identify with them most relevant issues to the scheme.
Leaders interviewed in O'Treng included:

- FWUC Board as a group, and all chairmen individually (Leader, maintenance Vice-Chief, water supply Vice-Chief, Accountant and Core Farmer Organiser)
- Leaders of the Groups I, II and III
- Leaders of the sub-groups II-2 and I-5

Leaders interviewed in Stung Chinit included: Leader of WUC1, Member of the Board in charge of maintenance for WUC2, village representative in 1 village, block representative.

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[1] Cham H., 2002, O'Treng irrigation scheme, rehabilitation project. Kompong Speu PDOWRAM.
Jinapala K., 2004. Draft. Assessment on the process used in setting up institutions for PIM. IWMI.
[2] ADB, 2000, Memorandum of understanding.
Castellanet, 2001.
Prevost, 2003.
MOWRAM, 2001. Contract with GRET.

In O'Treng, 10 farmers in three different sub-groups were interviewed, mostly from two sub-groups from the head and tail of the scheme. These groups were selected at hazard.
Farmers were then selected (not randomly) from different socio-economic groups/ facing different types of issues. Due to the lack of time and of adequate documents on which to base selection, selection was done by asking the leader of the sub-group or another village leader to meet a certain typology of households:

- For the sub group II – 2: one rich, one poor, one female-headed household, one complementary activity, one average
- For the sub group I – 5: one average, one female-headed household, one family cultivating vegetables, one leader of an informal group of farmers sharing irrigation water
- For the sub-group IV: one family who had been cultivating in the reservoir formerly

Socio economic characteristics, such as wealth of the household or gender (female headed households) can be important factor in determining the stakes of the families in irrigated agriculture, or the involvement of its members in collective actions. Besides, farmers with specific agricultural activities/ responsibilities were interviewed to ensure a first hand collection of information on relevant issues identified from previous interviews.
In addition, a household cultivating just outside the boundary of the Community was interviewed, as it is planned that the Community area will be extended there. The family already received irrigation water last dry season, and could cultivate water melon in Jan-Feb 2004.

Tab. 8 : Characteristics of farmers interviewed in O'Treng.

N°	Group	Main Characteristic	Gender interviewee	Age estimate years	Family members	Area cultivated - in irrigated area	Number of plots in irrigated area	Area cultivated - outside irrigated area	Water melon dry season (Jan - Feb)	Other productive activities?	Other people attending the interview	People adding information to the discussion?
1	II - 2	FHH - poor	F	40		0.7 ha	1	-	Yes	Water melon in April-May.	Son	-
2	II - 2	poor	F	30	6	0.3 ha	3	-	Yes	-	-	-
3	II - 2	average wealth	M	30	5	1.5 ha	4	-	Yes, only 0.5 to 0.7 ha	Motorcycle driver in the area. Water melon in April-May.	Housewife	-
4	II - 2	rich	M and F	45	6	0.5 ha	3	-	Yes	Before irrigation, husband was motorcycle driver in Phnom Penh	4 Neighbours	-
5	II – 2	complementary activity	F	35		1 ha	5	1 plot	Yes, only 0.5 ha	Husband is doctor	Son	-
6	I – 5	average wealth	M	55	5	1.5 ha	1	1 plot	Yes, only 0.5 ha	Daughter works in Phnom Penh (garment industry)	3 Neighbours	-
7	I – 5	cultivates vegetable	M	35	11	0.2 ha	1	-	0.2 ha	0.2 ha of courgettes on a borrowed land (irrigated) in dry season	-	-
8	I – 5	FHH - poor	F	50	7	0.5 ha	2	-	Yes	Home garden	3 Neighbours	-
9	I – 5	Leader of an informal group of irrigation	M	40	7	0.75 ha	1	-	Yes, only on 0.2 ha	Rents generator	-	-
10	after I - 5	outside Community boundary	M and F	45	12	0.7 ha	-	3 plots at the end of the main canal	Last dry season. Hopes to receive irrigation water every year.	Home garden. Before, cyclo-driver in Phnom Penh during the dry season.	-	-

11	IV	Farmer who cultivated in the reservoir	F	50	2	0.3 ha	1	-	Yes	-	10 Neighbours	4-5 of them
	II – 2 and II – 3	Group discussion	33 F 13 M	Most between 20 and 60 years old	-	Wet season rice			All of them	A few husbands go to Phnom Penh to work. Almost all families have cattle.	15 children	

FHH = Female Headed Household

In Stung Chinit, 6 farmers in three different villages were interviewed about their knowledge of the structure for collective management of irrigation, information flows, establishment of legal documents, and their knowledge about current financial arrangements and plans for financing irrigation.
The farmers were randomly selected by walking around the villages and asking in the houses for families with plots in the Pilot Block. They were selected from three different villages, as the owners of the pilot block belong to 8 different villages – with the nearest village including the third of farmers (3 farmers interviewed), another village nearby (1 farmer), and other villages further away (about 1h by bicycle, 2 farmers from Sivottha).

Tab. 9 : Characteristics of farmers interviewed in Stung Chinit

				Interviewee								
N°	**Village**	**Distance to pilot block**	**Villagers farming in pilot block**	**Sex**	**Age estimate (years)**	**Family members**	**Area cultivated - pilot block**	**Dry season rice 2004?**	**Area outside pilot block**	**Other productive activities?**	**Other people attending the interview**	**People intervening in the discussion?**
1	Tbaeng	0.1km	83	F	35	7	0.8ha	No, they rented	-	She and her husband go to the forest.	2 farmers	1 farmer, not from the pilot block
2	Tbaeng			M	40	9	0.5ha	Yes	-	Home garden, they usually go to the forest in the dry season	Housewife	-
3	Tbaeng			F	30	7	0.3ha	Yes	0.19ha	-	-	
4	Sangkruoh	1 km	13	F	30	7	0.5ha	Yes	1.5ha	Her husband goes to the forest.	Her sister	Her sister
5	Sivottha	8 km	12	F	40	9	0.28ha	Yes	1.72ha	Small shop, TV room	-	-
6	Sivottha			F	55	?	0.08ha	Yes, and rented 0.25 ares	0.09ha	-	Her son, 1 member of WUC2	Her son

Total of owners in pilot block = 122, located in 8 villages

Some remarks can be made about the characteristics of farmers interviewed. Because of the method of selection chosen, most interviewees happened to be housewives, as husbands were busy at that time in the fields. Due to the lack of time, and the sensitivity of this information, the wealth of people, which is usually a relevant factor regarding the level of knowledge or their ability to spend time in Community activities, could not be investigated.
Frequently, other villagers were attending the interview. In half of the cases, they intervened in the course of the interview, to provide additional information. It was usually when the interviewee did not know the answer to the question, and was interesting in encouraging an exchange of information.

Limitations

- To the immediate analysis of the schemes

Field work in the scheme has been limited in time (10-15 days), and many subjects had to be reviewed (at the beginning at least) to identify the most relevant lines of analysis. Secondary information on O'Treng scheme was scarce and not very extensive.
Regarding primary collection of data, the main limitation in O'Treng is linked to the selection procedure of farmers to interview. I expect that interviewees know well enough the sub-group or community leader who led me to them, and their answers shall be biased particularly in 3 main ways: higher awareness, better compliance of farmers with the rules, and more positive appreciation of farmers representatives. I will therefore account for these biases in the analysis.
In both cases, some questions were biased per se, such as questions about attendance to meetings, or compliance with rules – all questions on which interviewees would not want to transmit a negative image of themselves! Questions about livelihood opportunities could also get biased answers (reducing the range and importance of opportunities) as many farmers were hoping that my study could help to attract more development interventions to the area.
Finally, the methodology adopted, which is of the type of a qualitative survey, prevents generalisation to be made on some aspects. Past history, formulation of legal documents, structure, main arrangements for operation, financial management, roles of different actors and finally methods adopted by the project officers and leaders to promote PIMD could be cross checked along the interviews. However, to obtain accurate data on awareness of different actors, agricultural growth and livelihood activities would have required a baseline survey.

- <u>To generalisation of findings and comparison</u>

Comparison will be limited by the great differences between the two schemes in terms of:
- Social context: the collective ties in the population in O'Treng scheme appear stronger than in Stung Chinit.
- Past history of irrigation and collective action for irrigation: in O'Treng there has been a long history of commitment of a few actors in irrigation at a small scale. In Stung Chinit however the infrastructure was too dilapidated to be formally operated, and the project is beginning with reconstruction of the infrastructure.
- Basis for institutional development: in O'Treng the public officials could build on existing leadership and experience. In Stung Chinit however institutional development has first proceeded through consultations on the construction's design.
- Stage of the project: in O'Treng, there has been already 4 years of formalised collective management of irrigation. In Stung Chinit however only the pilot block has yet enabled to test in practice management of irrigation.
- The sizes of the schemes: schemes will be of a very different scale in the future[1], which is a limitation to comparison (there are different complexity of issues and difficulties at different scales) – this limitation is however prominent only for certain aspects. Most institutional development activities in Stung Chinit have been focusing on the first secondary canal (about 150ha), which is of a comparable size to O'Treng command area of 250 ha (dry season). However, the difference in size brings strong differences in the overall structure, or in the links with outside entities.

Comparison will therefore focus on the methodologies adopted by the intervening entities in promoting PIMD more than on resulting achievements, and differences due to the differences in context (as presented above) will be accounted for as much as possible.

Regarding general achievements in O'Treng scheme, as compared to stated objectives, not all objectives can be tested – particularly those regarding long-term achievements.
Then, O' Treng scheme should give indications on how the Department of Irrigated Agriculture understands and plans to implement PIMD, as O'Treng scheme is one of the 11 pilot schemes of the MOWRAM for implementation of the policy. The approach taken to institutional development in O'Treng is quite similar to the steps followed in other pilot schemes.
However, resulting arrangements and achievements are very scheme- specific, particularly as the MOWRAM chose pilot schemes in different contexts: different locations, types of structure and cropping patterns, fertility, past histories of irrigation. The main generalisations will therefore bear primarily on the methodology adopted by the Department of Irrigated Agriculture to promote PIMD.

[1] O'Treng irrigation scheme = 500ha in wet season in the coming years, Stung Chinit scheme = 2970 ha in wet season from 2007

Appendix 19: Matrix for analysis of legal arrangements

		Membership	Registration of members	Elections	Statute	By-laws and Regulations	Service contract	Registration of Community to MOWRAM	Legal ownership of the scheme by the Community	Official Transfer Agreement	Water rights
Law		No definition of what an "irrigated area" is and no reference to drainage. Membership is not compulsory.	Compulsory	All representatives democratically elected. Every farmer should have one voting right.	Extensive, with duties and rights of members, structure, roles of representatives, offences and penalties, water fee collection and expenditures. To be adopted by the FWUC Board.	*Not referred to*	*Not referred to*	Compulsory	*Not referred to*	*Not referred to*	*Not referred to*
Draft texts, main changes		Irrigated area = receiving water delivery and drainage services. Membership compulsory for tenants and owners.		1 voting right per water use allotment (= plot)	Essential content reduced to basic roles, structure, rights, power and obligations of the FWUC. The FWUC should not be forced to follow a single detailed model.	FWUCs officers positions, rules for water delivery and maintenance, rules for the ISF, structure for decision-making. By-laws should be as specific, complete and locally-appropriate as possible.	*Not referred to*		*Not referred to*	Draft texts impose it, and a specific sub-decree gives essential contents	The government should allocate water rights to the Community following the provincial allocation plan
DIA in pilot schemes – main differences		Irrigated area= receiving water delivery services. Membership should be compulsory for tenants and owners			To adopt changes to the statute, need to register again to the MOWRAM	Includes 5-year plan with budgetary allocations, and target for fee collection.	-	Registration after each election. Entails statute, structure, name of leaders, 5-year work plan, target for revenue, and decree of registration.	Considered to be de facto	Not considered yet	Not considered yet
O'Treng	Arrangement		Voluntary basis for irrigated area, all owners convinced. It was first ad hoc, with the areas declared by owners. Then it was checked along the years on the field by representatives.	In 2000, election of groups and FWUC Board in a general meeting. In 2003, elections in addition of sub-groups and FOs in villages.	Farmers voted on levels of fees and fines.	Representatives were invited to work on budgetary allocations for the 5 year work plan with MOWRAM/ PDWORAM.	-	Community registered in 2000 and 2003		Will be considered at the end of the 5-year support period	

	Relevance	Issue of tenants not considered - but few tenants. New owners irrigated will become members for next dry season.	Presently accurate.	Candidates to elections were appointed by local authorities and FWUC Board. Elections at general meeting for FWUC and Groups: problem with low rate of participation (25%).	Standardised statute used. Only general provisions (about structure) are applied. No fines levied.	Budgetary allocations for the 5 -year work plan are specific to the scheme, and form the basis for reflection on annual budgets. Rules enforced and procedures do not come from legal documents. Practical relevant arrangements are ad hoc, not formally established, and inherited from the past.			Representatives and PDOWRAM officer are convinced the FWUC has ownership		
Stung Chinit	Arrangement	Tenants will not register, they share duties with owners	Voluntary basis, all owners convinced in SC1. Technical survey on land areas and land ownership survey prior to registration.	Elections organised in villages. Indirect elections for WUC Boards. Households have one voting right per SC to which they belong.	Representatives participate to the drafting. The basis used was the Circular n°1 but it has been simplified, and the organisational structure has been modified.	Representatives participated to the formulation, then local authorities and farmers were consulted: vote by village to adopt them	Draft proposed by GRET/ CEDAC was signed last year by 75% of owners in the pilot block.	Plan to register in late 2004. Will have to find a compromise between legal structure and structure proposed for the scheme		Will be considered near completion of the project	
	Relevance		Effective.	About 60% members voted. Problem with election of block representative: only farmers from the main village(s) could vote	The statute is specific to the scheme, and contains fewer elements than the model. It is however to be tested in context of real management. Representatives, although they were involved, do not make the difference between statute, by-laws, and practical plans.	Regulations issued are extensive. Awareness is high, although more on the broad terms than details. They have been applied in 2004, with fines levied.	Most farmers and leaders did not remember about it: however, The contract can be relevant only if people understand its aim. As there few legal recourses, will have to find ways to ensure it is enforced				

Appendix 20 : Matrix for analysis of institutional arrangements

		Levels of organisation	Hydrological/ administrative structure	Roles of entities	Roles of representatives	Links between entities	Participation of representatives to the decision-making process	Participation of farmers to the decision-making process	Outside environment	Links with local authorities
Law		-The FWUC Committee. -The FWUGs at a subsidiary level. -The General Assembly of farmers.	Groups made up of farmers who use water from the same irrigated area	FWUC as executive body of the Community. FWUGs have an implementation role.	FWUC: Chairman, maintenance, water supply, treasurer. FWUG: implementation of decisions, collection of fees	Meetings FWUC - FWUGs. Meeting FWUG - farmers. General meeting of farmers,before and after cropping period	Based on capacity of the Community, responsibility shall be transferred	Farmers vote at general meeting on repair and budget plan.	Support from the MOWRAM on technical backstopping, managing, monitoring…	*Not referred to*
Draft texts, main changes			Sub-units based on subsidiary canals		FWUC: chairman, deputy chairman, secretary, treasurer, technical officer for O&M	*Not referred to*	After empowerment and capacity building, transfer of responsibility	Decisions taken with the majority rule. Decision-making arrangements to be specified in the by-laws. Approval of farmers required for regulatory texts, cropping pattern schedule, annual irrigation service plan and budget, ISF	Government focuses efforts on water allocation and capacity building/ empowerment, provision of support services. At provincial level: FWUC support team, Provincial Irrigation Council shall be established.	Shall inform with local authorities on plans or decisions that are important for the area
DIA in pilot schemes – main differences										Promotes involvement of local authorities

O'Treng	Arrangement	FWUC, then 4 Groups, and 15 sub-groups, with 5 elected officers each.	Groups corresponding to main canals, sub-groups by villages (1-4 per village, depending on the size)	Formally, identical structure and roles to the legal framework.	Formal positions at each level are: leader, water supply, maintenance, accountant and FO. Officers all share the same basic task of check and cotrol. Leaders of sub-groups and FWUC chairmen have additional responsibility	Regular meetings at/ between each level of organisation.	Leaders invited to contribute to 5-year work-plan and formulation of new arrangements on the water turn and revenue generation activities.	Farmers voted on levels of fees and fines only. They are informed via meetings in villages and more rarely meetings at the FWUC office. Information flows bottom up are mainly through informal personal contacts.	Regular meetings with MOWRAM/ PDOWRAM at present, with financial (to be stopped after the project), human and technical support.	There are 2 District and Commune advisers (Officer of Water Resources and Chief Commune respectively). Most village chiefs or vice chiefs hold positions in the Community. Local authorities are also invited to certain meetings with FWUC.
	Relevance	Steps were taken in 2003 to redefine some sub-groups, but no representatives could explain clearly about the resulting structure	Few subsidiary canals, and there might be a good correspondance between subsidiary canals and village boundaries	In fact, many entities have different roles for information sharing, operation, fee collection, or check. They have evolved from the past ad hoc arrangements, and have been transformed to accomodate new tasks (such as information sharing, or checking). Lower levels of informal organisation for small maintenance and water supply.	The formal positions are not relevant. There are basic tasks of check and control relevant to all officer and all other tasks are fulfilled by sub-groups leaders and FWUC chairmen.	Good coordination, notably ensured via pivotal roles of sub-groups leaders and FWUC chairmen	Real level of information sharing appears limited, as for example leaders did not dare to share their feelings on training methods. Limited participation to definition of legal arrangements, more pronounced for practical arrangements, and paramount for actual implementation (which often differs from formal reference).	Little participation of farmers to the decision-making processes.	Strong links at present, arrangements for the future to define.	Very strong links with local authorities. Particularly used for enforcement and authority.

