Mekong River Commission

The Regional Workshop on the Strategy Review of MRC's Role in the Agriculture and Agricultural Water Management in the Lower Mekong Basin and the Sustainable and Efficient Water Use in Irrigated Agriculture in the Lower Mekong Basin Project (SEWU)

Workshop Proceedings

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The options and interpretations expressed within are those of the authors and presenters and do not necessarily reflect the views of the Mekong River Commission

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REPORT ON THE REGIONAL WORKSHOP

Strategy Review of the Mekong River Commission's Role in the Agriculture and Agricultural Water Management in the Lower Mekong Basin

and

Sustainable and Efficient Water Use in Irrigated Agriculture in the Lower Mekong Basin Project (SEWU)

(*22 - 23 April 2009, Mekong River Commission Secretariat, Vientiane, Lao PDR*)

1. Background

The Agriculture, Irrigation and Forestry Programme (AIFP) team were the organisers of this, the first Regional Workshop to discuss two main topics: the Strategy Review of the Mekong River Commission's (MRC) Role in the Agriculture and Agricultural Water Management in the Lower Mekong Basin (LMB) and the Sustainable and Efficient Water Use in Irrigated Agriculture in the LMB Project (SEWU). The workshop was held from 22 to 23 April 2009, in the Mekong River Commission Secretariat in Vientiane, the Lao PDR to discuss the revised Strategy Review document, finalise the SEWU project document and discuss the outline of the upcoming activities under the SEWU Project. National consultation meetings had already been held in February to March, 2009.

The activities of the first day of the workshop were to address the issue of the new programme and projects in the light of the formulation of the MRC's Strategic Plan for 2011 - 2016. In the past, agriculture was accorded a relatively low profile however, in December 2008, the MRC began to scope out a more strategic role for agriculture focusing on agricultural water management, and to plan for further work on reaching an understanding of the range and depth of agricultural assistance needed across the basin. Future initiatives by the MRC in agriculture need to involve strategic partners and embody a clear analysis of the roles, goals and programmes of the major agricultural players in all four Member Countries.

The second day was designed to provide a forum for a discussion of the new AIFP Project on the Sustainable and Efficient Water Use (SEWU) in Irrigated Agriculture in the LMB. This project follows on from the Improvement of Irrigation Efficiency on Paddy Fields in the LMB Project (IIEPF) which had been aimed at improving the efficiency of irrigation in paddy fields through the introduction of guidelines covering the technical, managerial and institutional aspects of irrigation schemes and of their operations. The project was funded by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of the Government of Japan and was implemented in close cooperation with the National Mekong Committees (NMCs) and their relevant line agencies.

The SEWU Project has taken into account the MRC's new strategy and focuses on the more efficient use of water in irrigated agriculture. Various consultation meetings have already been held with the Member Countries. These resulted in the formulation of the Draft Project Document of 10 April 2009 for further discussion and acceptance by the Member Countries at this workshop. In addition, the Member Countries were asked to propose two or three candidate pilot sites for inclusion in the project and to prepare presentations of these for consideration at the workshop.

The Workshop Agenda is given in *Annex 1.*

2. Organisation

2.1. Participants

A total of 43 participants attended the workshop. These included five (5) participants each from Cambodia and Thailand, seven (7) from the Lao PDR, six (6) from Viet Nam, six (6) from the Development Partners, five (5) from various international organisations and ten (10) professional and support staff from the Mekong River Commission Secretariat (MRCS).

The list of the participants is given in *Annex 2*

2.2. Opening Remarks

The workshop began at 09.00 on Wednesday, 22 April 20098 in the MRC Conference Room, Vientiane, the Lao PDR with an opening address by Mr Jeremy Bird, the Chief Executive Officer of the MRCS.

Mr Bird expressed his appreciation for the support given to the MRC by the Ministry of Agriculture, Forestry and Fisheries of Japan and for the significant technical support to implementation from the Food and Agriculture Organisation (FAO) in Bangkok. He also acknowledged the work of the Member Countries. He explained that the MRC has a long-term role to play in the agricultural sector focusing on planning, development and capacity building. The MRC are in the process of preparing a Basin Development Plan and it is that process which had brought the participants to this workshop. Mr Bird said that the first item of this workshop was that of the MRC's role in agriculture and agricultural water management. He described the various consultations which have taken place in determining the future direction for the MRC. A clear outcome of the consultations was that Member Countries would like a more active engagement in agriculture by the MRC. The consultations also confirmed that the MRC should strengthen its in-house expertise in agriculture in order to better inform and interpret development scenarios, and to provide a continuous and active link with national agricultural planners. He asked the participants to make further contributions in order to

finalise the Strategy Review paper. He mentioned the second item in the workshop was the beginning of the new project in the irrigation sector, the Sustainable and Efficient Water Use in Irrigated Agriculture project.

These opening remarks were followed by a short speech from Mr Metoku Yuichi, Second Secretary of the Embassy of Japan to the Lao PDR.

Mr Yuichi, speaking on behalf of the Government of Japan, re-affirmed his Government's commitment to the Mekong region. The Japan-Mekong Foreign Ministers' Meeting held in January 2008, decided to celebrate the year 2009 as the "Mekong-Japan Exchange Year", to promote further exchanges between Japan and the Mekong Region Countries. Japan places great importance on this region and plays an active role in strengthening the mutual relationship. Development in this region will benefit the Association of South East Asian Nations (ASEAN) as a whole by redressing intra-ASEAN disparities, and so, in turn. Japan will benefit since it has strong ties with ASEAN. The Government of Japan will maintain its constant support in Economic Cooperation including agricultural development in association with MAFF, the Japan International Cooperation Agency (JICA) and other Government Organisations. MAFF Japan is especially active in agricultural land and water resources development. It first provided a trust fund to the MRC in 1998, and each year since has continued to make a steady contribution. These contributions focus on irrigation water use, which forms the basis of the current project – SEWU. MAFF Japan understands that there are still challenges facing effective agricultural water management in this region. It is hoped that the SEWU project will contribute to agricultural and irrigation development in the Mekong Region.

These speeches are given in *Annexe 3.*

The AIFP Technical Advisor then handed over the chairmanship of the workshop to Mr Do Manh Hung, the Director of the Operations Division, who welcomed the participants and invited them to introduce themselves.

3. Workshop Agenda

The AIFP Technical Advisor gave a brief outline of the workshop agenda. The first day would be devoted to a series of presentations which would include:

1. A Strategy Review of the MRC's Role in the Agriculture and Irrigation Sector in the LMB;
2. National Strategy and Policy in the Agricultural Irrigation Sector in the Member Countries;
3. Experience in Agriculture and Irrigation Projects in the LMB by International Organisations - the Food and Agriculture (FAO), the International Water Management Institute (IWMI) and the Mekong Program on Water, Environment and Resilience (M-POWER); and

4. Experience in Irrigation and Water Management Projects by the Japan International Cooperation Agency (JICA).

The second day would focus on presentations and discussions on;

1. The New AIFP Project on Sustainable and Efficient Water Use in Irrigated Agriculture in the LMB;
2. The Draft Terms of Reference (TOR) on Line Agency Activities; and
3. The Candidate Pilot Sites

The AIFP Technical Advisor asked the participants if they had any comments and they agreed to the adoption of this agenda.

4. Presentations - Day 1

The presentations can be found in *Annex 4.*

4.1. Strategy Review of MRC's Role in the Agriculture and Agricultural Water Management in the Lower Mekong Basin

This presentation is made available in *Annex 4.1*

The Technical Advisor began with an outline of the Strategy Review process of which there are two components namely: the current structure of AIFP and the MRC review process. At present there are three projects within the AIFP which are implemented independently. These are (1) the Watershed Management Programme implemented by German Technical Cooperation (GTZ); (2) Irrigation Water Use Efficiency Projects and (3) the Challenge Program on Water and Food. These three resemble a collection of projects rather than a set of activities directed towards the achievement of a common goal. In contrast, the MRC has taken several important initiatives which include a review of the Strategic Plan for 2006 – 2010, begun in December last year, and a consideration of the longer term core functions of MRC as the regional river organisation. In order to provide the direction for MRC's future work in the agricultural sector in the LMB, this strategy review has started since December 2008.

The review process began with a brainstorming meeting in December, 2008, followed by National Consultation Meetings from February to March, 2009 during which four key elements were identified and agreed upon in principle by the Member Countries. These elements were:

- to develop a closer linkage between Basin Development Project (BDP) outputs and national sector planning;
- to facilitate the funding process for projects in the pipeline in cooperation with development partners;

- to provide technical assistance on agricultural and natural resources management; and
- to assist with and facilitate the preparation of trans-boundary projects.