Stung Chinit	Arrangement	SCIC for the primary structures, WUC federation, WUCs and block/ village representatives (In the new proposal: SCIC, WUC and then WUGS at secondary level)	Higher levels on a hydrological basis. Lower levels on a hydrological and administrative basis	Higher levels for primary structures, WUCs for management of SCs, block levels for operation and small maintenance	For WUCs: leader, water supply, maintenance, accountant and security (enforcement). For lower levels: block and village representatives	Regular meetings at/ between each level of organisation	Representatives from WUC1 and WUC2 have contributed extensively to definition of arrangements, following different methods (more or less participatory/ time consuming).	Farmers consulted on most important matters. They are informed via block meetings (in the main village of the block), and via meetings for all farmers in their village. Information flows bottom up are mainly through informal personal contacts.	Link with MOWRAM/ PDOWRAM formalised via the SCIC. Also a Provincial Coordination Committee for duration of the project.	Monthly meetings at District to report on activities. Local chiefs invited to certain meetings at GRET/ CEDAC
	Relevance	The structure will have to be adapted to correspond the legal framework	Original structure, has to be understood by farmers and tested	To be tested	They have almost the same tasks at present	To be tested	Adequate level for participation has not been found yet.	Divergent appreciations on participation from farmers question the relevance of arrangements and their real contribution to decision making processes. Problem of attendance: organised specific meetings in their own villages for pilot block farmers. Problem of turnover in people attending, and low attendance because distances to cover and forest activities.	Until now mostly through GRET/ CEDAC.	Weaker formal links, but called upon to help with enforcement.

Appendix 21 : Matrix for analysis of financial arrangements

		Sources of revenue	Setting the fee level	Arrangements for fee collection	Fines	Financial support from the government	Other resources	Adoption of budget	Accountability	Types of expenditure, responsibility	Compensation to leaders
Law		- Fees collected, - Assistance or credit from Government, NGOs and Ios, - Profit from business operation, - Various levies and fines.	Formula of calculation: to cover expenses (at least repair and maintenance), and support the administration of the Community + tax 20% of the increasing rate of output per ha. No consultation of farmers required.	Fees collected by Groups officers. No reference to flexibility in payment.	In the model statute, offences listed, levels of fines to be determined by the Community	Assistance from the government to help with fee collection, and to be phased out in 5 years, as follow: - In the 1st year, the Government pays for 80% of the water fee, and members 20% - Gradual decrease by slices of 20% - In the 5th year the Community collects the full amount.	Profit from business operation, Assistance/ credit from NGOs and IOs	Budgets are prepared by the FWUC to be approved in general meetings by farmers.	Following an annual audit, farmers shall be presented with past revenues and expenditures.	FWUC should pay for O&M, administration costs.	A "support to the Committee" is to be granted
Draft texts, main changes			Community establishes modalities for calculation of the fee and integrates them into its statute. The fee level should cover budgetary requirements as set in the annual irrigation service plan.	Established in the by-laws	Offences and fines determined in by-laws	Provision abandoned. In systems where government is paying for part of cost of the O&M, this payment is phased out within 3 years. Cost-sharing mechanism promoted for major rehabilitation and upgrading, and for development of irrigation.			Audits as part of a periodic Irrigation Management Audit. Farmers shall have the right to inspect financial records	Makes a difference between minor repairs and improvements, major rehabilitation and upgrading, and development, with a system of cost sharing with the government	Not referred to
DIA in pilot schemes – main differences			Formula non applicable. Promotes a fee at 10 US$/ ha/ year, lessened for pumped irrigation			Because of the lack of funds, the provision for financial support will not be implemented in other schemes than the pilot schemes.			No auditing yet.	FWUC should save money, by spending only 2000 US$ of the target annually	Salary to FWUC chairmen and Commune and District adviser

O'Treng	Arrangement	Only dry season fee collection at present. 1 200 US$ was collected for 2004.	Fee level set at a general meeting with farmers in 2000: 10 US$/ha/year for gravity irrigation, 5$ for a mix of gravity and pumped irrigation, 2.5$ for pumped irrigation. For wet season, fee established by representatives at half the price.	Fees collected in cash by sub-groups leaders and FWUC chairmen at the field or in the village. Level of the fee negotiated between the farmer and the leaders according to the agricultural returns. FWUC Board does not want to modify this arrangement. Representatives often exempt themselves from the payment of the fee.	Offences and fines listed in the statute. The level has been set up with farmers. However, no fines levied yet.	The first slice of 1 000 US$ was awarded in June 2004, when the FWUC had been able to collect more than 1 000 $ on its own, and deposit it on a Bank account.	FWUC Board will raise revenues from fishing in the reservoir in the long term. The FWUC has required assistance to MOWRAM to help introduce young breeds.	Bugdet is prepared between MOWRAM/ PDOWRAM and the representatives. Farmers are not invited to vote.	Farmers are told about expenditures during meetings in villages. No audit.	Past expenditures on urgent repairs, investment in gates, pumping, and loan repayment. For 200' – 2005: investments, salaries, O&M will be to add. FWUC chairmen are not confident they can save a lot of money.	FWUC Board 13-18$ monthly salary to FWUC chairmen, and 20$ to the Commune and District advisers.
	Relevance	FWUC Board wants to increase revenues (because of the target, and concerns about capacity to be self-sustaining). It will promote wet season fee collection, levying of fines, and, for the long term, fishing operations. Other options to consider could include: - If bad harvest, farmer can postpone full payment for one year - Increase the basic water fee level in the dry season	Farmers interviewed said the level is suitable, maybe high for pumped irrigation. They did not know about a water fee for the wet season. It might be difficult to enforce if no good communication campaign is undertaken priorily.	Flexibility because of the high variability of returns from watermelon cultivation (difficulty to earn money when bad harvest), and of the past arrangements (depending on personal basis). Flexibility causes results from fee collection to vary from year to year. Self-exemption by representatives of payment sets a bad example and causes loss of revenue, and should be abandoned.	Will be enforced next dry season. Farmers interviewed say that everybody respects the rules, so it will not bring money.	Amount awarded on a standardised basis, common to all pilot schemes, without reference to real needs. The main concern of FWUC chairmen on the future if the government completely withdraws is that the FWUC will not be able to face major damages' costs.	Very low stocks at present and overexploitation. The FWUC will have to define how it will control and raise a revenue.	Low level of awareness from farmers about plans.	Low level of awareness from farmers about expenditures. FWUC chairmen are concerned that farmers will complain if they do not see visible investment: FWUC Board plans investment in two gates on the main canals for 2005.	No regular O&M expenditures until now, no idea how much it will cost.	FWUC chairmen are concerned the means of the Community are too limited to sustain these salaries. In any case, the salaries to Commune and District adviser seem an unnecessary burden.
Stung Chinit	Arrangement	Resources only from fines yet.	Farmers consulted on the principle. For next season, fee set to cover basic expenses (allowance to leaders and ranger's salary). For the future: evaluation of O&M costs and debate with farmers	Not established yet. CEDAC project officer stresses that there will be no flexibility or exemption, whatever agricultural returns or water service quality are.	Offences and level of fines were proposed by the representatives, and approved by farmers. Fines were collected from the first irrigation season. About 12.5 $ was collected.	Cost-sharing in the long term between Government and Community: farmers will pay for secondary structures, and MOWRAM/ PDOWRAM for primary structures.	-	For WUC1 last year, allocation of money had been decided by WUC1 Board only.	Farmers were told in meetings about expenditures.	WUCs for O&M on secondary canals, government on primary structures.	At present, compensation to representatives when they join meetings at GRET/ CEDAC. For the future: not decided yet.

	Relevance	Arrangements will be made for water fee collection from next irrigation season	-	-	Arrangements implemented with some flexibility: offenders could also give some labour if they had no cash to pay. No problem reported with enforcement.	-	Farmers and leaders interviewed were doubtful about it, saying there are already too few livelihood opportunities for them.	CEDAC project officer suggests it will not be practically possible to make farmers vote on the budget.	Most farmers interviewed knew that some money was spent on small repairs.		Will have to decide on arrangements for partly compensating the time spent on the field.

Appendix 22 : Comparative study on O'Treng and Stung Chinit irrigation schemes

This comparative study focuses on institutional, legal, and financial arrangements, and examines them following participation, awareness, relevance and adaptability lines.

A. Institutional arrangements

I will focus on the organisational structure, information flows/ decision-making arrangements, and the links with local authorities.

1. Organisational structure

Principle:
The Circular n°1 stipulates there should be three levels of organisation:
- The FWUC Committee, with 5 elected members, which is the executive body of the Community
- The FWUGs at a subsidiary level, with an implementation role
- The General Assembly of farmers.

The structure of the FWUC should furthermore parallel the hydrological structure.

Structure – Stung Chinit
The project team has chosen quite a different structure to the one promoted by the MOWRAM.
Regarding the levels of organisation:
- The highest authority should be the Stung Chinit Irrigation Committee (SCIC, not established yet). The SCIC is to be composed of the heads of the WUCs Boards, representatives of local authorities of the government, and of other economic actors (fishermen…) to encourage collaborative work of these actors in irrigation management. Farmers' representatives should compose the majority of the members of the SCIC. It is planned that the SCIC will be established soon.
- A Federation of WUCs to be responsible for the scheme[1].
- WUCs[2] Boards at a SC level are composed of 5 members, with the following responsibilities: head, maintenance, water supply, security (enforcement), and accountant. It is elected from the village and block representatives.
- There is one village representative elected for each SC in which the villagers have plots.
- FWUG[3]: it is composed of one or two elected representatives per block (corresponding to one tertiary canal).

In the GRET – MOWRAM contract (2001), the village/ WUG level is for information, consultation, reflexion. At the SC level, the WUC ensures planning of works, O&M, fee collection and financial management. The SCIC is in charge of management of the main structures and overall planning for the scheme.
This structure is currently under revision, as it is a requirement of the Department of Irrigated Agriculture that the organisation should abide by the legal basis of one FWUC as the main body/ and FWUGs at lower levels.

Structure – O'Treng
The MOWRAM has chosen to promote a structure with three levels of organisation:
- The FWUC has authority over the whole scheme. It comprises 4 members (Leader, Vice-Chief maintenance, Vice-Chief water supply, accountant), plus the Core FO[4] since 2003.
- The four FWUGs are responsible for each main canal[5]. They report to the FWUC on the activities of sub-groups, and control the situation on the field.
- There are finally 15 sub-groups, in villages.

For each sub-level, there are 4 members of the Board, with the same division of responsibilities.
Other entities include:
- District adviser and Commune adviser: they are responsible for advising and helping the FWUC to deal with its responsibilities.
- FOs in villages: there is one FO[6] per village.

[1] It will become a FWUC in the new structure.
[2] WUGs II in the new structure.
[3] WUG III in the new structure.
[4] Elected from FOs
[5] 3 main canals, plus the irrigated area South-West of the reservoir
[6] Responsible for calling farmers to meetings.

Spatial definition of levels

In both cases, organisation at the highest level parallels the hydrological structure, but is a mix of administrative/ hydrological units at the lowest levels.

In Stung Chinit, organisation of the sub levels, ensuring representation of all users and their coordination was indeed a complex task. There are farmers from many different villages for each block[1]. The project team therefore proposed, after consultation of farmers, that:

> The Committee of FWUC will be formed by block representatives (1 person per block) and village representatives (1 person elected per village). In this condition, every village is participating to decision related to water management and maintenance, by representation into the FWUC committee.

In O'Treng, sub-groups have been directly defined by villages, with 1-4 sub-groups per village – depending on the size of the village[2]., with 1 to 4 sub-group by village, depending on the size of the village. Sub-groups boundaries are said to follow the hydrological logic within the village. Interviewee stressed that the dominance of the administrative boundaries had to do with the fact that village boundaries correspond quite well to main hydrological boundaries[3].

This information could not be cross- checked during the interviews, as representatives interviewed were confused about sub-group boundaries and could not locate them on a map.

Therefore, the formal structure in both schemes is quite different to the legal basis - both in terms of numbers and types of levels, and of their hydrological/ administrative basis. Particularly, in both cases, organisation at the highest level parallels the hydrological structure, but is a mix of administrative/ hydrological units at the lowest levels (see Figure 6 and Figure 7). It calls for flexibility in implementation of the legal framework, so that each scheme can define the structure that suits it best.

Finally, in both cases , there are additional, lower levels of informal organisation, with informal groups of 4 to 10 farmers. These farmers have neighbouring plots and share a wood block on a canal, and should irrigate at the same time. In O'Treng, they have a stronger role than in Stung Chinit. They organise together to get water, and to undertake small repairs. In stung Chinit, although GRET/ CEDAC tried to promote collective organisation for irrigation and maintenance, project officers related that there is little collective action and in particular very little coordinated irrigation at the moment at this level.

Roles of different entities are little specified in the legal framework. The model statute suggests the FWUC Board is the executive body, and FWUGs implement the decisions at their level of management. Draft texts require that each Community defines precisely roles and activities at each level in its statute.

In both schemes, the formal structure is a complex one, with many levels and intervening entities. In O'Treng, the formal roles do not correspond actual activities. For each type of task a different entity is called upon, formal or informal: for example, water supply[4] is organised via informal small groups of farmers, in connection with leaders of sub-groups and FWUC chairmen, fee collection is organised by sub-group, and meetings are by villages, groups levels only have the task of reporting on activities, and finally check and enforcement is a responsibility for all levels.

In Stung Chinit formal entities have different set duties, with the block level used for water supply and maintenance, and the village level for information sharing.

It is therefore important that roles of entities can be defined on a scheme-to-scheme basis. It would also be suitable to formalise actual arrangements in O'Treng.

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[1] The sharing of land between villages was perpendicular to the old scheme layouts (basis for the new construction). As a consequence, owners from 2 to 5 different villages are cultivating in a same block (and 1-2 owners from some other villages). In this context, election of block representative by owners of 1 block, and formation of WUC Committee from these block representatives only would have led to choose 1 village instead of another.

[2] There is no sub-group in Chrey village, as only 3-4 families from the village have plots in the irrigated area.

[3] Most farmers from one village have their plots in the same locations. The Chief of the District indeed explained that land was distributed in 1987 after the end of collectivisation. As there were no records on earlier ownership patterns (before the Khmer Rouge regime), the land distribution pattern followed the village logic.

There are a in addition relatively low numbers of secondary and tertiary canals, which means that most farmers get irrigation water from the main canal. As there are no delimitations on the main canals (such as gates), farmers irrigate by small groups of about 10 families along the canal, and these small groups can be aggregated for management in a way following the administrative division (according to M. Bonn and the maintenance Vice chief of the FWUC).

[4] In general, as stressed by Molle, 2002: "One of the core functions of the WUGs is the management of water at the tertiary level. WUGs are widely expected to define rotations within the ditch, to help solve conflicts which may arise, and to follow the discipline dictated by the scheduling".

Figure 6: Structure[1] in Stung Chinit

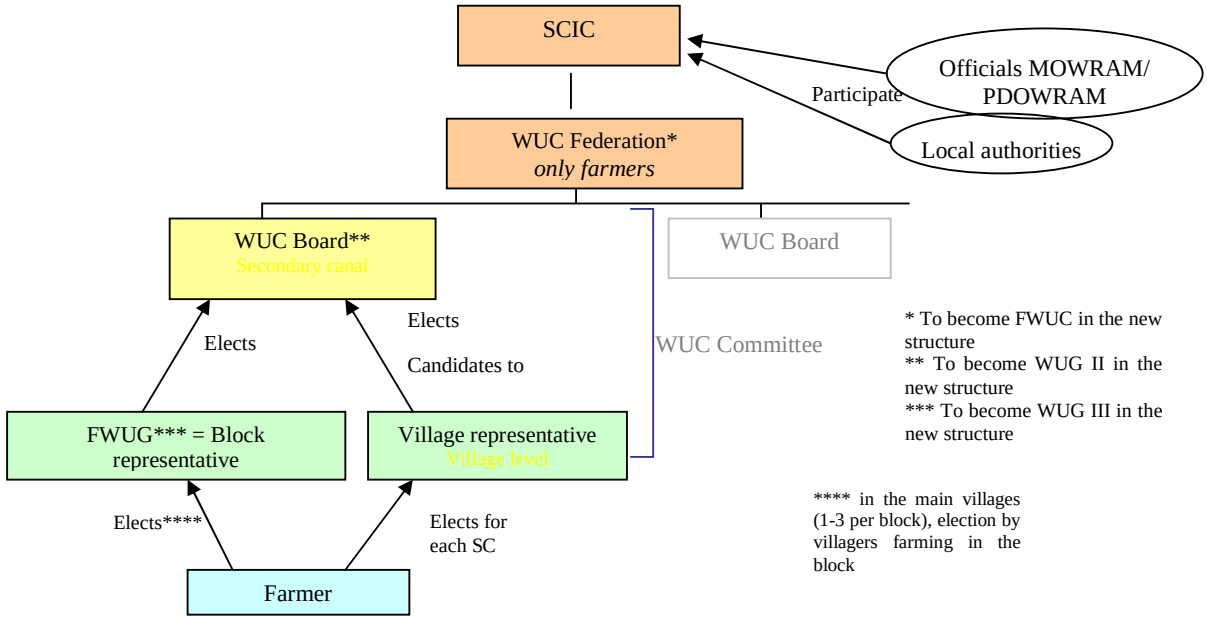
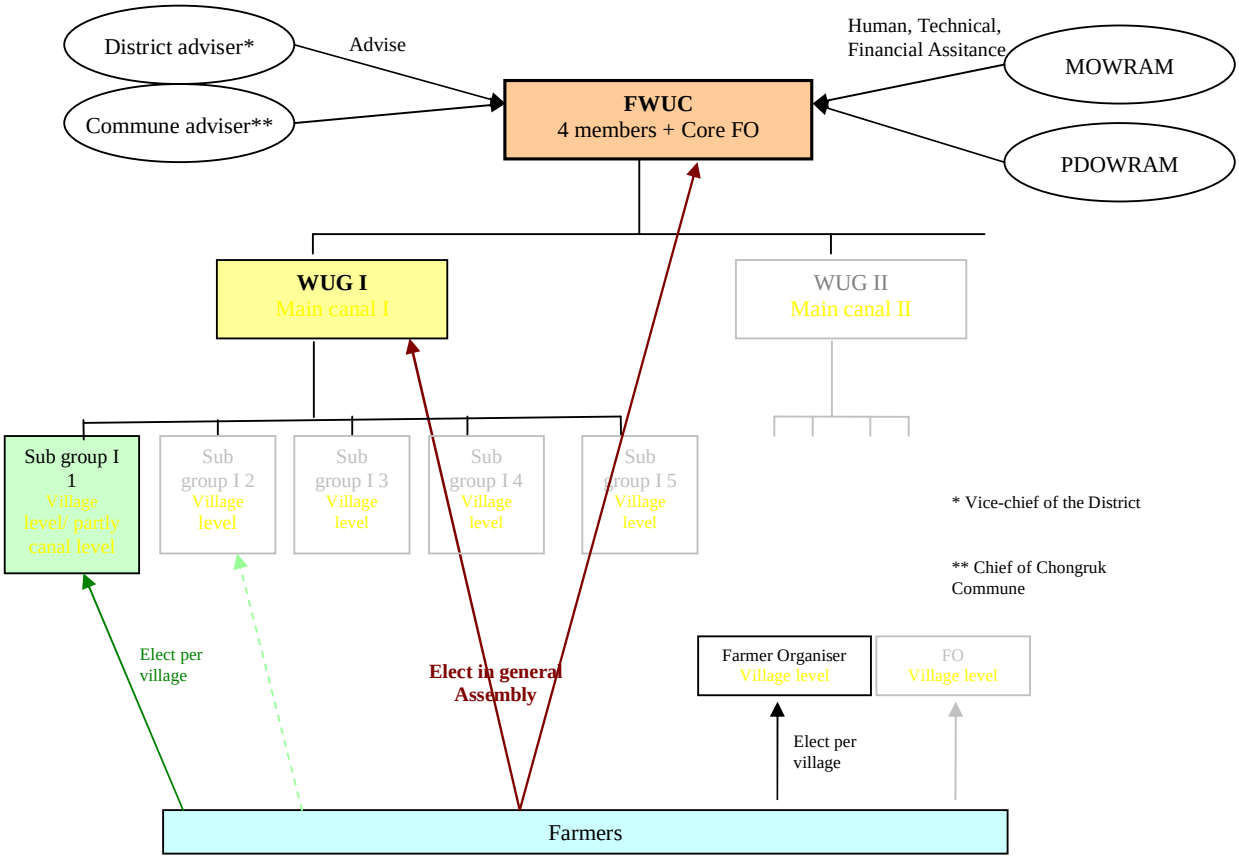


Figure 7: Organisational structure for O'Treng (2003)



[1] This structure is currently under revision, as it is a requirement of the Department of Irrigated Agriculture that the organisation should abide by the legal basis of one FWUC as the main body/ and FWUGs at lower levels.

Duties of representatives

Number and duties of representatives are suggested for the higher levels in the model statute, and specified in draft texts[1]. For lower levels, two officers at minimum are required. Arrangements in the schemes differ to the framework: there are fewer or more representatives than planned at the levels, with different duties.

In both schemes, there is a ratio of representatives to farmers of about 10%.

At the lowest levels, they have different set duties:

O'Treng	Stung Chinit
Leader	Block representative
Maintenance	Village representative
Water supply	
Accountant	
FO	

Different positions entail different activities. In practice, in both cases it appeared that the basis of the work of representatives was the same, whatever their title – in Stung Chinit it might be however because only one block could be irrigated last year.

Leaders interviewed at all levels in O'Treng stressed that the core of their work is to go and observe on the field water supply[2], and cultivation results[3]. There were additional, specific activities for Leaders of sub-groups (operation) and groups (report on activities), for FOs (call villagers to meetings), and for each FWUC chairmen.

Therefore, provisions from the legal framework are therefore little applied as such, either formally or informally, and should be modified to integrate more flexibility.

Outside environment

External linkages will be crucial for the Communities. The policy stipulates that they shall received support on technical aspects, management, or monitoring and evaluation. Draft texts then set up the general framework for assistance, with establishment of organisations at national and provincial levels[4], and role of the government.

For Stung Chinit, links with higher authorities (MOWRAM and PDOWRAM) are formalised via the SCIC. The role of the MOWRAM/ PDOWRAM is to increase gradually, as the GRET/ CEDAC team will step out. Following the Memorandum of understanding (ADB, 2000), the MOWRAM will be responsible for O&M of the main canal, weirs, cross regulators and cross drainage structures. The project will provide funds, on a declining % over time, and government share will increase proportionally. A Provincial Coordination Committee has also been put in place for the duration of the project. It is headed by the Provincial governor, and comprises officers from diverse Provincial Departments, District and Commune chiefs, and representatives of farmers.

External entities that collaborate with the Community in O'Treng are the District and Commune advisers (Vice-Chief of the District and Chief of Chongruk Commune), and the MOWRAM/ PDOWRAM. The advisers were appointed by the MOWRAM. They have a double role: providing support to the FWUC, and ensuring a good coordination with local and District authorities. Their support is mostly focused on helping with enforcement and, for District adviser, reporting regularly to PDOWRAM on activities. PDOWRAM and MOWRAM officers provide human and technical assistance – and financial assistance for a temporary number of years.

Awareness

Awareness of farmers and their leaders has to be estimated for different levels: from the sub levels to the highest levels.

In both cases, farmers interviewed had a fragmentary vision of different levels of responsibilities (see Figure 8 and Figure 9). Most knew only 1 to 2 representatives from their own villages – and in O'Treng FWUC chairmen. It causes a particular problem in Stung Chinit, where they are supposed know and refer to the block representative, who is in many cases not from their village.

In all cases, they could not tell the difference between activities of different leaders.

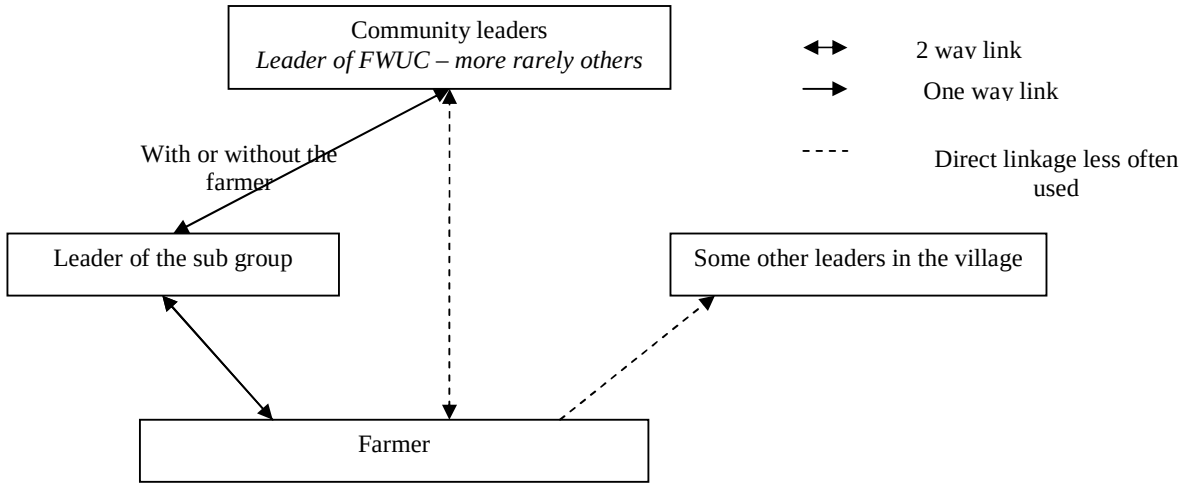
[1] Respectively a minimum of 4 and 5 officers, with different sets of duties: chairman, maintenance, water supply and treasurer in the model statute, and chairman, vice-chairman, treasurer, O&M officer

[2] *Which plots receive water? What blocks are closed, do they have the right to take water?*

[3] *Is the harvest good?*

[4] Interministerial Working Group, FWUC support teams , which have been recently established and Provincial Working Groups

Figure 8 : Dominant vision of farmers interviewed about the entities and the links between them – O'Treng



Farmers representatives interviewed were aware in the broad terms about the number and set duties of other representatives. In Stung Chinit however they appeared confused about the distinction between village representatives, block representatives and WUC Board members. In O'Treng, they could not explain boundaries of each sub-groups[1].

For higher levels of management, farmers interviewed in both cases knew about the leading project entities GRET/ CEDAC and MOWRAM/ PDOWRAM. They did not know however how the scheme would be managed at the highest level. Leaders interviewed in O'Treng showed a higher level of understanding about the role of MOWRAM/ PDOWRAM, both because of their longer experience with irrigation, and the lower complexity of management and involvement of other entities.

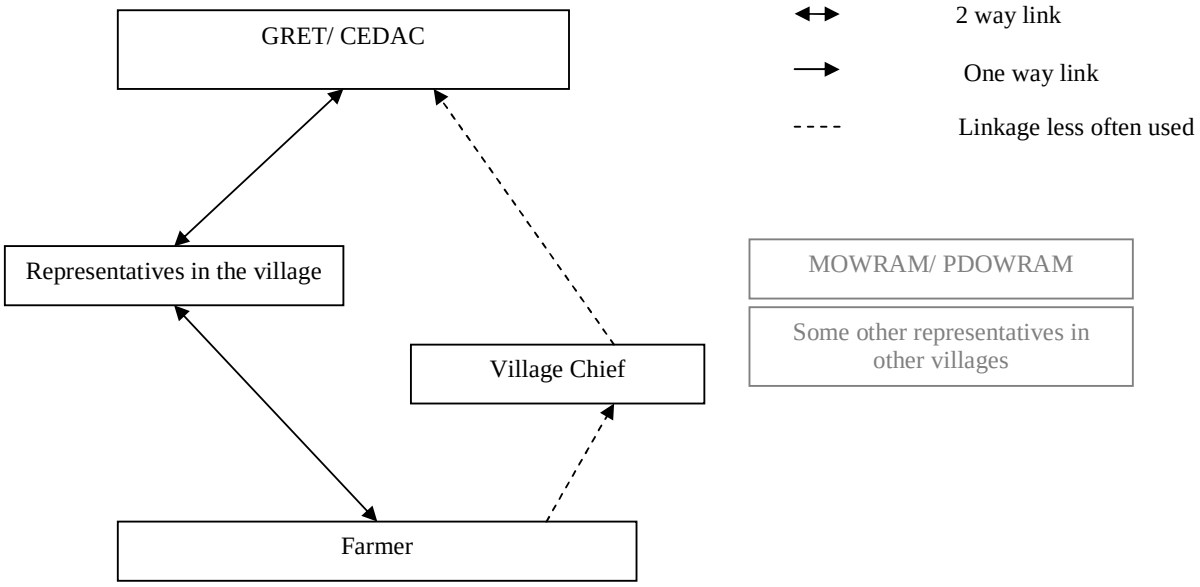


Figure 9 : Dominant vision of farmers interviewed about the entities and the links between them – Stung Chinit

[1] As they were ask to draw on a map boundaries, this ignorance might have come either from a real uncertainty, or from a lack of mapping skills.