A clear outcome of the consultation was that Member Countries would like the MRC to be actively engaged in agriculture with a much closer two ways collaboration in the agricultural sector planning and basin level planning. In this sense, it was confirmed that the MRC should strengthen its in-house expertise in agriculture, in order to better inform and interpret development scenarios, and to provide a continuous and active link with national agricultural planners. Some countries showed their strong interest in projects or pilot projects that "learn by doing", for example such projects in:

(i) the efficient use of irrigation water;
(ii) land and water management in rain-fed areas; and
(iii) the utilisation of agricultural areas for flood mitigation and management.

In addition, the consultation meetings revealed a modest level of interest in agricultural knowledge management, partly in recognition of other on-going efforts and programmes. However, the participants sought assistance with capacity building over a range of topics from agricultural water management and improved productivity; from agricultural responses to climate change, and the monitoring of land use change. Some countries expressed their need for assistance in attracting project funds, but others realised that funds were not likely to emanate through the MRC. There was a final understanding that funding for the implementation of physical projects does not fall within the MRC's mandate but that, in certain circumstances, the MRC could facilitate funding.

All the Member Countries re-iterated the importance of poverty alleviation and the link between agricultural development and the Millennium Development Goals, and the important role of agriculture in improving livelihoods. It was widely felt that a stronger agricultural focus is required in the BDP process to generate poverty focused agricultural development planning. In addition, all of the Member Countries expressed a considerable interest in understanding the implications of climate change for agriculture and agricultural development. A similar interest was expressed in the likely impacts of climate change on flooding and their secondary effects on pumped irrigation. In the future, Environmental Impact Assessment for irrigation development is likely to become more demanding. The MRC could play a clear and impartial role in deciding if projects were in compliance with the required environmental safeguards.

Some Member Countries felt that inter-sectoral coordination and cooperation with agriculture were not clearly emerging from the BDP scenario analysis, with particular reference to (i) hydropower development; (ii) environmental impacts of land use change; and (iii) climate change. They also felt that the regional and external policy drivers for agricultural sector development were not effectively incorporated into the scenario analysis.

Progress of this strategy review was reported to the Joint Committee (JC) Meeting in Bangkok in Thailand in March, 2009, and now in April, 2009 there is this, the First Regional Workshop.

The agricultural sector plays an important socio-economic role in the basin, providing a livelihood for 70% of the population. Poverty still remains a major challenge with 45% of the rural population living below the poverty line. In addition, population growth rates in the basin are still high and are projected to reach 80 million by 2020. Although 70% of the current usage of water is for irrigation, the percentage of arable land is less than 27% of the total land area; this is lower than the figure of 45% for Asia as a whole. Other issues include the impact of climate variability and change on agriculture, and concerns for food security in the light of the increased food demands of the ever-growing population. However, there are opportunities, for example, the increased water flows in the rivers in the dry season as a result of the many planned hydro-power projects.

The Member Countries were reminded that any future programmes and projects should;

- contribute to the MRC's overall objectives of economic prosperity, social equity and environmental soundness;
- have basin-wide relevance and make a meaningful contribution to national sector management and development;
- focus on water related issues (e.g. irrigation and water quality) together with related cross-cutting issues (e.g. farming systems, livelihoods);
- be relevant to the MRC core functions; and
- build on MRC's comparative advantages (strengths) and entry points (opportunities).

At the end of his presentation, the AIFP Technical Advisor explained the expected outputs in this Workshop.

The first output was agreeing on how to proceed to the next step. In order to formulate the AIFP programme and projects, the MRCS intends to finalise the paper and submit this to the development partners for them to discuss their support for programme formulation. The MRCS understands that during the national consultations Member Countries agreed, in principle, to the contents of the paper, and that the JC meeting has taken note of the progress. The MRCS also believes that the comments made during the consultation meetings were useful and should be reflected at the next step of the formulation of the programme and projects. Taking into consideration the progress that has already been made in this activity, the MRCS does not expect there to be many further changes however the MRCS has asked that if Member Countries wish to submit any further comments then they should do so by 8 May 2009. The second output was to be the results of an exercise in which the Member Countries tried out the formulation of the new programme and projects.

In this workshop there would be several presentations of their strategies and policies in agriculture and water management from the Member Countries, and presentations from FAO, IWMI, M-Power about their activities in this sector. After listening to these, the MRCS requests the participants to engage in country group discussions and consider the possible future activities of MRC.

There was one comment from a member of the Cambodian team who after thanking the MRC for their continued support, commented that the MRC's role should not only be extended to the implementation of physical projects, but should also include the pro-active search for funding to enable the Member Countries to achieve the Millennium Development Goals and to meet their plans for poverty reduction in the Mekong Basin. He mentioned that the population is expected to grow to 50 million in 2020 thus making agriculture and food security very important. He asked that these issues should be included in the formulation of the project.

4.2. National Strategies and Policies in the Agricultural Irrigation Sector:

This presentation can be found in *Annex 4.2*

Cambodia

Agriculture plays a very important role in Cambodia and contributed 34.4% of the Gross Domestic Product (GDP) in 2008 (the industrial sector contributed 23.8% and the services sector 41.8%). In addition the Gross Value Added (GVA) for agriculture has been gradually increasing since 1999; from 5,078 billion Riels (US$1= 4,109 Riels) to 7,562 billion Riels in 2008. Crops comprise 52.7% of the agricultural sector, fisheries 25%, livestock 15.5% and forestry 6.9%. The major crop is rice. The production of which has been steadily increasing since 1999 - from 4 million tons to 7.17 million tons in 2008. There has been a similar increase in the production of other crops - from 0.77 million tons in 1999 to 5.19 million tons in 2008.

However many issues remain to be addressed. These include the capacity for acquisition of the transfer of technology and for research and development, the empowerment of farmers' organisations, the quality and the value added of the agricultural products, access to markets and the irrigation sector and its management. However these are balanced by the opportunities presented by the land and water resources, and the manpower.

Cambodia's vision for water resources management includes the formulation of a Water Resources Road Map, and a National Strategy for Water Resources together with the development of strategies and action plans for the specific sub-sectors. Water for agricultural irrigation is given a high priority in these. The aims are:

- to ensure the effective and sustainable management of water resources for the next 20 years;
- to protect, manage and use water in an effective, equitable and sustainable manner; and
- to foresee and take measures to assist related institutions to solve any problems which may arise in the water sector.

The goals of the water policy are;

- to develop and implement the national strategy, and formulate the national and sector policies on water resources management;
- to direct water resources development, management and utilisation in the Kingdom of Cambodia in all the activities of institutions, the private and public sectors; and
- to improve the livelihoods of the people through the achievement of the national policy on poverty reduction and the sustainable development of the national economy.

The priorities and the direction of the strategy are:

- to provide farmers with the quantity and quality of water they need, when and where they need it, and within the limits of available water resources and technology;
- to promote the rehabilitation and construction of irrigation, drainage, and flood management infrastructure, in order to provide sufficient water for agricultural production and to alleviate the adverse consequences of excess water;
- to promote the development and extension of appropriate water management technologies that are particularly suited to rain-fed agricultural areas, such as water harvesting, improvements to the moisture-holding capacities of soils and the use of farm ponds;
- to strengthen and expand the Farmer Water User Communities, to enable them to participate in water management and allocation, and to effectively and sustainably maintain irrigation infrastructure;
- to minimise the impact on the water resources from the use of chemical substances in the agricultural production by encouraging people to implement diversified agriculture and Integrated Pest Management (IPM); and
- to introduce and implement the IWRM concept into the priority river basins by establishing River Basin Organisations (RBOs).

The Lao PDR

The presenter, from the Department of Irrigation (DOI) of the ministry responsible i.e. the Ministry of Agriculture and Forestry (MAF), opened with an overview of the organisation chart. The agricultural sector, which accounts for about 53% of the GDP,

plays an important role in the economic development of the Lao PDR. Paddy rice production has increased from 1.4 million tons in 1996, to 2.2 million tons in 2000, mainly as the result of substantial government investments in water pumps. In 2009, the government declared that the nation was self sufficient in rice. There has also been an increase in the yields and the areas under other commercial crops, such as coffee, sugar cane, tobacco, groundnuts and cotton. In the lowland rain-fed areas of the country a single wet season rice crop is grown, while in the irrigated areas two crops, a wet and a dry season rice crop, or a wet season rice crop and another commercial crop, are grown. In the upland and mountain areas a single wet season rice crop is grown. More and more commercial crops are being produced in the plateau areas.

Agriculture, as practiced in the Lao PDR, is predominantly labour-intensive farming thus agricultural development faces many constraints. Farmers are reluctant to plant improved varieties of rice and they lack knowledge of modern techniques of crop maintenance, pest control and irrigation management. Furthermore, the farmers are unable to access credit. In addition, there is flooding and the resulting damage. In the upland and mountain areas, there is a lack of credit, fertilisers and technical knowledge. Further constraints are the poor soil fertility and the poor road access which makes market access difficult. Commercial crop production is hampered by the limited agro-processing facilities, the falling prices of commodities and the limited access to both markets and market information.