Adequacy of the formal structure in O'Treng

In O'Treng, the formal structure is a complex one, with a multiplicity of levels (Groups, sub-groups) and of representatives. For different types of tasks, different levels are called upon:

- For operation, the basic entity is the informal small group of farmers, calling upon the leader of the sub-group and the FWUC chairmen.
- For maintenance, the basic entity is again the small informal group of farmers. Maintenance can be organised by the leader of the sub-group for bigger scale repairs, and the FWUC is called upon for large-scale works.
- The leader of the sub-group together with the FWUC chairmen undertakes water fee collection.
- For organisation of meetings, the FOs have to call farmers to the meetings in villages
- For meetings, the basic entity is the village level, with the contribution of the sub-groups leaders and of the FWUC Board.
- For linkages between formal entities, the Group has to report on activities of sub-groups to the FWUC.
- For control and enforcement: all leaders at all levels are called upon to control water supply and agricultural results.

Therefore, it does not appear that the formal structure adopted is related to the tasks described above, which rest primarily on the Leaders of sub-groups / FWUC members.

I suggest that the main advantage of the formal structure is to multiply the leadership positions, and to ensure a high number of people are available for the control and enforcement activities (which has been identified by all leaders interviewed as their primary activity).

Modalities for adapting the structure are important for the future viability of the Community. They are not referred to in the existing legal framework, although the draft texts specify that statute should entail procedures for revision. The issue is acute at present in O'Treng scheme, where institutional arrangements primarily rest on an ad-hoc basis quite different to the formal model. These arrangements have been inherited from the past arrangements for management on a small-scale area (such as for operation) or introduced under the impulsion of the FWUC Board and MOWRAM/ PDOWRAM (information sharing at village meetings). These ad-hoc arrangements, although effective, are more open to contestation than formal ones, and are less easily understood.

Steps are currently taken by the MOWRAM to modify some arrangements, and make them abide to the formal regulation (introducing a water turn for example). However, it could also be interesting to build on existing arrangements to formalise them, and seize the opportunity to rationalise them as well: particularly as they are often time-consuming for farmers and their leaders, for example with the negotiations on the water fee and operation arrangements.

2. Information flows and decision making arrangements

Information can flow from many sources to many recipients (farmers, their leaders, outside entities) in very different ways. Decisions can be taken also at different levels following the subject at stake. Therefore, I will highlight the main characteristics only of the existing arrangements in O'Treng scheme.

Arrangements for information flows and decision making are very important to give farmers and their leaders the means to understand the stakes and issues of water management, and to allow them to give their opinion about it and influence decisions. Leaders are to take over responsibility for decision-making following the empowerment and capacity building period. Currently, farmers shall participate only for establishment of the budget and cropping pattern schedule (model statute). Draft texts however require a higher involvement from farmers on many issues: including regulatory texts, cropping pattern schedule, annual irrigation service plan and budget, fee level….

Coordination between entities is ensured in the model statute via regular meetings to be held at and between each level. In the draft texts, it is left to the statute to arrange for it.

The main channel for the flow of information between farmers' representatives and farmers is through meetings organised in villages. In O'Treng, for villages with several sub-groups, meetings are organised for all sub-groups at the same time. In Stung Chinit, village meetings include meetings per block (directly in farmers' villages or in the main village[1], for all farmers of the block at a time), and meetings per villages, for all farmers of the village. Frequency of meetings varies, depending on the issues raised: frequency is at its highest during preparation of cultivation. Whereas in O'Treng the highest frequency is one meeting per week, there can be up to one per day

[1] Tbaeng village, about 70% of owners, for the pilot block.

organised in Stung Chinit. Frequency should be limited however, so as not to cause lassitude from farmers' behalf.
In O'Treng, farmers are in addition invited twice a year to general meetings at the FWUC office. Whereas attendance in villages is high, in general meetings only about one third of farmers join. In both schemes, it appears that attendance is higher for meetings organised directly in the villages of farmers. When they have to cover distances (farmers from the pilot block joining meetings in Tbaeng, or general meetings in O'Treng), attendance lowers. Until now, GRET/ CEDAC has organised collective transportation to remedy to the problem. However, this is not a sustainable solution.
According to farmers interviewed, there were no differences in the subjects reviewed in the different types of meetings: rules, maintenance, operation, water fee (for O'Treng).
A limitation imposed on information flows from upper levels to farmers is the important turn over in people attending meetings. Husbands, wives or children come to join meetings in turn; sometimes the people attending are not those spending most time on the field. The problem is particularly in Stung Chinit, where most farmers work part-time in the forest, and are therefore absent from the scheme for long periods.
Furthermore, another problem noted was that of the multiplicity of speakers. Representatives, project officers or local authorities intervene in different meetings, and the link made by the presence of one or two farmers representatives is not enough to ensure that all speeches are consistent. Conflicting pieces of information are therefore delivered to farmers.

In both cases, informal information flows from farmers to the upper levels are mainly through personal contacts with the lower levels representatives in their villages[1], plus with FWUC chairmen O'Treng. Farmers directly go to see the representatives, particularly to ask for more water, plus in O'Treng to negotiate the water fee. It would be valuable to formalise these channels, so that information is centralised (as farmers go to see different leaders).

It appeared in the interviews generally that little is expected from the flows of information from farmers to their representatives. The only case in O'Treng quoted of influential action from farmers on the general management of the scheme was in the dry season 2004. As the water level in the reservoir became too low to allow for irrigation of the main canal I areas, farmers demanded and insisted that the FWUC should provide them with water to finish the cultivation season. The FWUC then applied to the MOWRAM for assistance, and a pump was established on the main canal I head structures to provide water to the canal. As in the usual cases of bottom-up information flows, this intervention of farmers was linked to operation and water supply.

Finally, another channel put in place for information sharing is through "exchange visits" of farmers and representatives from the whole area to the pilot block. Exchange visits were organised usually over one day for 10-15 farmers. Although farmers interviewed from the pilot block noted that this happened several times per month, and that the visitors were looking at the pilot block, none reported having had the opportunity to talk with them. The principle of exchange visits is important in letting farmers and representatives from future irrigated areas understand what is irrigation. In addition, mechanisms for exchange with farmers from the pilot block (2-3 families for one visit) could be established as well, so that direct dialogues between farmers are rendered possible.

Participation to decision-making processes
In the schemes, issues open to consultation differ: they are the fee level for O'Treng, and on major organisational/ regulatory/ financial decisions in Stung Chinit.

Regarding direct participation of farmers, in O'Treng, they were invited to vote to adopt statute, after having chosen the levels of fees and fines. Farmers interviewed then did not say that meetings were opportunities for debates.
In Stung Chinit, farmers are consulted on major organisational/ regulatory/ financial decisions taken. However, the true level of participation of farmers in debates, and their influence over the final decision, is very difficult to assess. For the CEDAC project officer, there have been examples of critics by farmers of the proposals made to them, particularly on arrangements for the water turn, and on organisation for maintenance. Most farmers interviewed however stressed that they did not discuss proposals made to them, or bring modifications to them.

[1] In O'Treng, leaders of sub-groups. In Stung Chinit, block and village representative.

Critiques expressed by farmers during debates?

WUC1 leader: "Before a meeting at the village, representatives go to the GRET/ CEDAC office to learn about activities. Then, they explain to the farmers the decisions taken. People in the villages never question the decisions because they understand that they are grounded".

Pilot block representative: "Some people disagreed at first with the rules (about restrictions to fish in the canals), but after discussion they understood and agreed."

Farmer from Tbaeng (n°1): "Some people complained that it was impossible for them to lead the cattle without damaging the canal: GRET/ CEDAC then agreed to build a bridge".

Farmers from Tbaeng (n°2, 3): "No one was critical about the rules proposed".

Farmer from Sangkruoh (n°4): "I do not speak in meetings. Twice, Commune and District authorities came to attend meetings. Farmers were then invited to give their opinion about water supply. Some people asked for the gates to be opened."

Farmer from Sivottha (n°6): "It happened that, after the project team raised a question, people debated about it. There were many debates on water supply. Also, it was the idea of farmers that, if someone is caught stealing water, he should be fined. People agreed however on suggestions about maintenance (farmers should be responsible directly for the parts of the canals in front of their plots), and with the water turn".

About the rules, overall, the 6 farmers interviewed stressed that everybody agreed, either directly (4 interviewees) or after discussion (2 interviewees).

Box 3: Interviewees views on farmers participation in decision and debates, Stung Chinit.

These relatively low levels of participation to formal decision-making processes have first to do with general governance patterns in Cambodia:

-They usually lack experience with irrigation
-There is a reluctance to speak up in meetings.
-There are other informal bottom-up channels to transmit information and requests
-Traditional patterns of authority are top –down.

In addition, they also have to do with specific conditions in each scheme:

- In O'Treng, farmers are invited to vote only on the statute.
- In O'Treng scheme, farmers interviewed expressed a high level of confidence in their leaders and their decisions (although this answer might have been biased by the selection procedures).
- In Stung Chinit, farmers have had very little experience with irrigation, and are therefore little knowledgeable yet about management issues.
- There are informal flows of information from farmers to higher levels to transmit their requests.
- Authorities interviewed considered that farmers are not aware about irrigation issues.

In both schemes, most contribution of farmers to the decision-making process is actually made via involvement of their representatives in shaping formal arrangements and running the scheme.

<u>Information flows at representatives' levels, and participation to decision-making</u>

It is crucial that good coordination is ensured between the different entities involved in management.
In both schemes, according to the representatives interviewed, there are regular meetings held at/ between each level of organisation.
There are also informal discussions held between representatives, at the field for example.
Then, in O'Treng where there is a very high number of entities involved in low-level management, the pivotal role of leaders of sub-groups and FWUC chairmen in most activities ensure a good ad-hoc coordination.

Leaders in O'Treng have been primarily consulted on plans and on redefinition of arrangements, such as the water turn prepared for next dry season. Doubts were raised in O'Treng however about the extent of flows from representatives to project officers (They did not dare to tell about their wish for more personal trainings to the MOWRAM/ PDOWRAM officers), and they should be encouraged to feel confident enough to speak up.
In Stung Chinit, arrangements for participation of representatives in the formulation of legal arrangements are extensive, but have not found the right trade-off yet between participation and time taken.

<u>Higher authorities</u>

Although GRET/ CEDAC officers regularly go to meetings in the villages in Stung Chinit, project officers in O'Treng rarely go to villages. Their main contact is with farmers' representatives.
Farmers' representatives in both schemes have regular meetings with higher authorities: with GRET/ CEDAC in Stung Chinit, and with MOWRAM/ PDOWRAM officers in O'Treng. Meetings in stung Chinit are used both for trainings and formulation of arrangements. Meetings in O'Treng are used predominantly for trainings.

In both schemes, representatives and higher authorities work together on the definition of arrangements. In Stung Chinit, as explained above, there has been an extensive work done on formal arrangements, but the right trade-off between participation and effectiveness of collaboration methods has not yet been reached. In O'Treng, participation of farmers' representatives to the decision-making process was limited for the adoption of formal rules, but has been more pronounced for decisions on practical arrangements – and is determinant in the implementation of these arrangements (without the MOWRAM, PDOWRAM[1]). Although the level of actual exchange of information and co-decision could not be evaluated, reports about capacity building activities raised doubts as to the intensity of the information flow from leaders to the MOWRAM officers. Two FWUC chairmen and the Commune adviser indeed stressed that they were not satisfied with the organisation of trainings: whereas trainings are organised for all representatives at the same time, these leaders would have liked to have more specific trainings relating to their responsibilities. They all said that they did not dare to communicate this remark to the MOWRAM officers.

3. Links with local authorities

The legal framework recognises as the basis the "irrigated area" (model statute) and the primary/ secondary/ tertiary canals in the draft texts. No reference is made to he administrative basis, or to involvement of local authorities in management. In the draft texts, the FWUC "shall inform and consult with local authorities on plans or decisions that are important for the area" only.
In both schemes however the village level is an important unit for organisation. Support from local authorities was particularly sought for enforcement. The legal framework could therefore try to accommodate the potential importance of the village unit.

The involvement of local authorities in the schemes, or their support at least, is very important for backing up efforts of collective organisation of farmers. Involvement goes through direct participation to management, formal channels of communication, and informal channels.
Some village and Commune chiefs held representatives positions. It is particularly the case in O'Treng, where 7 villages (out of 9) have their Chiefs or Vice-Chiefs members of the FWUC, Groups or sub-groups. This was voluntary promoted by authorities during formulation of the Community, and also inherited from the past[2]. In Stung Chinit, direct involvement is at a relatively low level, with only about 5 chiefs or vice chiefs elected representatives.
Formal channels of collaboration are based primarily on meetings with farmers representatives and project officers. Village and commune chiefs in Stung Chinit for example had been invited to the GRET/ CEDAC office for consultation on legal arrangements. In O'Treng, they are invited depending on the subject discussed.
Village and commune chiefs are informally involved via their voluntary participation to meetings in their villages, or their support in some day-to-day management activities. In both schemes, it appeared this support mainly focused on enforcement of regulations.

Finally, two additional alternative channels have been put in place for collaboration. In O'Treng, the Chief of Chongruk commune, and an Agricultural officer of the District are "advisers" to the Community. In effect, they help with enforcement, and relay information to PDOWRAM. In Stung Chinit, regular meetings (1/ month) are held at the District, with the different stakeholders: MOWRAM, Provincial Departments, GRET/ CEDAC and some farmers' representatives. These meetings are used to report about activities and to decide on management of the reservoir and opening of the gates.

There are therefore various channels for collaboration with local authorities. Although links are stronger in O'Treng, it appeared that, on the crucial issue for collaboration identified by interviewees (enforcement), collaboration is at a high level in both schemes.

Conclusion

[1] See the flexibility for water fee and operation for example.
[2] Representatives in the early form of Community 1998 – 2000 were then village chiefs and vice chiefs, and commune authorities.

Participation

Information flows to farmers appear to rest primarily on meetings held in villages. Information from farmers is transmitted via informal interpersonal contact with leaders to the higher levels. For information flows to and from farmers, generally speaking farmers should be invited as much as possible to speak up in meetings. Informal interpersonal contacts should also be organised so that information from bottom to up could be centralised.

Some constraints were identified, such as the difficulty to hold general meetings to consult all farmers at a time, the risk that some discourses held are inconsistent, and the important turn over in people attending. Other methodologies for sharing of information can be explored, such as conducting some surveys (information from) or producing leaflets (information to), and encouraging farmers to discuss at home about subjects reviewed, but it will be difficult to relieve these constraints.

The level of contribution of farmers to the decision-making process is not clear cut. It is more promoted in Stung Chinit than in O'Treng, but even there appreciations diverged on it between project officers and farmers interviewed. Several external and internal reasons were listed to try and explain a general low level of contribution from farmers. However, it must be noted that farmers in O'Treng are able to directly influence, in informal ways, decisions directly impacting on them, such as water supply and fee. Finally, farmers in O'Treng could be formally invited to vote on more issues, such as the annual plan, as they have no some experience with irrigation, as it could raise their awareness about the management of the scheme.

Most contribution of farmers to the decision-making process is actually made via involvement of their representatives in shaping formal arrangements and running the scheme.

Representatives have been involved in decision-making on different areas in both schemes. In Stung Chinit, they have yet been participating intensively in decision-making about formal arrangements. In O'Treng, representatives have primarily contributed to decisions about redefinition of practical arrangements (to be implemented in the future), and implemented until now arrangements following their ad hoc base. Doubts were raised in O'Treng however about the extent of flows from representatives to project officers. They should be encouraged to feel confident enough to speak up.