In 2007 - 2008 the irrigated areas were 250,000 ha in the wet season and 117,000 ha in the dry seasons comprising small scale (<100 ha), medium scale (100 - 500 ha) and large scale (> 500 ha) irrigation schemes.

In 1997, Decree No156/MAF on Water User Associations (WUA) and the related Department of Irrigation (DOI) Guidelines No 976/DOI were issued. The following year saw the issue of the Prime Minister's Decree No 26 and the subsequent Ministry of Finance Guidelines. This decree authorised the full transfer of the irrigation schemes to the users. The government ceased to have the obligation of meeting the operation and maintenance costs of recently constructed schemes and also began to recover part of irrigation investment costs from the farmers. This proved unsuccessful mainly because the WUAs received insufficient support and training. MAF with support from the Asian Development Bank (ADB) issued improved decrees in 2000.

Many issues still remain to be addressed for future agricultural development. Policies often differ at the local level. There are the difficulties presented by choosing between options - rice production or irrigated crop diversification; food security or economic viability - which is better? Is full transfer always realistic? Other issues include the degradation of the head-works and the distribution networks, the availability of labour, and the rigidities existing in land management. In addition, there is the issue regarding the capacity of the DOI to fulfil its mandate.

There are also constraints to the carrying out of Irrigation Management Transfer (IMT). These include the poor dissemination of IMT to the local authorities and the farmers. There is a lack of accountability in the management of the Village Development Funds (VDF) and some controversy regarding the use of these funds. There is no database on the physical and institutional conditions of existing irrigation schemes that require rehabilitation and upgrading before/during the IMT process. Delays in land tenure registrations reduce the farmers' willingness to invest in farming. Progress in forming Water Users Associations (WUA) is slow and there is a lack of agriculture support services (research, extension, credit, etc.) which are a perquisite for a sustainable IMT process.

In 2006, MAF decided to review and update its strategy for the irrigation sub-sector in order to improve the effectiveness of its program. In addition MAF intends to better ensure the effectiveness of development partner assistance by establishing the Program Based Approach (PBA) with an action plan and road map providing for a national framework. Irrigated agriculture is regarded as having a high potential of being an important contributor to the achievement of the goals of 2001 - 2020 National Strategy for Economic Development Plan (NSEDP) however any new strategy needs to be more holistic than those in the past. Many factors, not only those related to infrastructure need to be considered in irrigation development initiatives. In future new strategies should refer to irrigation as "irrigated agriculture" rather than "irrigation engineering". While new models should be more market oriented and multi-sectoral, and describe the approach to planning, budgeting and implementation of the any public management initiative. New models need to support the further modernisation of the production system by establishing effective linkages between research for technology development, extension of the introduction of technology and markets for both inputs and outputs.

The National Strategy Plan, together with detailed Action Plans, is expected to be ready in early 2010.

Thailand

The presenter from the Royal Irrigation Department of the Ministry of Agriculture and Cooperatives first gave a brief history of the National Strategy and Development Plans and their aims. The first for 1961 - 1966 aimed increasing the irrigated areas, while the 2nd (1967 - 1971) and the 3rd (1972 - 1976) focused on improvements and construction of distribution and drainage systems to improve agricultural productivity. The 4th (1977 - 1981) dealt with the construction of small scale projects to mitigate domestic water shortages and to provide for cultivation in non-irrigated areas. The 5th (1982 - 1986) included water distribution plans for the major rivers, the improvement and expansion of existing irrigated areas for their optimum use, the development of under-developed river

basins, a survey for the planning of water diversion from the Mekong river and the collection of water fees in the irrigated areas.

Subsequent plans gave a greater focus to development strategies. The 6th (1987 - 1991) aimed at the development of the river basin water resources, the improved efficiency of existing large and medium scale irrigation projects, the development of country-wide small scale irrigation projects and the establishment water user organisations and their participation in water management. The 7th (1992 - 1996) introduced the allocation of a budget for the systematic development of water resources and prioritised small water sources throughout the country, the formulation of a feasibility study on the hydrology, topography, and environmental impacts in the planning stage of medium scale irrigation projects, the accelerated construction of potential reservoirs prior to distribution system and a project for the promotion participatory irrigation maintenance. The 8th (1997 - 2001) focused on the development of various sized raw water sources as potential river basins, the management of water resource efficiency in river basins, the bye-laws for the coordinating mechanisms for water resources development, the formulation of a system for water allocation and sharing, and the improvement of the distribution systems for irrigation and domestic consumption in communities, so as to minimise water leakage. The 9th (2002 - 2007) was aimed at improving agricultural production by cultivating crops using less water, and increasing in the efficiency of water use in parallel with the development of a forecasting system, There was a master plan on integrated water resources management at the river basin level and the solution of serious watershed problems with an emphasis on community participation.

The 10th, and the current strategy of 2007 - 2011 focuses on the development of water resources to increase the benefits, the development of the network of the water resources and distribution system, the development of new or supplementary water resources, an increase in the efficiency and effectiveness of water management and the development of decision making support in water management, warning and forecasting systems.

In Thailand 16.8 million ha, mostly in upstream areas are under forest, 21.0 million ha in the plains are used for agriculture, 13.2 million ha are urban and rural areas, mostly downstream, and 0.2 million ha are coastal areas. The total area is 51.2 million ha; 21.0 million ha are farms and 4.8 million ha are irrigated. Farmers make up 25 million of the total population of 25 million.

Details of the various existing irrigation schemes and their capacities were then given, before the presenter moved on to a discussion of the current problems of repeated drought and flooding, and low water quality. The water demand increases by 5% per year, while runoff is presently decreasing by 0.5 % per year. There are difficulties in water sources development coupled with changes in the eco-system and in land use. These lead to a total of 23,000 MCM/year of water shortages in all sectors, more flash floods and a low efficiency in water management with more problems in water quality.

Three main strategies - water resources development, the optimisation of water utilisation and the alleviation of water-related disasters - have been formulated for the solution of these problems. The development approach includes the increase in the irrigated area to a total of 9.6 million ha, the development of irrigation project efficiency, the prevention and mitigation of water hazards, and participatory water management and public relations.

Furthermore, the division of the responsibilities for IMT has already been established. The government (that is the Royal Irrigation Department) and the farmers will each be wholly responsible for about 25% of the operation and management, and construction. The remaining 50% will be the responsibility of the government with the participation of the farmers. Regarding Participatory Irrigation Management (PIM) full details of the water user organisations were presented together with a list of the eight activities which will be transferred. These include operation and management of small-scale projects, of waterways, of pipe projects, of on-farm and ditch and dyke systems, and of electric pumping systems, together with pond and natural channel dredging, and the responsibility for pump irrigation projects out with the irrigation boundary.

Vietnam

This presentation was given by a representative from the Viet Nam National Mekong Committee and opened with a general overview of the situation in Viet Nam. Moving from the north to the south of Viet Nam there are three climate zones. The agricultural and forestry lands are small and fragmented with each household having an average area of 0.68 ha and 0.27 ha/agricultural worker. The total population in Viet Nam is just over 86 million with approximately 69 million (80%) of the people living in the rural areas. Agricultural land utilization is multi-functional (the land is used for different purposes depending on the situation and the opportunities). In 1986, the centrally planned economy moved towards a market-oriented one.

The main agricultural issues are the loss of land, water and forest resources and a reduction in the gene bank. There is environmental polluted and this is serious pollution in some areas. Most of the rural population lives below the “poverty line” suffering unemployment, hunger and poverty.

The strategies and policy direction include the changes to be made in the agricultural structure in order for it to become strong, diversified and sustainable. Resources should be used effectively and incomes increased. The plan is to expand irrigation and the water supply to provide for 34,224 ha under rice and 87,148 ha under coffee in the central highlands, to irrigate 23,380 ha in the midlands with channels and pumping stations. In addition natural disaster prevention and mitigation measures will be undertaken, as will a study of effect of investment and development in irrigation.

Some of the main issues to be addressed are related to the environment, and, in particular issues concerning the Law on the Management and Exploitation of Water Resources. In addition, the existing policy for Operation and Maintenance (O&M) of the hydraulic infrastructure is out of date and needs to be revised. There are also issues in science and technology.

4.3. Experience from International Organisation in Agriculture and Irrigation Projects in the LMB

This presentation is made available in *Annex 4.3*

Agriculture and Irrigation Projects in the Lower Mekong Basin - Food and Agriculture Organisation (FAO)

Mr Thierry Facon, from the FAO Regional Office for Asia and the Pacific opened his presentation with an extract from the FAO Strategic Framework and Medium-Term Plan 2010 - 2013 focusing on FAO's Strategic Objective F: "the sustainable management of land, water and genetic resources and improved responses to global environmental challenges affecting food and agriculture" since this is particularly appropriate for consideration by this workshop.