Local authorities are either directly involved in management via representatives' positions (particularly in O'Treng), or formally, but less regularly, via participation to diverse meetings. In all cases, interviewees appeared to expect involvement from authorities particularly for enforcement, and were satisfied with the current level.

Awareness

In both schemes, the level of understanding of actors interviewed about the structure and the duties of the representatives appeared to be low. There are three main reasons to this:

- The formal structure is a complex one, with a multiplicity of levels and leaders in O'Treng and a parallel block/ village organization in Stung Chinit.
- The formal structure is little used yet: because informal, ad hoc arrangements dominate in O'Treng, and because there has been very little practical experience with for actual management of the scheme in Stung Chinit.
- For actors interviewed, the structure rest at present on a few pivotal representatives, who have important roles in management and linkages of entities: sub-group Leader position, and FWUC Board in O'Treng, and representatives from villages (including village and block representatives in Stung Chinit).

This low level awareness will not a problem as such if farmers know to whom they can refer to, and if representatives at least have a good understanding of the structure.

The establishment of the 5-year work plan in O'Treng has proven particularly useful in raising awareness of leaders about long term issues for the scheme, and for the activities of the Community.

Institutional viability

Relevance

The current structures ensure that all farmers are represented at a higher level of management, through the village unit, and through the hydrological unit as well in Stung Chinit.

The structure developed for Stung Chinit is an original one, with a combination of administrative and hydrological logics. However, it has yet been little tested (one irrigation season only), and it is difficult to judge its relevance. Interviews tended to indicate that the system is yet little understood, which will be a handicap for running it efficiently.

In O'Treng, the main characteristic of institutional arrangements is that the real entities relevant to water management, and their links, do not actually correspond to the formal structure. For different types of tasks,

different levels are called upon. Coordination between the numerous entities involved appeared effective, ensured first via formal regular meetings and second (and maybe most importantly) via informal arrangements based on the pivotal role of leaders of the sub-groups and FWUC chairmen. The ad-hoc organisation for water management therefore differs to the formal structure.
Institutional arrangements therefore primarily rest on an ad-hoc basis quite different to the formal model. These arrangements have been inherited from the past arrangements for management on a small-scale area (such as for operation) or introduced under the impulsion of the FWUC Board (information sharing at village meetings).
Steps are taken to try and modify some arrangements, and make them abide to the formal regulation (introducing a water turn for example). It could also be interesting to build on existing arrangements to formalise and rationalise them – as they are often time-consuming for farmers and their leaders (see negotiations for the water fee or operation). These ad hoc arrangements are also fragile in that they are open to contestation, which does not happen at present, but might in the future (with increased pressure on farmers to pay fees for example).

Finally, links with external entities are strong at present, and will have to be kept for the future. In Stung Chinit, links with public agencies are more institutionalised than in O'Treng, notably via the SCIC[1]. In O'Treng, links with local authorities are multiple and stronger than in Stung Chinit - although in both schemes their involvement in enforcement appeared satisfying.

Adaptability
Efforts have been made in O'Treng to adapt the structure of some sub-groups in 2003. However, the changes made were not clear, either to FWUC chairmen, or to the leaders directly concerned. Steps are currently furthermore taken to redefine practical arrangements so as to make them more formal and rational.
The structure in Stung Chinit will have to be tested in the context of actual irrigation of a whole SC, to see if it is manageable. It is important that GRET/ CEDAC ensures it is reviewed in the future.

B. Legal arrangements

Legal arrangements are the basis for collective action in irrigation management. They include membership/ registration, elections, statute and by-laws, service contract and recognition by the government.

1. Membership and registration

First, the Community is to be defined over the irrigated area. However, legal texts do not describe what is and could be the area: there is no reference made to drainage, no description of systems in the policy, and description[2] in the draft texts does not reflect the diversity of water management systems. In both schemes, the areas considered are actually those receiving water, and the drainage structures are to be maintained by the Community.
The Circular n°1 does not entail that membership of landowners in the Community area should be compulsory. The MOWRAM now promotes compulsory membership. The draft decrees on PIMD (MOWRAM, 2003) also specify as such.
The option chosen in both schemes is to reach 100% membership, but with a voluntary registration: farmers were invited to register at meetings, and absentees were contacted directly at their homes.

Registration and membership are to be established on the basis of the boundaries of the command area and the knowledge of ownership patterns (owners, areas).
In O'Treng scheme, when the registration process began, the boundaries of the scheme were unknown (they did not know how far the water could go), and lands had not been measured. The process therefore begun on an ad hoc basis. It was then refined and reviewed during the first irrigation seasons, as at the beginning one of the main activities of the FWUC Board members was to go to the field to measure areas. Presently, representatives have an up to date list of farmers irrigating, of their number of plots and of the sizes of these plots.
The boundaries of the irrigated area were first been established through estimates of the MOWRAM and consultation with villagers on water ways, and finally checked with a technical survey. A land ownership survey (completed in May 2002) was organised to obtain a precise list of owners. A technical survey is finally currently undertaken to measure exact areas. It is already complete for SC1 and SC2. The list of landowners in the command area was therefore complete before elections of representatives begun. Registration is complete for

[1] Overviewing management of the primary structures.
[2] Described as an area served by an hydraulic network *"main canal, secondaries, tertiaries, quaternaries"* whereas there are flood control areas for example

SC1 (227 owners), reaches 96% for SC2 and around 60% for the other SCs. Owners register to each WUC they belong to (one WUC per secondary canal).

Circular n°1 specifies that tenants can be members of the Community, and the draft Sub Decree on FWUCs (MOWRAM, 2003) goes further in imposing the obligation to all water users in the area, whether owners or tenants, to register. There are very few tenants in O'Treng scheme, therefore the issue has not been considered. In Stung Chinit, where tenancy reached 50% on the pilot block in dry season 2004, GRET/ CEDAC decided that tenants would not register, but share duties with the owners.

Relevance
Although registration rests on a voluntary basis at present in both schemes, farmers and project officers could convince all owners to register.
The process followed for establishment of accurate land ownership patterns and land measures was different in the two schemes: it was done ex post by leaders in O'Treng along the years, whereas in Stung Chinit it preceded registration procedures and elections. Both systems have proved effective.
In O'Treng scheme finally last years some farmers outside the Community boundaries received irrigation water. They should be invited to join the Community in the coming months.

2. Elections

The Circular n°1 specifies that "the FWUC will respect democratic principles" and "every farmer member shall enjoy the right to vote and be elected in the FWUC". As recommended in the legal framework, the mandate of representatives is 3 years in the scheme.
Each household in the schemes is given one voting right. It ensures that farmers are equally represented, although it could be advised that, to truly represent farmers and their stakes in the area, voting rights could be given in proportion to the size of the land owned. In O'Treng, farmers vote only once, in their village, but in Stung Chinit households are invited to elect each WUC (SC) they belong to.
First elections were organised in O'Treng in 2000. The Chief of Chongruk Commune appointed candidates, and all farmers were invited to an information meeting by the MOWRAM to vote to appoint FWUC and Groups (main canals) chairmen. Meetings of information were then organised by villages to inform farmers and to appoint sub-groups leaders[1].
After official selection as a pilot scheme at the end of 2002, the MOWRAM organised elections of one Farmer Organisers (FO) per village[2]. In 2003, after the first mandate of leaders, new elections were organised. A general meeting (25% attendance) was held with farmers to re-elect FWUC and Groups chairmen. Elections were then organised by villages for sub-groups' representatives.
In Stung Chinit, block representatives[3] were fist elected in 2002. They were elected in the main villages of each block, by farmers from the village. More block representatives were elected than needed, so as to provide for departure of unmotivated persons or lack of capacities for some of the elected people. WUC representatives were then elected in villages for each SC. In both cases, information of farmers, registration of candidates and elections all happened in one day in each village. Both farmers and their leaders stressed that some candidates were truly volunteers, and others were pushed by the farmers themselves, or the chief of the village.
The 5 members of the WUCs board for each secondary canal were then elected by village representatives and block representatives (of the SC). As defined by the project team, only village representatives can be elected to the Board, although both village and block representatives voted.

Democratic principles
Of the principles for establishment of the FWUCs, the "democratic" statute of the Community has proved difficult to guarantee. In both schemes, modalities for selection of farmers' representatives have involved both designations (formally or socially promoted) and elections.
In O'Treng have been based on a mixture of election and direct appointment to the charge. There has been a progress towards democratisation in 2003, with election of sub-groups leaders. In Stung Chinit all leaders have been elected –however representatives for higher levels of management (WUCs Boards) are elected indirectly.

[1] Structure in O'Treng : FWUC Board for the whole structure, Groups on each main canal, and sub-groups in villages/ secondary canals.
[2] The FO has the duty to act as a facilitator and organiser of meetings
[3] Structure in Stung Chinit : SCIC and Federation of WUCs for the whole structure, WUCs Boards on each Secondary Canal, WUC representatives in each village and Block representatives for each tertiary canal.

The rate of participation appeared good (higher than 50%) in elections organised in villages. In O'Treng however a low rate of participation (25%[1]) was reported for elections of the FWUC and groups chairmen, as it was organised via a general meeting with few people attending. Efforts should be devoted to raise the rate of participation.
Finally, in both cases it was reported that candidates had been mostly pushed by their fellow villagers, or by local authorities/ farmers' leaders to run for elections. Efforts should be taken to encourage voluntary candidatures to the charges. It might prove difficult to tackle with however, as the number of people with the needed qualities (literacy) is limited, and it is generally acknowledged that new leaders in Cambodia have to be pushed by local authorities, or by their fellow farmers: Hasselskog noted for example in 2000 in two case studies that "there is a widespread reluctance to hold position authorities".

Awareness
Farmers interviewed in O'Treng generally had little knowledge about the modalities of selections of leaders. 4 out of 10 only remembered there had been some elections in the past. In Stung Chinit, however, most farmers remembered about elections, although they are not clear about the number of elections held and their goals.
Leaders in both schemes appeared more aware about the selection procedures – although only in the broad lines. In Stung Chinit for example, the system of indirect elections for the WUC Board was not clearly understood by leaders.
For democratic principles to be effective, people must be aware about them.

Institutional viability – relevance
A particular problem arose in both cases with the number of farmers allowed to vote. In O'Treng, farmers could vote for all the sug-groups in their village, or all groups generally, even though they did not belong to it. In Stung Chinit however, farmers with plots in one block, but not from one of the ain villages of the Block, were deprived of the possibility to elect the block representative.

3. Statute, other regulations

The Circular n°1 entails a model statute, extensive, but there is no requirement to apply it strictly. The draft texts emphasise that the statute should be simple and scheme-specific: "the FWUC support team should not force all FWUC to follow exactly a single detailed model".

The first statute in O'Treng was adopted in 2000, based on the model statute Appendix to the Circular n°1. Levels of the water fees and of fines were discussed at a general meeting with farmers, following proposals from the MOWRAM. Statute and by-laws were therefore adopted and the first set of legal documents related to O'Treng irrigation scheme did then entail:

- The statute of the Community, with different levels for fees and fines as compared to the Circular n°1
- The organisational structure of the Community
- Names and responsibilities of leaders
- Registration of the Community to the MOWRAM (Decree of)
- Decree of establishment of MOWRAM and National Policy for the Sustainability of Operation and Maintenance of irrigation schemes (2000)
- 5-year work plan of the Community: budget for expenditure (on repairs and maintenance, human resources, gas, extension services and communication) of 2 000 US$, and resource from the water fee (5 000 US$)

During re-elections of Groups and FWUC representatives in 2003, farmers were asked if they were satisfied with the level of fee and fines. Between April and July 2003, the MOWRAM/ PDOWRAM, farmers' representatives and local authorities worked together on understanding of the statute and by-laws of the Community. Modifications were also brought to the allocation of budget in the 5-year work-plan. The set of legal documents for the Community in 2003 therefore corresponded very closely the earlier set and to the legal basis.
Leaders interviewed on the subject of changes in statute and regulations referred to other modifications introduced in 2003: water turn, planned areas for cultivation, enforcement of the rules. Decisions were taken jointly by the farmers' representatives and by the MOWRAM/ PDOWRAM. However, these decisions were not formally on any document, or submitted to all farmers for approval. Practical rules for implementation are therefore promoted in an informal way.

[1] As compared to the legal minimum level of 2/3 of farmers to validate the election

The statute of the WUCs in Stung Chinit is currently under preparation, with one statute per WUC in the present proposal (this will change if the structure is modified).
Consultation with representatives of SC1 and SC2 (both WUC boards and block representatives) was undertaken on the basis of the legal framework from May 2003. Representatives were asked to analyse the legal base, sentence by sentence, and to reformulate and modify each point. These arrangements promoted ownership by leaders of the statute, but were finally not considered satisfying by GRET/ CEDAC, as it was very much time-consuming. GRET/ CEDAC is currently reviewing the final draft by comparing it to the legal framework (Circular n°1) and to the statute of the Community in Prey Nup polders[1]. The Circular n°1 promotes an extensive statutory basis, where most areas of management are reviewed (including offences and penalties for example). GRET/ CEDAC has tried to simplify the statute, by moving some formal rules into internal regulations, or into the service contract. The aim is also to ease future modifications of internal rules.
The final draft, after adoption by farmer leaders, will then be transmitted to local authorities and farmers for adoption.
A similar method for consultation was followed for establishment of internal regulations. Ideas on main areas where rules were needed first came, in addition, from farmers representatives. For the first regulations adopted[2], CEDAC project officer wrote proposals and submitted them to SC1 farmers' representatives to discussion. A new method is now experimented[3], whereby brainstorming sessions are organised for representatives to write proposal themselves.
After adoption of proposals by representatives, local authorities were invited to discuss them. Regulations were then extended in villages by representatives.

Participation
Approaches chosen to formulation differ. In the legal texts, it is required only that FWUC chairmen work on drafting statute and by-laws, and adopt them – and, in the draft texts, that all members vote.
In O'Treng scheme, farmers were only consulted on fees and fines' levels. Leaders were more involved on discussions about the 5-year work plan. Most contribution from farmers' representatives to the establishment of regulations actually happened for definition of practical arrangements, which did not lead to the formulation of legal/ formal documents.
In Stung Chinit, participation from representatives was set at a higher level, with an extensive work done on the re-formulation and adaptation of statute and regulations. Farmers are invited to adopt formal regulations, and are consulted via an information meeting organised in their villages. Mechanisms for consultation with representatives have been fluctuating, from very participatory methods to more consultative and quick methods. The project management has yet to find the right balance for participation, capacity-building and effectiveness.

Awareness
For legal arrangements to be valuable to the Community, it is necessary that representatives develop a good awareness about them
In both schemes, the only understanding of farmers interviewed about formal texts was on offences.
Representatives interviewed had a higher awareness, but could not make the difference between statute, regulations, and practical, informal arrangements. In O'Treng, FWUC chairmen could not distinguish between statutory elements/ by laws and other practical rules used (not formally adopted). In Stung Chinit, most representatives interviewed did not make the difference between statute and regulations.
The low level of awareness might not be a problem for daily management as such if there is a good social consensus on what are the rules of the Community. However, for the long term it will be important that representatives understand well these different sets of regulations, so as to be able to modify them.