This objective comprises six organisational results: (1) Countries have strengthened capacities to promote and develop sustainable land management; (2) Countries address water scarcity in agriculture and strengthen the capacities to improve water productivity of agricultural systems at national and river-basin levels including trans-boundary water systems; (3) Policies and programmes are strengthened at national, regional and international levels to ensure the conservation and sustainable use of biological diversity for food and agriculture and the equitable sharing of benefits arising from the use of genetic resources; (4) An international framework is developed and countries' capacities are reinforced for responsible governance of access to and secure tenure of land and its interface with other natural resources; (5) Countries have strengthened capacities to address emerging environmental challenges, such as climate change and bio-energy; and (6) Improved access to and sharing of knowledge for natural resource management has been facilitated. The indicators are the number of countries or river-basin organizations adopting recommendations on water-scarcity coping strategies as a result of FAO policy, legal and strategy support, the number of institutions which have adopted FAO water productivity enhancement tools and approaches and the uptake of FAO water information products and global datasets. This was followed by an outline of the primary tools to be employed.

The 29th Asia-Pacific Regional Conference identified a number of priorities to be addressed. These include the issue of the growing regional water scarcity and

competition for water, which is compounded by the effects of climate change. This represents a major threat to future advances in food security and poverty alleviation. Member countries should strive to develop systemic national responses to water scarcity that address policy, institutional, legal, economic and technical obstacles, adopt more effective and strategically focused investment strategies in water management, assess the potential of international trade to offset water scarcity, and enhance regional cooperation. In addition, although supply-side responses are still an option in some basins, managing the demand for agricultural water use should be the priority in the region. Member countries should focus on water-use efficiency and agricultural productivity along the value chain from farm to market, including on-farm water management, irrigation system performance, improved governance and adjustments of national water and irrigation policies.

FAO will scale-up its regional irrigation modernisation programme in support of the member countries' efforts to implement service-oriented reforms of irrigation institutions and adopt demand-driven irrigation modernisation strategies focusing on cost-effective water service delivery, while recognising multiple uses and services of agricultural water and extending participatory management to various local actors. In addition, FAO will give member countries the support for the needed significant new investments in irrigation systems by strengthening capacity at all levels and adopting benchmarking systems to monitor the effects of policy change and performance improvements in the irrigation sector. Member countries should work towards boosting the productivity of rain-fed agriculture by providing incentives for the adoption of practices that minimise water risks, such as water harvesting, and by developing and promoting the use of seeds tolerant to flooding, salinity and drought. They should develop and report reliable information on agricultural water use, facilitate effective dialogue among key water sector interests, establish robust and transparent methods to negotiate allocation amongst competing water uses and users, and address institutional, those technological and economic obstacles which constrain progress towards optimal intra- and inter-sectoral water allocations, and consider and develop mechanisms for the compensation of providers of environmental services.

FAO will assist member countries in developing comprehensive policy and strategic frameworks for coping with water scarcity by:

- improving water governance at the level of communities, irrigation systems, river basins and aquifers;
- adopting multi-sectoral strategic planning approaches related to food security, agriculture, water, environment and investment;
- adopting demand-driven and service-oriented irrigation development and management;
- modernising irrigation systems;
- enhancing water productivity in rain-fed and irrigated production systems while maintaining environmental protection;

- developing and adopting improved on-farm water management including water-saving practices;
- safeguarding vulnerable agro-ecosystems and populations, such as those in tropical deltas and in arid or semi-arid areas; and
- addressing land tenure and land titling issues and access to natural resources to create a more conducive environment for investment and sustainable use of land and water resources.

Furthermore, FAO will assist member countries in promoting conservation agriculture, integrated pest management, integrated plant nutrition, sustainable forest management, best practices in livestock production, more efficient processing and marketing processes, water treatment facilities for industrial and marketing complexes, and other measures to conserve and protect water resources and water quality, while at the same time promoting the protection of inland fisheries, aquatic resources and aquaculture.

FAO plans to strengthen AQUASTAT in the region, and to support the establishment of regional networks of experts to facilitate the sharing of knowledge, information, experience, technologies and best practices related to water management and approaches for coping with water scarcity. In addition, FAO in collaboration with other relevant organisations will continue to facilitate regional and international dialogue on water scarcity issues and trans-boundary cooperation in the management of water resources. A regional initiative (FAO-IWMI) on re-inventing irrigation and agricultural water governance in Asia and the Pacific will be launched. Support will be given to the development of practical adaptation and mitigation strategies for climate change in the region and to the collaboration with regional centres of excellence to develop and promote appropriate and affordable water management technologies and mechanisation for effective on-farm water management. A high priority has been given to all these activities and to FAO strengthening its own capacity and resources.

The presentation closed with a brief overview of the on-going regional projects / programmes / initiatives which include the Regional Irrigation Modernization Programme, a Study on the Analysis of Sustainable Water Resources Use, the IWMI-FAO Knowledge Hub on Irrigation Service Reform, support to ASEAN Food Security/AG policies and FAO-ESCAP Water Resources Strategic Planning Network. In the pipeline are capacity building in irrigation modernization in China, India, Malaysia, Thailand and Viet Nam, the development of the FAO-IWMI Initiative on re-inventing irrigation and Agricultural Water Governance for MDGs in China, India, Pakistan, Indonesia, Malaysia, Thailand and Viet Nam and assessing the market demand for key agricultural products in China (Yunnan), Laos and Cambodia.

The on-going FAO programmes in the Lower Mekong Basin are also given in *Annex 4.3*

International Water Management Institute - South East Asia (IWMI - SEA): An Overview of Its Research in Southeast Asia

Dr Andrew Noble opened with the International Water Management Institute's (IWMI) vision of "Water for a secure world" and the accompanying mission statement "To improve the management of land and water resources for food, livelihoods and the environment".

Dr Noble stressed that we are now living in a water scarce world and that this situation is going to worsen. It is estimated that by 2025 60% of the global population may suffer from water scarcity. Human activities have a critical negative impact on both the quantity and quality of water resources. It is a fact that hunger and water scarcity coincide. Most hungry and poor people live in regions where water challenges hamper food production. 840 million people, living in the semi-arid and arid tropics, are malnourished. This situation is exacerbated by climate change and other regional factors.

We must all consider the question, "Do we have enough water resources to grow enough food to meet the future demand for food and bio-fuels in the context of climate change?" The answer is a resounding "No!" not unless we change the way we think and act on water issues. This point was further demonstrated by a consideration of China. If China grows at only 8 per cent per year and f the pattern of Chinese food consumption in 2031 emulates that of the current US consumption patterns then China's grain consumption will rise to 1.35 billion tonnes (from 382 million tonnes) equal to two thirds of current global grain harvest. Therefore this region is critical in meeting the global food demand.

Land resources are of critical importance. Inappropriate land management results in the increased transfer of sediment which in turn impacts on soil fertility and water quality. This also leads to greater sedimentation in water storage facilities, and since reservoirs are at the outlets of cultivated watersheds, runoff and soil erosion may alter the water quality and thereby generating "off-site" effects. However, changing cropping patterns has a direct impact on the sediment discharge in sub-catchments. Furthermore, although soil erosion can be reduced through the planting of various species of grass the adoption rate is low since farmers do not see erosion as an issue. There is a need for incentives.

Dr Noble then addressed the question of which institutional structures are the most appropriate. In terms of the management of the uplands fodder can be used to ensure sustainable agriculture and compost can be added to improve soil fertility. Here, reliable indicators are those of soil rehabilitation, crop yield enhancement, sediment and water discharge for lowlands and water quality. In respect of households there are problems related to health and sanitation. These days many households are generating bio-gas about which there are many questions: Does bio-gas reduce helminthic infections? Increase health? How efficient is bio-gas in meeting household requirements? Can we use the bio-gas/animal waste as a means of nutrient management for crops/fisheries? What

are the carbon budgets? And in terms of Payment for Environmental Service who are the potential buyers of services? The hydro-power sector.

However, there are some global "bright spots" giving rise to optimism. A comprehensive study of 286 cases in 57 countries where individuals and communities have adopted simple, non-exploitive, innovations to their production systems that have increased incomes and enhanced food security at the household level. Bright spots influenced 10.9 million households covering 31.6 million ha.

There are relatively simple solutions for addressing the issue of degraded land. An example of this is the addition of clay, or of clay and compost. In addition there is the issue of degraded irrigation systems, for example, in central Asia 30,000 ha of irrigated land go out of production annually as a result of salinity. Reverting saline lands back into agricultural production is an important strategy. One cost effective bio-remediation is through the planting of salt tolerant liquorice which results in improved hydraulic conductivity and lowering of water table.

Institutional changes are an imperative in reforming irrigation and may be best achieved through empowering farmers in the management of irrigation systems and by changing the approaches to irrigation planning and water allocation. One such change would be to reduce the water diverted for wheat production by more than 50%. Another is the establishment of pilot PIM schemes in Cambodia, where FAO provided assistance in the drafting of the PIM policy and implementation manuals. There is also the irrigation knowledge hub of IWMI/FAO.

Waste water should be viewed as a valuable resource and needs to be managed in a sustainable manner. It can be used for irrigation to produce fodder for livestock and for the cultivation of rice and vegetables. It can also be used to recharge the ground water. However, the public health issues in such usage need to be addressed. One such issue concerned rice grain with elevated cadmium (Cd) which was found in an isolated area in the Basin. Studies have been undertaken to understand and predict Cd distribution within irrigated paddy rice systems.

In conclusion, sustainable water and land resources management is the key to addressing food security both in the region and globally. There is a need for a transformative approach to agriculture in the region in order to meet this demand. There is no longer the luxury of lateral expansion of the agricultural sector in Southeast Asia. However the adoption of adaptation/transformative strategies has a cost. Who pays? We should not lose sight of the fact that the poor and marginalised are the most vulnerable to the impacts of change drivers in the region.

Irrigation in the M-POWER framework: Participatory and optimal water use

Mr Ram Bastakoti was assisted in his presentation by Dr Phillipe Floch.

The presentation opened with an overview of M-POWER (Mekong Program on Water, Environment and Resilience). This is a regional network of organisations and individuals focusing on the Mekong region as a whole and not just on the Mekong basin. It aims to achieve improved livelihood security and human and ecosystem health in the Mekong region through better water governance. Its action research program is centred on empirical comparative studies and cross-cutting governance themes. However, of interest to this workshop are those activities undertaken in a comparative study of the irrigation sector focused on the opening-up for public deliberation any plans for large-scale water infrastructure for irrigation and the suggestion of alternative approaches for securing adequate water supplies for agriculture.

In this comparative study, the focus was on the rationale and processes for decisions taken on large scale water infrastructure developments and, in particular, on the 're-packaging' different elements of the Thai water grid, and the irrigation works planned in the north west and north east of Cambodia. Research is conducted through theme leaders who lead the working group, together with partner organisations like the Insitute de Recherche pour le Développement (IRD)/France, IWMI-SEA, the Cambodian Centre for Study and Development in Agriculture (CEDAC-Cambodia), and the Unit for Social and Environmental Research (USER)-Chiang Mai University Thailand who contribute comparative studies, and the M-POWER research fellowships to conduct empirical studies.

An example of these comparative studies is the research undertaken under the title of "Improving Mekong Water Allocation (PN67)" which included a study of the expansion of irrigation in Viet Nam (IWMI-SEA) and in Cambodia (CEDAC) and a case study from the Chi-Mun basin in north eastern Thailand on the political drivers of water allocation. Mr Bastakoti then invited Dr Phillipe Floch to present his results of one such study of irrigation in north eastern Thailand.

Dr Floch began with a brief background to his study. The idea of the "Water Grid" was first introduced at a workshop on "Sustainable Water Resource Management" in July 2003. The plan was that the existing 30 million rai (1 ha = 6.25 rai) of irrigated land was to be gradually increased by an additional 103 million rai within 5 years, with the expected benefit of enabling farmers to cultivate and access water all year round. The term "Water Grid" was used as a simple way of describing a set of interconnected reservoirs and basins which would allow the movement of water from sources to water-short areas. The official name is the "Sustainably Holistic Water Management Project". This project came under fire from academics, environmentalists, and a few water experts. The issues to be addressed in the Chi-Mun Basin were the fact that large-scale water resources

development is increasingly being challenged and the targets are becoming increasingly disconnected from the storage facilities. However, in the planning everything was envisaged including the Pa Mong dam, flood plain storage small and medium reservoirs, pumping, siphoning water off Lao rivers, and even a tunnel into the Chi-Mun river basin.

There are four main reasons for concern about this plan. The first of these is related to water storage. North eastern Thailand does not offer adequate storage and the diversion of water from the Mekong is problematic and costly. The second is concern about the shortage of labour. Rural Isaan is already experiencing the exodus of young labour as a result of urbanisation. This labour shortage has also led to the rapid spread of direct seeding instead of transplanting. A third concern is the environmental change and, in particular, the issue of salinity which has been identified as an early constraint. Finally, there is the concern about agricultural production and markets. Only 14% of the total irrigated areas are cultivated in the dry season. The pumping stations underutilised. The lacks of capital, the shortage of labour and soil salinity hinder the adoption of dry-season cropping.

A glance at the state and local approaches to irrigation in the Lam SeBai Basin illustrates some of the issues. There are two sub-projects of the Khong-Chi-Mun (KCM) Project which aim to increase the area under irrigation from 9,000 ha to 39,000 ha. However, although there are three pumping stations the utilisation of the existing pump-irrigation infrastructure is marginal. The farmers have made their own significant investments in farm ponds and individual pumping since these allow them to draw water from the different sources as required. Direct seeding has often replaced transplanting. The KCM Project was based on the hypothesis of improved yields, adapting dry season cropping, and so on. This hypothesis neglected to take into account the changes and was heavily biased to justify a project that appears to miss the real needs of the region.

There are, however, some conclusions which can be drawn about investments. The massive injection of public investment in irrigation infrastructure is unsound where there is no large contingent of unemployed people. Irrigation in Isaan was found to yield the lowest return on investment (0.76 Baht (US$=35.5 Baht) for every one Baht invested), while the corresponding figures for the returns from investments in roads, education, and electricity are 1.23 Baht, 1.26 Baht and 8.66 Baht, respectively. The World Bank, and the National Economic and Social Development Board of Thailand in 2005, concluded that the expansion of irrigation was not a priority but priority should be given to improving the skill of workers (education), to a better targeting of poor segments of the population through existing rural support programs, to strengthening and empowering public administrations from villages and provinces, and to an increased integration within the Mekong sub-region. An up-to-date in-depth assessment of all the small- or medium-scale projects, including deep or shallow wells, weirs, pumping stations, farm ponds and other reservoirs is lacking.

Dr Floch then asked Mr Bastakoti to continue.

- ***Irrigation in the LMB Countries: The Beginning of a New Era?***

Although approximately 90% of all the water abstracted in the LMB is used for irrigation, recently there has been a trend of lower investment in irrigation. Water is the key factor in moving from a single crop, mainly of rain-fed rice, to multiple cropping systems and increased crop yields. The question now is, "Are we at the beginning of a new era?" M-POWER has attempted to answer this in their second book by re-visiting irrigation in the Mekong part of LMB countries in the past and analysing the future trend of irrigation under various drivers, in particular that of the recent increase in food prices in the global market. It appears that irrigation systems in LMB countries are not performing as well as expected and that fluctuations in food prices affect investment.

- ***Participation, Fit and Integration: Early lessons from the Stung Chinit Irrigation Scheme and Rural Infrastructure Project (SCIP)***

Some key policy makers in Cambodia believe that without large scale irrigation schemes, farmers will remain forever trapped in a life of poverty and hunger existing on subsistence farming. The Stung Chinit Irrigation Scheme and Rural Infrastructure Project (SCIP) was to provide the solution. M-POWER analysed the key issues related to the project fit: cost overruns and shortfall of benefits; social, economic and environmental impacts; scheme modernization Vs local adaptation and concluded that it was necessary to consider the real needs and interests of the local farmers and types of their livelihood. In addition, alternatives to large-scale irrigation should be considered taking into account the geographical and hydrological situation.

M-POWER's on-going activities include:

- Irrigation inventory in Cambodia
  - To assess the situation of irrigation in Cambodia
  - Case study on best irrigation schemes
  - Case study on poorest irrigations schemes
  - Case study on collapsed irrigation schemes
- Capacity building of water user community
  - Capacity building and management assistance
  - Farmer and water learning network: to connect the FWUC each other

At the conclusion of the morning presentations the Chairman thanked all the presenters and asked if there were any comments from the floor.

There was one comment from a participant who asked Dr Noble (IWMI-SEA) for further clarification the cadmium contamination in the Basin. Dr Noble explained that immediate

government action on this had been taken by banning the production of rice and by introducing a range of different strategies to prevent cadmium from entering the food chain.

A second comment was the fact that there had been no mention of the role of women in the use of water by communities, even though 70% of the poor are women. The representative felt that the gender issue should not be neglected by the workshop participants.

The Chairman then declared the end of the morning session and invited the participants for lunch in the MRC Courtyard.