Relevance
The "Statute of the FWUC" appendix to Circular n°1 is an extensive one, where most subjects relating to internal regulation are reviewed. Statute and by-laws adopted for O'Treng irrigation scheme are common to all pilot schemes of the MOWRAM – the differences lying in the levels of fees and fines, and in allocation of budget in the 5-year work plan, as well as in the structure of the Community (number of Groups and sub-groups)[4]. The relevance of these documents to the specific conditions of O'Treng irrigation scheme is therefore questionable. Working provisions however on decision-making arrangements, rules, resources and expenditures, are not applied as such. For example, cash penalties, although the basis for enforcement and punishment in the statute, have never been implemented in the scheme. I suggest that the main functional mechanisms actually

[1] It is another GRET project, and the oldest large scale PIMD initiative in Cambodia
[2] On cattle grazing control, fishing control and access roads/ oxcart roads
[3] For the additional regulation on water turn.
[4] Interview with officers from the DIA.

follow practical, informal arrangements put in place by the Community (sometimes with the help of MOWRAM) in O'Treng scheme, and that the formal set of regulations is applied only in its broad terms.
The little use made of legal documents should no be a problem if there is a good social consensus on the ways of doing. Rules can also be informally adopted, shared and respected – if there are effective social coercion mechanisms and if responsible organizations have enough authority over farmers. As local authorities are already involved in enforcement of regulations (as acknowledged both by local authorities, farmers and their representatives), it is not sure whether a priori formalization was really needed. In addition, legal arrangements are generally little enforced yet, due to weaknesses notably in the judiciary system (ADB, 2001).

In Stung Chinit however, an extensive work has been done on statute and regulations, to adapt them to predicable issues of management. Relevance cannot be appreciated yet from experience, as irrigation is too recent yet.

Adaptability
In O'Treng scheme, although some provisions of the statute and bylaws are not applied, no steps are planned to modify the regulatory framework. Instead, the MOWRAM/ PDOWRAM are working on the modification of actual practical arrangements. This task is important, but it will be crucial that finally legal documents correspond to reality on the field.
For Stung Chinit, as regulations have been adopt ex ante experience with irrigation on a medium/ large-scale, regular reviews to integrate experience from field activities will be needed. GRET/ CEDAC team stressed that a particular problem with adaptation of statute was to register new modifications to the MOWRAM. It reduces the flexibility in bringing modifications to the legal basis of management.

4. Service contract

The service contract is a formal agreement between the farmer and the WUC on the duties and rights of each party. The Circular n°1 does not refer to such a contract.
There is no question of such a contract yet in O'Treng.
For the Stung Chinit scheme, a first contract was prepared before last dry season for the pilot block by the project team, on the principles of water management, and participation in canal and drain maintenance. About 75% of owners signed it. In the future, the contract will be based on technical specifications, with the WUC committing itself for a technical service.
There appears to be yet little awareness about it: most farmers and representatives interviewed did not remember about it. The 2 farmers remembering about it thought it was a commitment only on their side to respect regulations. The aim of the contract (obligations of the farmer in response to a quality service by the Community) is therefore not yet understood.
The relevance of making a formal contract in such a context is therefore quite questionable. A contract can be valuable only if people do not understand its aim. Furthermore, in the general Cambodian context, where the judiciary system is very poor[1], the chance that farmers will make claims or go to the Court seems very thin.
Promoting a service contract would however have the indisputable advantage of raising awareness that farmers can expect a level of service quality, and raise accountability. It also increase chances that, however difficult it might be, a legal recourse by the FWUC against users evading fee payment is possible.

5. Recognition by the State

In the Policy for sustainability of operation and maintenance of irrigation systems (MOWRAM, 2000), it is specified that the FWUCs should obtain due recognition from the Royal Government of Cambodia (RGC). The FWUC has to register to the MOWRAM, with publication of a decree. Although legal texts do not provision for it, the DIA promotes registration after each elections[2] or changes in statute, which is a constraining procedure.
The Community of O'Treng irrigations scheme already registered twice to the MOWRAM: in 2000, and in 2003 after the new elections. The plan of GRET/ CEDAC is to organise registration before the end of 2004, after the finalisation of the statute. The main difficulty was to find a compromise between the structure previously proposed by GRET/ CEDAC and the structure promoted by the MOWRAM (see above).

The issue of ownership of the scheme after the transfer is not dealt with: The draft decree only specifies that the « Community has jurisdiction over an entire hydraulic system », which does not give ownership. The

[1] Song, 2000.
[2] Hence in O'Treng, the Community registered in 2000, and in 2003.

MOWRAM considers that there is already a de facto ownership by the Communities, however legal texts should specify as such.
Although the existing legal documents do not provision for it, the draft Decree on PIMD (MOWRAM, 2003) imposes the formulation of an official transfer agreement, to be signed between the Community and the Government. In both schemes, it is planned that formulation of such an agreement will start near completion of the project.
Finally, water rights are among the main provisions put forward in the draft Law on Water Resource Management. In the draft Decree on PIMD (MOWRAM, 2003), it is specified that "the Government shall allocate a water use right to all FWUC". Modalities for implementation of this provision are however yet unknown.

Conclusion

Participation of farmers and their representatives

As emphasised by F. Prevost (2003):

> "The method used to draft the statute is perhaps more important than the actual results in their own right. The users' representatives have to develop answers to the many questions raised. […] This is always a delicate exercise."

In O'Treng scheme, actual participation of farmers to the establishment of formal procedures or documents has been severely limited. Some progress can be emphasised in the procedures, for example with elections by villagers of sub-groups leaders, or discussions between the representatives and the MOWRAM/ PDOWRAM on allocation of the budget for the 5-year plan.
The main channel of participation in the establishment of legal documents is actually the contribution of farmers' representatives to the definition of practical, not legal, arrangements: they are not "legal" stricto sensu, but are the provisions actually applied.

In Stung Chinit, participation rests mainly on the collaborative work between GRET/ CEDAC with the representatives of SC1 and SC2. Different method have been tested, more or less participatory and time-consuming. The adequate trade-off between effectiveness/ rapidity and participation has not yet been found. It would maybe be advisable that most participation is promoted after representatives have had the opportunity to gain some practical experience, so that they understand better about the importance and relevance of different elements.
Farmers are consulted for adoption of proposals. Interviewees did not agree on the level of debates generated. GRET/ CEDAC emphasising the opportunities for debate created, and farmers interviewed stressing that there are very few debates, that are usually solved by more explanations from the team side.

Awareness

The general level of understanding of farmers and their leaders about legal arrangements could not be quantitatively tested, as interviewees were too few. However, their interviews suggest that farmers knew mostly about offences, and not other arrangements. Representatives interviewed understood in the broad lines the arrangements, but not their particulars or their specific importance.
In Stung Chinit this potential low level of awareness is not very important at the moment. Raising awareness is a long term process, and will be better undertaken through confrontation with the reality of irrigation.
In O'Treng, representatives appeared more aware about practical arrangements used (rules) than formal, legal ones. It will be important however that they are capable to understand and use formal regulations.

Institutional viability: Relevance

In O'Treng scheme, formulation of arrangements and implementation are proving a mixture of a priori standardised principles and ad hoc implementation. Regarding statute and by-law, the Department of Irrigated Agriculture has followed a standardised approach in establishment of the legal set of documents for the schemes in which it is supporting institutional development. But these legal arrangements are little effective, and are taken over by real, practical and informal, arrangements.
Therefore, relevance of these documents to the specific conditions of O'Treng irrigation scheme is therefore questionable.

On the contrary, an extensive work on legal documents has already been undertaken in Stung Chinit scheme. The aim is to provide the Community with an adequate package of legal tools for the management of the scheme.
The debate is however open on the adequate level of legal documents to reach. A few words of caution can be expressed about a possible over-focus on formulation of legal arrangements:

- In many cases, in Cambodia, legal arrangements are either non-existent or non applied (ADB, 2001). De facto arrangements and social coercion are often used, given the lack of legal framework, or the incapacity of local or national authorities to enforce the Law.
- Existing regulations for the scheme are extensive and very detailed. However, if the authority of the Community is well established, farmers will know and respect broad principles of rules. In addition, the capacity of farmers' representatives to remember or actually enforce specific points of detail is questionable. Enforcement of general rules and authority are at least as important as the exact definition of rules.
- Finally, there is an opportunity cost to the extensive work undertaken on formulation of legal arrangements, in terms of human resources. The extent of work needed should be balanced with other work that could be undertaken on reinforcement of the authority and the capacity of the representatives.

On the other hand, the multiplication of legal documents also presents some advantages: it increases chances of seeing farmers abide by them[1], and they are opportunities to raise awareness of leaders and of farmers. The level of detail necessary, and the time to spend on fine-tuning them, should however to be reasonably limited.

Adaptability

Legal arrangements have been slightly modified in O'Treng in 2003. In Stung Chinit, arrangements shall be reviewed according to experience on the field.

Generally speaking, as explained above, formal statute and regulations have not been adapted to the scheme's specifications. For this, it is necessary that representatives understand about the different provisions and their relevance, and that the procedure is not too complex. As modification of statute and by-laws entail re-registration to the MOWRAM, it is not to be the case for O'Treng scheme.

C. Financial arrangements

Financial arrangements are concerned with revenues, accountancy, and expenditures.

In Stung Chinit, fee collection will start only from next dry season, and most financial arrangements have not yet been decided upon.

The O'Treng irrigation scheme is supported at present by the MOWRAM, but it is expected in the future that the Community will be self-sustaining. On the contrary, Stung Chinit scheme will be an example of cost sharing between the government and the farmers. The primary structures are of a very large scale and the MOWRAM/ PDOWRAM will provide technical and financial assistance for their management.

a. Revenues and water fee

Legal framework

The Community of farmers can have diverse sources of revenues, following the legal framework. Sources of revenues are listed in the Circular n°1 and its Appendix on the Statue of the FWUC as:

- Fees collected
- Assistance or credit from Government, NGOs and IOs
- Profit from business operation
- Various levies and fines

The fee is calculated on the basis of expenses comprising at least repair and maintenance expenses, and administration of the Community. The Community should also tax 20% of the increasing rate of output per ha. No consultation of farmers on the level is planned by the legal documents.

In the draft Sub Decree on FWUCs, modalities for calculation and establishment of the fee are left at the discretion of the Community, which should decide on these modalities and integrate them into its statute.

The Circular n°1 goes further in establishing a gradual increase of water fee collection, with financial assistance from the government in the first years:

- In the 1st year, the Government pays for 80%, and members 20%
- Gradual decrease by slices of 20%
- In the 5th year the Community collects the full amount.

This provision is abandoned in the draft Sub Decree on FWUC (MOWRAM, 2003).

Fee collection in the schemes

In both schemes, the main resources of the Community will be the water fee levied on the surfaces cultivated.

[1] As stressed by Martin Desautels, from DFDL, people would be less keen to openly disobey a greater number of contracts and formal documents of obligations.

In Stung Chinit, fee collection will start only when dry season cultivation will become profitable to farmers. Farmers have agreed on the principle to pay a fee, but the level has not yet been set. The fee will be calculated first to cover basic expenditures of the WUC[1]. Later, the level will be set following estimation of the costs of O&M[2], and also discussed at meetings with farmers.

In O'Treng however, fee collection started (on a very small-scale) in the early 1990s[3]. In 2000, when the Community was formalised, the level of the water fee was discussed at a general meeting with farmers, based on proposals from the MOWRAM. It was agreed that the fee level would be:

- 40 000 riels/ ha for gravity irrigation
- 20 000 riels/ ha for a mix of gravity and pumped irrigation
- 10 000 riels/ ha for pumped irrigation

The fee was then reviewed in 2003 during new elections of representatives. All farmers interviewed said that the level is suitable for them – although a few said it was expensive for pumped irrigation.
The fee has not been calculated on the basis of actual expenditures requirements (not estimated) or agricultural returns (not estimated), as promoted in Circular n°1. The MOWRAM acknowledges that the formula is not applicable as there are no capacities to estimate costs or returns (it recommends instead farmers in all pilot schemes to choose a fee level at 10 US$/ year/ ha).
Most interviewees said that as far as water melon cultivation is concerned, the average return lies between 1 and 2 million riels/ ha (see -). In such a case, the water fee is set at less than 4% of the returns to cultivation, which is quite a low level[4].

Tab. 10: Fee collection in O'Treng scheme

Year	Wet season cultivation (June - December)	Dry Season cultivation[5] (January-March)	Number of families	Fee collected [6] - Million riels	*US$*[7]
Before 1998	About 30 ha	About 30 ha	Around 100	?	
1998 - 1999	?	100 ha	300	0.5	*125*
1999 - 2000	?	45 ha	?	0.45	*110*
2000 - 2001	?	210 ha	653 registered, maybe more obtained water	3.9	*975*
2001 - 2002	?	211 ha	?	1.7	*425*
2002 - 2003	?	172 ha	?	4.2	*1050*
2003 - 2004	389 ha	279 ha	867, and about 20 families outside the Community	4.8	*1200*

Water fee collection is undertaken at present only for dry season cultivation, after the harvest (March to May). Most farmers paid at least part of the fee.
From 2004, fee collection is planned for the wet season[1], so as to raise the Community means.

[1] Investment in small material, salary to a ranger.
[2] Consultancy mission to be launched by the end of 2004.
[3] Farmers who had not contributed by their labour to the repairs undertaken were asked to pay a small fee, to feed in the village budget. Between 1998 and 2000, there was a set level at 10 000riels/ ha for gravity, and 5 000 riels/ ha for pumping irrigation.
[4] The Circular n°1 refers to taxing 20% of the increased returns to agriculture.
[5] Variation from year to year in dry season areas cultivated because of (dis)satisfaction with watermelon cultivation by farmers one year impacts on their investment decision the following year. Areas lower than dry season irrigation because labour and investment constraints for farmers.
[6] Variation from year to year because of variations in agricultural results..
[7] Rough approximate from the current rate of exchange.

Flexibility and exemptions

Legal documents do not refer to any type of flexibility –either linked to quality of water supply or to agricultural returns.

Flexibility in the payment of the water fee is one of the major characteristics of O'Treng scheme. Flexibility is linked here to the returns of agriculture, more than to the quality of the service. Community representatives go to the field during cultivation and at harvest time, to look at the results that farmers obtain. The fee is then negotiated directly between the farmer and the sub-group leader or a FWUC chairman. Leaders had no comprehensive information on how many farmers paid a full fee: it was estimated by them that more than 60% of farmers paid the full fee[2]. Most farmers interviewed expressed satisfaction with the system of negotiation, but answers might have been biased by the selection process[3].

Such a flexible system has several advantages in the context of O'Treng irrigation scheme: it accounts for the high variability in the returns to watermelon cultivation, and it raises the level of satisfaction from farmers. However, the system is a complex and demanding one to operate (many controls are needed on the field), and is prone to create conflicts[4]. In addition, it diminishes the means of the Community, which might reduce capacity to being self-sustainable.

Finally, farmers are never in principle exempted from the payment of the fee. However, the poorest families can not pay, and most farmers' representatives exempt themselves from the payment of the fee, as a compensation for their activities: this causes a loss of resources, and of credibility for the Community. Other types of compensation should be provided to representatives, if it is affordable accomplishing the major part of the management tasks.

On the contrary, no flexibility or exemptions are planned in Stung Chinit. Project officers were positive that payment would be de-linked from agricultural returns. The case of a poor water supply has not been dealt with yet.

Additional resources:

Additional resources could include fines, alternative activities and financial support from the government.

Although the statute entails provisions for cash penalties in case of offences, the provision was never enforced in O'Treng scheme. FWUC chairmen might enforce this provision in the future, so as to increase the Community means.

In Stung Chinit, on the contrary, fines have been levied from the beginning of irrigation. 50 000 riels[5] were collected last year over the pilot block.

Concerning alternative sources of income, from business operations, FWUC chairmen plan to collect money from fishing activities in the reservoir. However, fish stocks are almost exhausted at present, and they first need to be repleted.

In Stung Chinit, farmers and their representatives interviewed were generally doubtful about any possibility to raise additional income.