The Chairman opened the afternoon session at 14.00. He explained that there would be first two presentations on the experience of the Japan International Cooperation Agency's (JICA) in irrigation and water management projects given by Mr Shigemitsu Tsukamoto. These would be followed an opportunity for the Member Countries to discuss in the issues in country groups and then to present the results of their discussions to the workshop.

4.4. JICA's Experience in Irrigation and Water Management Projects

These presentations are made available in *Annex 4.4*

Participatory Irrigation Management (PIM) Activity in Viet Nam under the JICA CDPIMS Project

The first project presented by Mr Le Quang Anh was on Farm Irrigation Development and Irrigation Management in Viet Nam. The first part of Mr Anh's presentation dealt with the general situation of on-farm irrigation in Viet Nam.

For many decades, the Government of Viet Nam together with the water users has concentrated on investments in the construction and rehabilitation of irrigation systems. Farmers in different regions made significant contributions to investments in irrigation systems. These have ranged from 12% of the total investment in the Red River Delta, to 30% - 50% in other regions and to 80% - 100% of self-managed small-scale irrigation schemes. About 91% of the irrigation systems are managed by state-owned enterprises serving about 80% of the country's irrigated area. The remaining 9% is managed by farmers and provides irrigation for the remaining 20%. In Viet Nam, almost all on-farm irrigation facilities are managed by communes, while those at the village scale are managed mainly by farmers. The irrigation facilities are highly effective as a result of the appropriate operation of the head-works, the main canals and the on-farm irrigation facilities. Farmers also play an indispensable role in the construction, management,

operation and maintenance of on-farm facilities. Thus the development of on-farm irrigation in Viet Nam is closely related to the implementation of PIM.

Almost all of the government's current policies on on-farm irrigation are usually either from existing legal instruments on water management, such as the Law on Water Resources, and the Ordinance on the Exploitation and the Protection of Irrigation Works or for other independent PIM-related documents such as the Law on Cooperatives. The legal documents are as follows:

- The Law on Water Resources (No. 8/1998/QH10 of May 20, 1998);
- The Framework Strategy on the Development of Participatory Irrigation Management in Vietnam (Included in the official dispatch No 3213/BNN-TL dated December 30, 2004 issued by the Ministry of Agriculture and Rural Development);
- Circular guidelines on the establishment, the strengthening and the development of water user organisations; and
- The Ordinance on the Exploitation and the Protection of Irrigation Works, (No. 32/2001/PL-UBTVQH10 of April 4, 2001).

The duties of farmers in on- farm development are clearly described and include participation in planning of the exploitation and the protection of hydraulic works; formulating a water use and waste water discharge plan with state-owned enterprises; using water in a reasonable and responsible manner while protecting the water environment; paying the various contracted fees for irrigation, water and waste water; protecting the local irrigation facilities; receiving compensation for any damage caused by the state-owned enterprises responsible for the exploitation of hydraulic works or resulting from wrong actions of the water user organisations; and having legal rights and obligations. Any organisation or individual managing and exploiting irrigation facilities, is also responsible for their protection. The People's Committees at all levels is responsible for compliance with the approved protection plan for irrigation facilities, while for those irrigation facilities serving the commune or town, the People's Committee of the Commune or Town has the responsibility.

Currently in Vietnam, there are six categories of Water User Organisations namely: (1) Cooperatives, (2) Cooperation organisations, (3) Management Boards, (4) Joint-stock companies, 5) Commune People's Committees, and (6) Villages. According to the results of a survey of the 63 provinces, only 11% of these have all six categories. The remaining 89% has between one to four categories mostly that of cooperatives. The presenter then gave details of these.

On-farm irrigation is funded in a variety of ways. Firstly, support is given through the budget whereby small-scale schemes are jointly developed by the government and the people. Farmers contribute varying amounts, ranging from 12% to 100%. The share of the responsibilities for irrigation development depends upon the relative contribution of the

farmers. Farmers contributed about 25% to 30% of a total of 170,000 billion Viet Nam Dong (VND) invested in constructing irrigation systems. The responsibilities for the operation and management of schemes are also shared. In 2006, the total water fee contributed by farmers through their Water User Associations was 640 billion VND. This is quite high in comparison was rates in other countries in the region and in the world. Total investment in irrigation development works is estimated at 120,000 billion VND, while that in on-farm works managed by farmers is estimated at approximately 50,000 billion VND.

Funding constraints and the limited transfer of technology mean that the techniques used in on-farm irrigation systems in Viet Nam are, as yet, not fully developed. Many techniques are applied only in certain individual projects. However, the government has provided technical assistance to small-scale schemes on the following topics: checking the safety of dams before the annual floods; checking for any damage and evaluating the quality as requested by the Commune People's Committee; providing instructions on the repair, upgrading, and rehabilitation of any works that are damaged or destroyed by natural disasters; and training in and fostering the operation and management skills, the management of water resources, water operations and distribution, and water-saved irrigation techniques.

Training for on-farm irrigation workers is usually carried out by PIM organisations or agricultural cooperatives in the commune, and usually comprises technical training, and management and financial management. Trainers come from two sources. They may be technical staff from the Integrated Management Committees (IMCs) or from district agricultural departments (some from agricultural cooperatives), or district agricultural extension stations. Trainers may also come from projects financed by overseas donors. These trainers provide training at the grass-roots level and this is often the Training of Trainers (TOT). An example of such an initiative is the training provided by the large-scale Vietnam Academy for Water Resources (VAWR)-JICA Project (CP-PIM Project). This project is a 5-year project from 2005 - 2010 and was initially implemented in three pilot areas in the two provinces of Hai Duong and Quang Ninh in the Red River Delta. It was later extended to cover 25 provinces in Viet Nam. (At the end of 2009, the project will select 10 provinces to be trained in the first phase). VAWR engineers are trained and then become the trainers who will train IMCs, WUA's staff and these staff, in turn, will train farmers.

Various problems exist in the development of on-farm irrigation. Firstly, there are issues to be addressed in terms of the physical works. The canal systems are severely degraded and there is a lack of regulatory structures, sluice gates, measuring devices, and of structures for water flow control and regulation. Irrigation is unreliable and often the irrigated area is only 50% of the total command area. In many cases there is a lack of on-farm canal systems and fields are small and disordered. Field boundaries and levees are incomplete so the retention is water on fields is impossible.

Secondly, there are problems in the institutional management. In particular, the management of the canal operations is, as yet, not clearly defined so the irrigation and drainage is inefficient and inequitable. The quality of irrigation and drainage services is poor. In April 2007, about 20 provinces had regulations on the decentralisation of the management of irrigation and drainage works. In the northern mountainous region 8 out of 15 provinces had decentralised. This at 53.3% was the highest rate of decentralisation. In contrast, in the south eastern region not a single province had decentralised while in the Red River Delta, only the single province of Hai Duong had a pilot scheme on the decentralisation.

Thirdly, financial management is poor. In many localities, the local policy and mechanism is rigid, even though farmers are willing to contribute to the on-farm irrigation (especially in those areas where water is scarce) they are unable to do so.

The total income of farmers from rice cultivation is on average about 30 million VND (US$1=17,778 VND)/ha/year but their costs of production amount to about 55% of this income. The annual profit from the labour of the entire family is about 13.5 million VND/ha or 82,000 VND/person/month. If the farmers' only income were to be from rice cultivation then every farmer in Viet Nam would be living below the poverty line. The value of a day's labour varies from 10,000 to 15,000 VND. The income from rice production is low so the farmers do not want to pay any water fees. This means that the fees collected are not enough to cover the necessary operation and management costs. Furthermore, the limited income from the provision of irrigation and drainage services to WUAs at the grass roots level results in the Irrigation and Development workers failing to fulfil their duties, and in some places, such workers or teams no longer exist.

CD-PIM Project - the Capacity Development of a Participatory Management System through VTWRR for the Improvement of Agricultural Productivity in Viet Nam

The CD-PIM Project area is to the south east of Hanoi and comprises two model sites. The Hai Duong Model Site is approximately 60 km from Hanoi and that of Yen Dong approximately 100 km. The presenter gave full details of these sites and the installed capacities.

The project objectives include the realisation of effective water management through training of IMC engineers, the solution of problems of water shortage by the expansion of the WUG's management areas from the tertiary canal to 2nd and 3rd canals, and the promotion of a farmers' meeting to discuss farming and water distribution in order to meet farmers' demand for cropping during the no-paddy season.

The project purpose is that PIM is promoted and agricultural productivity is improved in terms of both yield and cost through the enhancement of the capacity of leading farmers and water resource engineers in the model sites.

The overall goal to be attained 3 - 5 years after the end of the project is an improvement in agricultural productivity in terms of both yield and cost through improved irrigation management in the area where PIM was promoted. (The indicators will be defined based on the results of the baseline survey.)

Project Output 1 is the strengthening of the functioning of PIM promotion in the VAWR study incorporating methods as practiced by other donors. This includes the preparation of guidelines, manuals, and a training programme. TOT will also be implemented. Output 2 is the acquisition of knowledge, technology and experience in water management by the engineers of the Irrigation Management Company. Output 3 is the improvement in water management by the farmers' organisations in the model sites and the promotion of crop diversification.

Further details were then presented on the on-farm development at the Yen Dong Model Site. Here, the issues related to poor irrigation management form a vicious circle; the lack of irrigation water results in low agricultural yields, which, in turn, act as disincentives to the farmers who then lose interest in maintaining the irrigation infrastructure, which then deteriorates exacerbating the lack of irrigation water. Furthermore, the inefficient usage of water resources results in an increase in management costs and a decrease in the farmers' profits.

Various field activities were undertaken. One of which was the organisation of monthly meetings of the farmers, the irrigators and the representatives of each organisation in which current issues of irrigation management were discussed and an appropriate water distribution was planned with VAWR staff. As a result of these meetings the local residents' understanding of the need for improvement was enhanced and they used their own funds to implement their improvement plan. Another achievement was an increase in the quantity of the water delivered. Previously, at the Yen Dong Model Site only 20% of the water drawn from the main canal reached the model site, but after improvements to the facility were made over 45% of the water was delivered. Yet another achievement was an increase of about 20% in the yield of paddy rice in some sections. In general, yields were higher than those of the previous but yields in the model site were better than those in other areas since many farmers had sufficient irrigation water as a result of the improvements.

The conclusion is that PIM can lead to the reversal of the vicious circle and turning this into a circle of ever-increasing sustainability.

Technical Service Centre in Irrigation System Project Phase 2 Cambodia

The presentation on JICA's second project experience, presented by Mr. Shigemitsu Tsukamoto, began with a description of the project background. In Cambodia, the irrigation and water sector is the responsibility of the Ministry of Water Resources and Meteorology (MOWRAM) which has severe human resource development problems. Unlike the Ministry of Agriculture, Forestry and Fisheries (MAFF), MOWRAM is unable to recruit staff with university level training in irrigation engineering. This is because at present there are no tertiary educational institutions offering such training. The solution to this problem was the establishment, with technical cooperation from JICA, of the Technical Service Center for Irrigation & Meteorology (TSC) within MOWRAM in December 2006. The roles and functions of the centre are the identification of the needs in human resource development, the implementation of technical training and on-site training courses (OJT), the production of a Technical Manual, the provision of Information Management, the study of and research in water resources, irrigation and meteorology, and the provision of technical assistance to engineers and farmers involved in Irrigation Systems Projects. In the future, MOWRAM intends to upgrade this centre into an institute for the enhancement of Irrigation Systems Development and Management.

The main project activities include the implementation of 39 training courses, the compilation of nine technical manuals, the provision of on-site training courses and technical assistance to the counterparts and farmers' groups for water management in three provinces, the formulation of the basic design document for three irrigation system rehabilitation projects and the provision of Technical Information Management (through the establishment of a technical library and catalogue).

The TSC has three pilot sites of 700 ha in Kandal/Kandal Stung, 300 ha in Takeo/Thomney and 100 ha in Pursat/Thlea Maom, and a 260 ha model site in Kandal/Kandal Stung. Various activities were carried out at these sites. Full details and the accompanying photographs of all these can be found in *Annex 4.*

The Chairman thanked the presenter for his valuable input and then invited the AIFP Technical Adviser to continue with the next step in the proceedings, i.e. the country group discussions. The Technical Advisor asked the participants to look back at the first presentation of the morning. He reminded them of the expected outputs of the workshop. In order to proceed to the next step of seeking funding support for the formulation of the programme, it was necessary to, first, finalise the discussion paper before any discussions could take place with the development partners. The contents of this discussion paper had been agreed upon, in principle, during the national consultation meetings. However, if any member countries still had comments then they should send these to the MRC by 8 May.

4.5. Country Group Discussions

These presentations can be found in *Annex 4.5*

The Technical Advisor asked the workshop participants to sit in their country groups and invited the representatives of the various international and other organisations to join a country group of their choice. He instructed the groups to select one or two issues in agriculture and agricultural water management which were crucial to their respective countries. They should then consider what policies measures or actions need to be undertaken to address the issues, and to propose the possible roles of the Member Countries, the role of the MRC as the regional organisation and the roles of the other relevant organisations. After the discussions each country would be asked to report the results to the workshop.

Cambodia

Cambodia identified their major issues as the lack of institutional capacity building of water management and farming techniques and the issue regarding water resources, irrigation and land management. The policy measures or action needed were institutional capacity building and a management support programme for agriculture and water resources, a water resources , irrigation and management programme, and agricultural and water resources research, education and extension programme. The Member Countries could play a role in technical exchanges (experience), the sharing of data and information sharing, and the provision of technical assistance. While the MRC could assist in providing technical assistance, facilitate the search for funding, and assist in preparing and developing projects.

The Lao PDR

The major issues in the Lao PDR were somewhat similar to those in Cambodia - issues in respect of water resources and the availability of water for irrigation, problems with deforestation and watershed management, and concerns about climate change. There were also issues regarding the policy. The establishment of clear authorities and regulations has not yet been finalised. In addition, since there is a lack of funds for the implementation of the watershed management enforcement of the regulations is impossible. The country group suggested that the role of the Lao PDR should be the planning of a programme and the strengthening of the existing mechanisms for enforcement, while that of the MRC should include facilitating the sharing of experience / knowledge in Watershed Management, the monitoring of the progress made each Member Country, acting as an intermediary for the gathering of information on developments in the Upper Mekong Basin, and providing information and data on climate change. Another possible MRC role could be seeking funding from development partners.

Thailand

In Thailand, sustainable agricultural development, the expansion of the irrigated areas and water use efficiency are the three main issues. Suggested issues for future development include comprehensive agricultural development, the maintenance and improvement of agricultural land, and increased water resources. Issues related to comprehensive agricultural development could be addressed through the identification of available water resources and the determination of the actual irrigated area with the potential for expansion. In addition, appropriate techniques could be used for increasing the efficiency of water use and for rain-fed agricultural development. The productivity per ha could be increased by getting the most out of every single drop of water. The MRC was asked to support theoretical and practical studies, to facilitate the making of a comprehensive agricultural in the Mekong Basin with the participation of the various nations and to formulate a network for future development with other relevant international organisations.

Viet Nam

The water resources issues concerning Viet Nam are those of water quality and quantity, and water resource management. The quality of the water resources is being degraded or becoming polluted due to over-exploitation and from the impact of the different sectors of agriculture, fishery, and water supply, while the quantity is reducing as a result of deforestation, soil degradation and the increased water demand in the Mekong River Basin. The water resource management issues include the fact that as yet there is no appropriate consideration of their integrated management, and although there is an existing Law on Water Resources the managers have no power in its implementation. In addition, there is a need for institutional improvement and capacity building. There are also some land use issues. Agricultural land is being lost as a result of urbanisation and industrialisation, for example Long An Province has plans for a number of golf courses.

With regard to the roles of the Member Countries each country should implement activities which are relevant, such as: integrated water resource management in small catchments where there is the possibility of scaling-up; land management including forestation and conservation; water quality and hydrological monitoring and the development and the updating of the land use and water resource database. MRC's role could include the harmonisation and coordination of the developments in the LMB, and the development and up-dating of the land use and water resource database in the basin.

4.6. Wrap-up of the workshop discussion

The AIFP Technical Advisor then gave a brief summary of the results of the Country Group Discussions. It would appear that all the Member Countries shared common concerns about issues related to water resources. In addition, the Member Countries believed that the role of the MRC should include that of project facilitation and the exchange of information.

The Chairman then closed the day's session at 17.30 after thanking all the participants for their inputs and hard work.

4.7. Social activity

A dinner to honour the participants was hosted by the MRCS in the evening of 22 April, 2009, at the Kong View restaurant in Vientiane. This gave the workshop participants the opportunity for informal discussions.

5. Opening Remarks of Day 2

The Chairman opened the second day of the workshop at 08.30. He explained that this last morning session would focus on the new SEWU project. First there would be a presentation, then a discussion of the Terms of Reference (TOR) and finally each Member Country would present their candidate pilot sites. He asked the AIFP Programme Officer to briefly describe the SEWU Project.