Finally, mechanisms for financial support provided by the government are not clear-cut. In the existing policy, there should be a financial support provided and phased-out over 5 years as water fee collection increases. The MOWRAM acknowledges that the provision is not applicable generally. Finally, the draft texts promote instead a cost-sharing mechanisms, depending on the type of expenditure[6]. For Stung Chinit, the joint management of the primary structures by farmers and public agencies implies that the MOWRAM will finance O&M for the reservoir and the main canal. It will be important that the government creates a special budgetary line to allocate budget for this.

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[1] Level set at half the dry season' fee.

[2] For farmers interviewed, about 30% paid a full fee. The others paid four others between 25 and 83% of the due fee. As it can be roughly estimated that the total fee collection should amount to more than 8 million riels, I suggest that actually most farmers benefited last years from a reduced fee.

[3] One farmer and her neighbours complained that the FWUC is still demanding too much money as compared to the means of farmers.

[4] For example, interviewees said they did not know how much their neighbours had paid. However, if they were to begin sharing information about it, the FWUC might face many protests and claims.

[5] About 12.5 US$.

[6] Operation, routine maintenance and minor repairs and improvements financed by the Community

Major rehabilitation and upgrading, development shall be shared. No definition is given however on these different types of expenses.

On the other hand, although O'Treng is to be self-sustaining, it is receiving at present financial support from the government, following the legal framework[1]. Financial support at O'Treng community will take place over a 5-year period. It ensures a good base for financial means of the Community. The procedure is to be the same in all 11 pilot schemes of the Department of Irrigated Agriculture, with support at the same level. However, there are schemes of different types and sizes, which would require different levels of support. Also, support is provided only after the FWUC has proved able to raise important financial means on its own[2] –leaving potentially some FWUCs to struggle with prior difficulties which they can not solve[3].
Finally, provisions for support if case of major damage to the structure after completion of the 5-year support period are yet unknown, and it will be necessary to reflect on modalities for support.

Increase the revenue?
FWUC chairmen in O'Treng expressed their concerns to raise the means of the Community. The options considered are to enforce a wet season water fee collection and levy fines, and to diversify the activities of the FWUC. Other options which are not considered, but could be included, are:

- Require payment of the rest of the dry season water fee the following year if one harvest was bad and the farmer could pay only part of the fee (suggested by one FWUC chairman)
- Increase the basic water fee level in the dry season

These two options are based on the consideration that, in times of normal returns, the fee represents only a small part of the revenue from dry season crop cultivation.

b. Accountancy

Regarding expenditures, the legal framework specifies Communities are to establish a budget, and to seek farmers' approval. In both schemes however farmers are not consulted.
Budget planning and reporting on past activities are to take place in both schemes. Communities report on plans and expenditures to their members, but actual awareness of farmers interviewed remained low.
A particular issues that could be noted in O'Treng was accountability. Farmers interviewed could not explain precisely how the money had been spent in the past years, or what are the plans for the future. They just stressed that the money collected is used for repairing the reservoir. FWUC chairmen were concerned that the farmers will complain (a few already do) that they do not see actual achievements. This is the reason why the FWUC Board has chosen to promote investment two gates[4] for 2005, with one gate located on the main canal I, near plots of current complaining farmers.
The FWUC Board has therefore chosen to promote visible investments – in the limit of the resources available – to show to farmers that the Community is active. Other methods could also be adopted for promoting accountability: presentation by villages with plans and budgets for expenditures, and especially explained about the different types of expenses.

c. Expenditures

According to the existing legal framework, FWUCs should pay for O&M of the irrigation scheme under their responsibility. The draft Sub decree on FWUCs (MOWRAM, 2003) is more detailed as it makes a difference between different types of expenditures: operation, routine maintenance and minor repairs and improvements, major rehabilitation and upgrading, development. For the last two types of expenditures, a cost-sharing mechanism should be put in place between the FWUC and the government.

In Stung Chinit, a cost-sharing mechanism will be adopted.
At present, resources of the WUC1 are used to pay for the salary of the ranger, and to invest in small material/ small-scale repair. For the future, the capacity of WUCs to actually pay for O&M of secondary structures is yet

[1] This provision is to be implemented for the 11 pilot schemes of the MOWRAM, but not for other schemes in the country. Only O'Treng scheme has yet received any money, as the government first requires that the Community can raise 1000 US$ and deposit it on a bank account. Under financing of the Loan ADB Cam-1445, the MOWRAM is to provide revenues to the FWUC as follows:

- In the first year, the FWUC collects 1 000 US$ and the MOWRAM gives 4 000US$
- In the second year, 2 000 3 000
- In the third year, 3 000 2 000
- In the fourth year, 4 000 1 000
- In the fifth year, the FWUC becomes financially self-sustaining.

[2] According to M. Bonn, MOWRAM officer, if a FWUC has too little money, it is difficult for the Government to help it.
[3] Such is the case in Sne irrigation scheme
[4] On the main canals I and II. Gates also needed for improvement of the infrastructure.

unknown. It is feared that the structure is fragile, and will be costly to maintain[1]. Then, WUCs will also have to pay compensation to leaders[2].

In O'Treng, no regular budget could have been established yet, with routine expenditures, investments and emergency repairs. Most expenses of the FWUC have until now focused on repairs and improvements on the dyke, and on some urgent reconstruction. Because of the low level of water fee collection in 2002[3], the FWUC had to borrow money from a Commercial Bank for the urgent repairs needed on the dyke.

Tab. 11 : Main resources and expenditures in the past years in O'Treng scheme, in Million riels

Year	Water Fee	Other resources?	Main expenditures
2001	3.9	PDOWRAM for the construction	Re- construction of gate at head of main canal I, reward to representatives
2002	1.7	1.2 borrowed from a commercial bank	Dyke repair
2003	4.2		Loan repayment, repairing and improving the dyke and spillway, pumping from the reservoir into the main canal I[4]
2004 – 2005 plans	4.8 + wet season fee collection + 2005 water fee collection	Financial assistance from the MOWRAM	Construction on two gates on the main canals I and II, Instalment of pipes through 3 main blocks in the canals, Rehabilitation of the main canal II, Compensation to leaders

As there is no estimation of real routine costs along the years[5], the FWUC will discover on an ad hoc basis what expenditures are needed. With the work on the 5-year-plan, the FWUC Board has a better idea on other lines of expenses, such as investments, compensation to leaders.

The list of expenditures in the Circular n°1 include compensation to leaders. In both schemes, interviewees were supportive of such a mechanism. At present, representatives in Stung Chinit receive a compensation for meetings to which they participate in GRET/ CEDAC office.
In O'Treng, some rewards were awarded in 2001 to the most active leaders[6]. The standard 5 year-work-plan of the MOWRAM entails budgetary allocations for salaries to higher levels' representatives. The FWUC Board therefore decided on a 13-18$ monthly salary to FWUC chairmen, and 20$ to the Commune and District advisers 20 US $.
FWUC chairmen however expressed concerns, as they were not sure these salaries are affordable for the Community.

Conclusion

Participation

In Stung Chinit, a compromise will be reached between estimation of real costs and wishes from farmers. In O'Treng, farmers were directly invited to vote on the level of the fee. Farmers are in addition to be informed about provisional budgets and actual expenditures.
In both schemes, the main channels for contribution of farmers to setting up of financial arrangements have been (and will be) through their leaders.

[1] Particular problems shall arise because of the low quality of earth in the area – as soils are sandy and little suitable for construction of canals, high investments in maintenance will be needed – and with maintenance of drains – considered at present to belong to the secondary structure, but which are long and fragile and will be expensive to maintain as well.
[2] At present, they receive directly from GRET/ CEDAC allowances for their presence to meetings at the office (1 US$/ day). They should also receive a retribution when they organise by themselves meetings with farmers (which did not happen yet).
[3] Due to a bad watermelon harvest.
[4] During the dry season 2004, as the water level of the reservoir was too low to allow water to flow into the canal through the structure.
[5] There were no routine costs in the past years mostly because rehabilitation was undertaken in 2003.
[6] Decision of FWUC Board

FWUC chairmen in O'Treng have proven active in deciding over generation activities, implementation modalities, and expenditures. They also negotiate with farmers implementation modalities (actual water fee to pay). Although the target for revenue generation (5 000 US$) was set up in an exogenous and standardised way by the Department of Irrigated Agriculture, FWUC chairmen all expressed their concern to increase resources as much as possible (without making so much reference to the target), so as to increase chances for the Community to be self-sustaining after the 5-year support period.

Awareness

It generally appeared knowledge of farmers interviewed was centred on issues directly relating to them. In Stung Chinit, interviewees showed very little awareness about payment next dry season, or about general financial arrangements for the whole scheme. In O'Treng, farmers interviewed were little aware about decisions and reflections on subjects others than the dry season water fee they have to pay.
On the other hand, leaders interviewed had a better understanding about the types of expenditures needed and financial arrangements.

A potential difficulty in awareness was furthermore raised both by the MOWRAM officer in O'Treng, and by CEDAC officer in Stung Chinit: farmers would not accept to be mobilised for labour-sharing activities without a pay. The two reasons for this are that they have been used in the past to work against compensation[1], and that they would not understand that both a monetary and labour contribution are needed. Farmers interviewed in O'Treng showed on the other hand readiness to work on canals unpaid – however their answers might have been biased.
In general, it will be important to raise awareness of farmers about the double constraint of monetary/ labour contribution.

From the interviews of farmers and leaders, accountability in O'Treng did not appear very developed. FWUC chairmen expressed indirect concern over the subject, and have decided to promote visible investments. Other methods could include explanations about the main lines of expenditures, and to raise awareness of farmers about the importance of routine, not-so-visible expenditures to make.

Institutional viability

Relevance

Relevance of arrangements in Stung Chinit, which exist only as proposals as yet, is difficult to judge. The main constraint that might appear will be with the capacity of the Community, as compared with the financial burden of management of the scheme. It has been noted that maintenance costs risk being high, the structure being considered fragile. As agricultural returns from irrigated agriculture have been poor yet, it might be necessary also to introduce some flexibility in the water fee collection at first – in any case, provisions must be taken for the case of low quality service.

In O'Treng, present arrangements are original ones, with mainly a high flexibility of water fee collection, linked to agricultural returns. Again, practical arrangements are ad hoc, informal ones, and have mainly evolved from the past arrangements.
However, FWUC chairmen stressed that arrangements will have to be adapted for the future. The leaders expressed concerns that the arrangements are indeed insufficient to ensure a satisfying level of income.

A target for revenue generation has been set up by the MOWRAM at 5000 US$ as a standard for medium-scale irrigation schemes. Without referring to the target, FWUC chairmen in O'Treng expressed their concerns to raise the means of the Community, by imposing a wet season fee, collect fines[2] and diversify activities. Other options could have been considered, such as allowing for a delay in payment of the fee, and increase the basic water level fee in dry season[3].
There are few indications at present on how much revenue the FWUC can actually raise: There are no estimates on the maximum area that can be irrigated, on the actual numbers of farmers irrigating by gravity/ by pumping, on the future flexibility of implementation of the fees, or on possible revenues from complementary activities. A

[1] Through the food-for-work programs.
[2] Both statutory elements that have not been enforced yet.
[3] Based on the consideration that, in times of normal returns, the fee represents only a small part of the revenue from dry season crop cultivation.

very rough calculation[1], gives as possible annual revenues the amount of 3 700 US$. There appears already a significant discrepancy with the target set at 5 000 US$.
Targets and phasing out mechanisms for financial support have been established by the MOWRAM in a standardised and exogenous way. Relevance to the issues face in O'Treng might be limited.
In addition, future support (after completion of the project) will have to be planned[2], and other types of support could be investigated, such as providing with loan facilities[3].

For expenditures, no estimations have been made yet on actual cost of routine O&M. The plan of the MOWRAM is that the Community should spend annually only 2 000 US$ on the scheme, so as to be able to save money – although not promoted by legal documents, it is recommended by the Ministry that communities save for future needs. This level again is not based on actual needs.
Routine costs might be high, as the canals already suffer from high erosion[4]. Main plans for expenditure are focusing on new investments, both to improve the structure and to give satisfaction to farmers. The establishment of the 5-year work-plan have been useful in making representatives plan the types of useful activities to be done.
Compensations to leaders have also been provisioned for. The expenses involved will be quite high[5], and it would be advisable to downsize the salaries, and postpone salaries to advisers, until the capacities of the Community are better known.

In summary, financial sustainability of O'Treng Community can not be estimated as such yet, as capacities of the Community are unknown, as well as real expenditures needed.

Adaptability
For Stung Chinit, GRET/ CEDAC shall ensure that mechanisms are tested on the irrigated area, and reviewed accordingly – as well as during the subsequent irrigation seasons.

In O'Treng, arrangements are in the process of being redefined, particularly with implementation of a wet season water fee, and of fines. As these will counteract the great current flexibility in financial arrangements with farmers, it will be a delicate exercise of communication and implementation.

[1] Based on the current area, with 70% of irrigation by gravity, and with full payment of the dry and wet season fees by farmers.
[2] Formal agreement on procedures in the case of a major damage.
[3] In 2002, the Community had to borrow money for urgent repairs of the dyke at a quite high 12% interest rate form a commercial bank (in real terms).
[4] Sandy soil used for lining, some problems with compaction.
[5] More than 1 200 US$/ year.

Appendix 23: Comparison between stated objectives and potential achievements

I point at elements indicating the level of achievements in the scheme along three lines: efficiency of water use, agricultural growth and economic growth, empowerment. These three elements are indeed important claimed objectives of the PIMD policy.
I then suggest what was the added value brought about by the governmental initiative.

1. Efficiency of water use

Water is a very constraining resource for irrigation in O'Treng, with the limited capacity of the reservoir, which regularly dries up (limited recharge during the dry season or dry spells in the wet season). Efficiency relates to:

- Economy and effectiveness of operation

In principle, as put forward in the Statue of the Community (inspired by the Circular n°1), an "irrigation program" is to be promoted: water turn should be organised between and within sub-groups. In O'Treng scheme, however, practical arrangements for operation are based on a water-at-demand method. Small groups of farmers join together to ask for water, and are allowed to take it the same day or up to three days after[1]. The arrangements used are very demanding in terms of human resources, for farmers and for leaders[2].
At the scheme level, there appears to be very little water wasted. Water supply is very fine-tuned and responds to individual demands of farmers[3]. Gates are open only the necessary time during the day. Until now, all farmers asking for water in the dry season, within the Community boundaries, and outside for 2004 (following an agreement with FWUC chairmen), have been able to get enough water for their cultivation needs. The system showed its limit in the dry season 2004 only, because of the importance of the cultivated area, and because of the scarcity of water available.

A journey to ask for water – a farmer speaks

When I need water, I go to ask the leader of my sub-group. All my neighbours – the 4-10 people with whom I share a block on the canal – need water on the same day. A few of us go to see the leader of the sub-group. He writes a letter to certify we need water, and then we go to see the leader of the FWUC (or some other FWUC chairman whom we know). It also happens that we go directly to FWUC chairmen without referring to our sub-group leader.
The leader tells us when he thinks we will receive water: if there are few other groups that need water, it can be on the same day. If it is busy, maybe we have to wait 2-3 days.
On the day we are entitled to receive water, first the people upstream take the water, and blocks are open along the canals as the day advances. Still, we have to patrol the canal upstream to ensure all blocks are open and people do not steal our water. Usually, it is the people who didn't go to ask for water who go to patrol. Sometimes we have little arguments with groups of people upstream about who is supposed to irrigate first: we then go and have a look at the crops to see which ones need water first.
When everybody has finished to irrigate, they close the gates on the reservoir: it can happen from 2pm, but in any case irrigation stops at 6pm.

Figure 10: Practical arrangements for operation in O'Treng scheme

The tail of the scheme very rarely receives water from upstream without having asked for it. If it happens, farmers stock the water for later use. Existing arrangements appear economic and effective in terms of water use for cultivation.
All these arrangements are valid for watermelon cultivation, which represents according to interviewees more than 95% of the cultivated areas in dry season. The case for the families cultivating vegetables is slightly different, as no irrigation water is made available before the beginning of watermelon cultivation[4]. The FWUC

[1] Only in the dry season. In the wet season, very often no water is available for supplementary irrigation because the reservoir has emptied.
[2] Leaders have to check and control on who is using water (*did the farmer ask for water previously*?), and farmers have to go to see leaders to ask, and have to patrol canals to ensure all blocks upstream are open. For farmers, spending time on operation might not be causing difficulties, as all farmers interviewed stressed that watermelon cultivation does not take much time (apart from planting and harvesting) and they have no other activities.
[3] Economy in water use could not be evaluated at the field level -but appears to be quite high: all farmers interviewed stressed that they are careful in not putting too much water, as it spoils the crop. They also construct in the dry season the equivalent of quaternary canals through their fields, to lead the water to plots behind without flooding their own crops.
[4] As explained by one farmer and FWUC Leader.

Board first does not want to take the risk to flood rice fields in the process of harvesting, and second does not want to operate the scheme only for a few families, and potentially lose water. Courgette is therefore irrigated by hand in the first month of cultivation: the system appears water-saving but time-consuming. A debate could be promoted on the interest of ensuring a minimal irrigation service to other dry season crops.

These arrangements might be changed in the future, with adoption of a water turn, as promoted by the MOWRAM because it would:

-Improve the cropping pattern: Introducing a formal time lag between cultivation in different sub-groups will improve agricultural returns (farmers obtain better prices if harvest is spread). In this regard however, the FWUC vice chief for water supply said that there already exists an informal time lag in plantation and harvest along the canals.

-Diminish conflicts between farmers: The main source of conflicts quoted by farmers interviewed, and by their representatives, was for operation: they happened over which small groups had the right to close their blocks and take water from the canal. However, farmers interviewed stressed the disputes were always small ones, and they could solve them by themselves, by looking at which crops actually needed the most water.

Such a turn could in the best case save on farmers and leaders' time, but should not change economy in water use. However, there is also a risk in promoting adoption of strict operation rules when farmers and their representatives have not expressed a clear wish to change arrangements. Farmers in particular will have to get used to having to wait up to 10 days for water[1]. The Community will also have to be careful to avoid rigid implementation of the turn, so that each area is provided with water for an adequate time.

- Management of water shortage

A major constraint on the extension of irrigation in the scheme is water availability, as the reservoir regularly dries up. The quantity of water available in the reservoir before the beginning of dry season cultivation varies from year to year[2]: it spills in October each year, but then some irrigation might be needed for the end of rice season cultivation. Officers do not have tools to estimate irrigable area, but experience of leaders tells them if there is going to be a shortage.

Different types of attempts for trying to limit the area cultivated in 2004 were reported:

- Ask all sub-groups to limit the area cultivated, as reported by FWUC chairmen and the MOWRAM/ PDOWRAM officers.
- Tell farmers at the tail they would not be guaranteed with water supply, as reported by farmers at the tail.

These efforts were ineffective and more areas than ever were cultivated. In the course of cultivation, FWUC chairmen and MOWRAM/ PDOWRAM decided to pump water into the main canal I to continue irrigating[3]. The decision was a costly one (more than 250 US$ for the FWUC), but this arrangement enabled all farmers at the tail to receive water – although barely enough for adequate cultivation according to 2 farmers interviewed. At the end of the dry season cultivation, almost no water was left at the bottom of the reservoir.

Such crisis situation might happen again in the future, either because of low level of water availability, or because of an important increase in areas cultivated. Cropping intensity for the areas within the Community reached last dry season 70%, and could increase if constraints on cultivation lessen[4]. In addition, the Community area will be extended[5] in 2005. The MOWRAM/ PDOWRAM officers and FWUC chairmen are ready to use the same system of pumping if the crisis situation re-emerges. However, it is a costly arrangement, and there is no guarantee that pumping will always provide enough water for all cultivated areas.

Management of water shortage is an unsolved issue, as attempts to solve the coming problem were ineffective. The problem will become more acute as the Community area extends. Steps should be taken to ensure that:

- Agreement from FWUC is required for farmers within the Community cultivating more of their plots
- Extension of the boundaries of the Community is limited, so that farmers cultivating outside know that there is no guarantee of service in dry years

Finally, a pre-feasibility study will be undertaken by the MOWRAM officer to investigate possibilities to link O'Treng reservoir to a big-scale irrigation system, to remove water scarcity constraints on cultivation and on

[1] It is proposed that each sub-group would have 3-4 days to irrigate.

[2] Before the dry season 2004, the water level was 1m below the spillway, whereas in some years it is at the spillway level.

[3] The uptake is higher than for other canals.

[4] According to farmers interviewed, constraints are lack of means for investment, and lack of labour.

[5] The infrastructure has been rehabilitated in 2003, and extension of the Community to areas at the tails of the main canals I, II and III is promoted. A first step was already taken in 2004 with 20 families cultivating watermelon and receiving irrigation water outside the Community boundaries. One of these farmers, and the Chief of a neighbouring village, stressed that more farmers will join in cultivation next year.

irrigation development. The viability of the investment (costs of management of such a structure, as compared to capacities of the Community) will have to be submitted to the highest scrutiny.

2. Agricultural growth

The second main objective of the PIMD policy put forward by the RGC in the Policy for Sustainable O&M of irrigation schemes (2000) is to "promote irrigated agriculture ensuring food security and economic growth".
In O'Treng, 400ha of rice field receive supplementary irrigation in the wet season, and 250ha are cultivated in the dry season, benefiting almost 900 families.
Beneficial impacts on agricultural productivity have been estimated as:

- For the wet season, it is estimated that yields for rainfed rice average 1.5 tons/ha, and for irrigated rice 2.5 tons/ha[1] - with less variability. Improvement in yield is attributed to irrigation, and to higher fertiliser use, during dry season cultivation.
- For the dry season, the main crop cultivated is watermelon[2] (more than 95% of the area according to interviewees). According to the leader of FWUC, in the early 1990s farmers were cultivating both rice and watermelon during the dry season (on the 30 ha irrigated). Dry season rice has since then been abandoned as returns are much lower than with production of cash crops.
  Cropping intensity is 70%, constraints being lack of labour and of cash for investment, according to interviewees. Returns from watermelon were estimated at 1 and 2 Million riels/ ha[3], with a very high micro local, and also annual, variability: results can vary between 0.5 and 3 million riels/ ha according to interviewees. Interviewees did not know the causes of variability[4].
  A few families cultivate as well vegetables, notably courgettes, in the dry season. Farmers interviewed on the subject stressed that returns from the cultivation are higher than for watermelon, and less variable, but that cultivation is very demanding. One of the constraints on cultivation is the lack of irrigation facilities at the beginning of cultivation), which requires irrigation by hand of the plot.

The farming environment is detailed in Tab. 12, based on characteristics and constraints as described by interviewees. The main constraints listed by farmers for agriculture were the high price and low quality of inputs, the risks in watermelon cultivation, the lack of labour and of money for investment, and the security of water supply for some farmers at the tail end of the scheme.

Tab. 12: Farming environment in O'Treng

	Inputs	Credits	Water resources	Labour	Techniques	Agricultural returns	Marketing
Characteristics	Fertiliser in both seasons, pesticides and chemicals in the dry season. Inputs bought from the market[5], or from the Fertiliser Credit Organisation	Access to credit via NGOs or commercial banks, depending on the villages	Limited for the scheme	Daily wage rate at 1 US$/ day. Most farmers share labour for transplanting and harvesting.	All farmers transplant. No technical extension services. Some families have adopted new varieties of rice under impulsion of a private company. Some families were cultivating watermelon before irrigation.	High returns for watermelon, but variable	Most rice is for on-farm consumption. Marketing of watermelon is via traders who come at the field.
Farmers' appreciation	Inputs are expensive and of a low quality. Lack of cash for investment.	Credit is for the poor	Tail end farmers stressed in dry season 2004 they had barely enough water	Labour is too expensive.	No changes in techniques since irrigation. Technique for watermelon is easy - some farmers stressed however they would like some advice, to reduce variability	Watermelon cultivation is risky	Marketing is easy, no need to transport the crop
Suggestions	Encourage local initiatives to supply higher quality inputs	Encourage credit for productive investment	Mechanisms for limiting areas cultivated per family when water shortage		Promote extension services	Extension services	Encourage local initiatives for marketing, so as to capture some benefits

[1] According to Cham (2002) and confirmed in interviews with farmers.
[2] The Vice Chief of the District Agricultural Office stressed that given local conditions of soil and weather the most suitable dry season crop is indeed watermelon.
[3] 250 to 500 US$, with inputs costs about 10 to 25 US$/ ha.
[4] Low quality of seeds, diseases and pests, but also wrong timing for plantation (following the phases of the moon) were quoted as potential causes of bad harvests.
[5] Trangpna market, 5km south of the scheme.

Therefore, irrigation appears to have a positive impact on agricultural returns, but other constraints could be removed to encourage further agricultural growth. These include particularly technical advice on watermelon and rice cultivation[1] (the FWUC is planning to promote some agricultural extension activities in 2005), steps taken to ensure availability of higher quality inputs, facilitation of credit for investment, and promotion of marketing facilities.

Economic growth
The economic basis for the area is agriculture[2], and agricultural growth is due to trickle down on the whole area.
The higher rice yields and revenues generated from dry season cultivation directly benefit farmers in the scheme. There are almost 900 families beneficiaries, which represent on average in the main villages from the irrigated area 70% of inhabitants.
The main linkages with the wider local economy are backward and forward linkages, as well as consumption linkages[3] Because most inputs are bought outside the scheme, agricultural labour employment is very limited, and marketing is made directly to external traders, it appears backwards and forwards linkages are very little developed in the area. These linkages could be promoted however, notably by organising arrangements for marketing of inputs in the scheme, and transportation of crops to the market to sell them at a better price.

In conclusion, impacts of irrigation on food security and economic growth for the farmers in the irrigated area are important. However, efforts for organisation of irrigation have not been linked yet to general efforts to remove other constraints on agricultural growth. The Community base could be used to tackle some of these constraints, and to promote general economic growth by activating backwards and forwards linkages in the scheme.

3. Empowerment

Objectives put forward in the Policy for sustainable O&M of irrigation schemes (2000) are to:

- Enhance the capability of the farmers and the FWUC in managing and safeguarding the irrigation systems
- Promote awareness of the farmers in taking over the management responsibility from the government

In O'Treng, there was a good basis for working on empowerment, as people in the area already had practical experience with irrigation and with management of the scheme.

Capacity building activities were undertaken by the MOWRAM from 2002. They include mostly trainings at the FWUC office for all farmers' representatives[4]. Interviewees emphasised that representatives need more trainings, given their poor general education level. Three FWUC chairmen further stressed that they need specific trainings related to their duties – however, they did not dare to tell the MOWRAM/ PDOWRAM officers about it. The PDOWRAM officer stressed the material difficulties in organising individual trainings.
Capacity building activities also include collaboration on definition of arrangements, such as establishment of the 5-year work-plan.
General awareness of farmers is promoted via meetings held in FWUC office or in villages. The resulting awareness of interviewees appears to focus on issues directly relating to them.

Although the Policy for sustainable O&M of irrigation schemes (2000) does not refer to such elements, empowerment also includes gender issues, and emergence of new leadership:

- No women are holding Community positions. The MOWRAM officer indicated that their involvement will be promoted for next elections[5]. As noted by Ahlers in 95, although women have the same activities as men, they are socially discouraged from participating in decision making processes.
- For emergence of new leadership patterns, the situation is mixed, as half the representatives interviewed had other responsibilities in the area[6]. Three main reasons can be suggested to this:

[1] The FWUC is planning to promote some agricultural extension activities in 2005.
[2] The economic basis appeared as: cash crops in dry season, cattle raising, and some pig raising.
[3] These last ones could not be investigated.
[4] At the frequency of 2 days every 2 months . Subjects include crop water requirement, operation, information management, report writing…
[5] In 2003, they tried to push women to candidate on the spot, on the election day. However, women refused, as they were saying they were not capable of holding responsibility positions..
[6] Such as Village chiefs or vice-chiefs, leaders of the Fertiliser Credit Organisation, or some other NGOs referent.
The case of the Leader of the FWUC is quite remarkable: he is as well vice-chief of village, leader of the Fertiliser Credit Organisation for his village, referent of Children for Development, and involved in the Commune Development Council.

- A reluctance to hold position authorities is often noted in Cambodia, therefore people already with leadership positions will often be the ones to take over new responsibilities.
- The number of potential capable leaders (literate notably) is not very high.
- Finally, it was a deliberate choice of MOWRAM and early leaders to promote direct involvement of local authorities in management of the scheme.

In conclusion, further steps could be taken to promote capacity building and awareness raising at all levels. Other aspects of empowerment could also be promoted for the future.

4. Other objectives[1]

An important objective put forward in the Policy for sustainable O&M of irrigation schemes (2000) is to "decrease the government's responsibility in development of irrigation sector, including repair, operation and maintenance". The responsibility referred to is technical, human, and financial. Plans of the Department of Irrigated Agriculture are to alleviate the human and technical burden by promoting self-management of the scheme by farmers. The government in the future would provide human and technical assistance, via the PDOARAM offices, to the crux of Community representatives.
A major objective of the PIMD policy is actually to remove the financial burden of management of irrigation schemes from the State. According to Chann Sinath in 2000[2], "the key constraint facing investment in agriculture is the poor state of the national economy". The means of the MOWRAM are very limited and it can not afford to support irrigation schemes on a regular basis.
As explained by the MOWRAM project officer, this provision entails that the Community will have to be self-sustaining after the 5-year support period. Financial sustainability relies on the adequacy between the means raised and the expenditures needed for sustainable management of the scheme.
As exposed in a, future revenues and expenditures of the Community have not been estimated. A target of 5 000 US$ of revenue, and 2 000 US$ or routine expenditures is promoted by the MOWRAM, but this target is common to all pilot schemes, and there are no indications as to its adequacy to the specific situation in O'Treng scheme. A decision will have to be reached for the cases of major damage[3].

Another objective is to "receive sustainable, reliable and environmentally friendly irrigation systems". Regarding sustainability, there is a strong local leadership and commitment to actual management of the scheme. Interviewees in their majority also stressed that the FWUC, with assistance of local authorities, has had until now a good authority over farmers. The major constraint appeared to be the financial capacity of the Community, as compared with costs of management, and the state of the infrastructure and its future life span (all unknown parameters).
Reliability of supply is primarily constrained by the physical infrastructure, as the reservoir dries up in cases of prolonged droughts. As wished by the FWUC Board, the MOWRAM will investigate possibilities of building a canal to link the scheme to another irrigated area[4].
Finally, there has been no question of environmental impacts of irrigation in the interviews.

In conclusion, it is too early yet to have indications as to how well other objectives of the PIMD policy can be achieved. There are important constraints on the sustainability of the scheme, and on reliability of water supply. The FWUC is trying to tackle with these constraints, but the lack of technical or financial estimates makes the success of these initiatives unpredictable yet.

[1] Two additional objectives are linked to the national policy implementation, to which O'Treng contributes as a pilot scheme.
[2] Sinath, 2000.
[3] All interviewees stressed that it would be too expensive for the Community.
[4] FWUC chairmen expressed their wish to see this project undertaken, but the viability of the investment (costs of management of such a structure, as compared to capacities of the Community) will have to be submitted to the highest scrutiny.