6. Presentations - Day 2

Sustainable and Efficient Water Use in Irrigated Agriculture in the LMB Project (SEWU)

This presentation can be found in *Annex 4.6*

The Programme Officer began his presentation by recalling the outputs of the two previous projects. The first of these, the Demonstration of the Multi-Functionality of Paddy Fields (DMPF (2003 - 2005)) established a basin wide irrigation scheme data base (this is currently being updated by the BDP) and on-farm data sets at six schemes in four countries, and produced two reports on the analysis of the multiple functioning of paddy field in pilot sites in Thailand and Viet Nam. The second, the Improved Irrigation Efficiency on Paddy Fields (IIEPF (2005-08)) resulted in an empirical analysis on irrigation efficiencies and water productivity at four pilot sites in four countries, and drafted Guidelines for Efficient Irrigation Water Use at the project level.

The new SEWU to run from July 2008 – June 2011 (3 years) has a budget of US$ 300,000 per year. The first year of the project constitutes the detailed design phase which included

the national consultations in February and March, 2009 and this regional workshop. The implementation phase will begin in May, 2009.

At present, the various farming systems employed in most of the agricultural lands in the LMB, from the lowlands in the Mekong Delta to the uplands, rely on rain-fed agriculture. This is immediately apparent by a comparison of the maps showing the changes in the land under rice with the rainfall. Water use for irrigation is less than 10% of the total mean annual water flows. The percentage of irrigated land in the LMB is 27%, far below the 45% of Asia as a whole.

There are four major issues of concern to the irrigated sector:

1. the 2008 world food crisis;
   Although the price of the major cereals has been recently decreasing, rice prices are still higher than in previous years.
2. the world population increase;
   According to the FAO the world population is expected to increase from 6.1 billion in 2000 to 8.9 billion in 2050 thus doubling the food demand by 2050.
3. climate change;
   If temperature rise more than 2 C, then the global potential for food production is expected to decline by 20% - 40 % in Africa, Asia and Latin America, and climate change will also affect water availability through a lengthening of the drought period.
4. hydro-power development;
   Nine storage type dams are under construction and about 30 dams are planned or proposed. Such dams would improve the flow regime in the dry season.

The questions for us are: what is the status of food supply and demand in the LMB? How will agriculture in the LMB be affected by climate change and extended droughts? Can the LMB contribute to world food security? Could the LMB benefit from the tightening world food situation? (e.g. by facilitating agricultural, rural development, alleviating poverty) What are the most effective and efficient interventions in irrigation development?

The overall objective of the SEWU Project of "to contribute to securing food supply and alleviating poverty through sustainable water use in irrigated agricultural sector in the LMB" hopes to answer some of these questions. The immediate objectives are: (1) to identify the issues and the policy needs in relation to Water Use Efficiency (WUE) and drought management in the irrigated agricultural sector; (2) to build the capacity of line agencies for improving WUE and drought management in the irrigated agricultural sector; (3) to provide recommendations for the future direction in the irrigated agricultural sector; and (4) to facilitate the dialogue among Member Countries and partners about the future direction.

During the round of the national consultation meetings, the Country Members agreed on the project concept in principle. However there were some suggestions. At the scoping stage drought management should be added and the results of the work on the BDP (Irrigation Sector Review) should be used. When performing the Scenario Analysis the policy directions of the Member Countries should be respected in making policy recommendations. In addition, the satisfaction of the farmers should be considered as an area function of the Agriculture, Forestry and Fisheries Research Council's model (AFFRC model), and any setting-up of scenarios should be done before the analysis. In terms of the Pilot Sites capacity building of the local people, the WUGs and the farmers is important. Further, agriculture and irrigation should be treated together with agricultural extension services to farming and other practices to support the farmers. Consideration should be given not only to the technical and institutional aspects, but also to the socio-economic aspects, e.g. marketing, agricultural extension, etc. There should be linkages between the activities of the previous project and those of this project, and coordination with other MRC programmes. The project objectives must be compatible with the budget available.

The Programme Officer asked once again if the Member Countries were in agreement. There was no dissension and he then moved on to discuss the TOR. The Chairman explained that there would be time for comments on this after the presentation.

The outputs of the SEWU project comprise; (1) a full set of data on irrigated agriculture in the LMB; and (2) A country report on field observations and a WUE improvement plan for the pilot sites. All Country Members had been provided with a print-out of the Draft TOR and they were asked to refer to this for full details.

7. Comments and discussion on the TOR of the SEWU Project

The first suggestion from the floor was that there should be coverage of a scenario for flood management which could also include flood control. Another comment was that the field observations mentioned in the presentation should be not only observations but field studies, and the details on the selection of sites should be more specific.

The next speaker agreed with the suggestion about flood management. His comment was that a quicker understanding of the overall situation could be if each Member Country first collected its own data. In terms of the field observations, the Member Countries could work together in establishing the criteria.

The next comment was one on the up-dating of the database. It was felt that the database not only needed up-dating but also needed up-grading and re-designing since a lot of information still remains to be included. Who will be responsible for this? The speaker went on to comment on the budget. There is no estimate of the cost breakdown or any indication of how the budget will be used.

The FAO representative then commented on the relationship between field work and policy asking, “What is the link here?” The production of guidelines does not automatically ensure their implementation. There may, in fact, be no forward movement. In addition, it is dangerous to base things on only one year of data collection. Another problem may arise in the collection of flow data at the times of scheduled changes since most problems arise between these scheduled changes of flow rates.

The AIFP Technical Advisor responded to the comments. He clarified the situation in respect of the existing database. AIFP intends to gather any new sets of data and information, and to compile these in a report, and it is proves necessary to up-date the database. In terms of the budget, there is a strict allocation of US$20,000 for each country. He added that the project was also aware of the limitations resulting from the collection of data over a single year, but since there is this awareness, the results can still prove useful.

This TOR is attached as *Annex 5*

8. Candidate Pilot Sites

These presentations are made available in *Annex 4.7*

Cambodia

Cambodia's presentation began with the definitions of the various terms used in the description of irrigation systems. These were followed by an overview of the roles and demarcations of the government and the farmers in irrigation systems. There are two main farmers' water management groups: the Farmer Water Users' Committees (FWUCs) and the Farmers Water Users' Groups (FWUGs). The enhancement of the FWUGs is an important element in the approach for achieving the sustainability of the FWUCs.

In February 2008, with the support of the Agence Française de Développement, a sharing of the maintenance responsibility of the Prey Nop polders between MOWRAM, the Municipality of Sihanoukville and the community of polder users was set up and endorsed through a Memorandum of Understanding (MOU). This MOU is the first of its kind in Cambodia to clarify the maintenance responsibilities and to commit the government and the farmers to maintain their irrigation infrastructure. It is now the MOWRAM's objective to work with other FWUCs to develop maintenance agreements in the coming years. The success of these maintenance agreements with the farmers will depends to a great extent on the capacity of the Royal Government of Cambodia to respect its financial commitments.

This site of Prey Nob, Sihanoukville was the first of the possible candidate sites where the issues are prevention of saline intrusion and rainfall drainage. The Prey Nob FWUC was established in 2000. There is an operation and maintenance technical team. The irrigated area is 10,500 ha which yields 3,600 Riels/ha (1US$= 4,109 Riels) and is increasing every year.

The second site proposed was that of Stung Chinit Irrigation System in Kompong Thom province. This was the site of a MOWRAM project supported by AFD, GRED and CEDAC from 2001 to 2007. The project purpose was to improve the irrigation and drainage systems, and to enhance the participation of farmers in irrigation system management,

The Kandal Stung Irrigation System was the third site to be proposed as a candidate. This site includes the TSC Model Site.

The presentation ended with a table showing a comparison of these three sites.

The Lao PDR

The Thatthot Irrigation Scheme was the only candidate pilot site put forward by the Lao PDR. This scheme was constructed in the early 1990s and has been providing critical irrigation services, mainly for rice cultivation, to about 470 ha of command areas in the wet season and about 150 ha in the dry season. A total population of about 5,000 people living in 1,000 households in the six villages of Ban Thathot, Ban Nalakhouay, Ban Sangkeo, Ban That, Ban Gnommalat-Neua and Ban Lao are the beneficiaries of this scheme which now is badly deteriorated.

This is not necessarily the final choice since this is a gravity-fed scheme. It is possible that a pumping scheme may be the preferred choice.

Thailand

The presenter from Thailand first gave a reminder of the selection criteria for the Candidate Pilot Sites:

- The site must be within the LMB area.
- It must comprise a surface irrigation system (the typical system in Thailand).
- There must be in on-going PIM activities.
- There must be good farmer participation.
- The site must be easily accessible.
- Data must be readily available.
- There must be good cooperation between the site and the project.

The proposed Candidate Pilot Site is within the Huay Luang O&M Project in Udon Thani Province and meets all the criteria. The site is divided into three areas: the watershed area, and the right main canal (RMC) and the left main canal (RMC) irrigation areas. The total irrigation area is 13,917.9 ha. The RMC has been chosen as the Candidate Pilot Site. Water is supplied for domestic consumption, for industry and for agriculture. In the wet season the only crop grown in the RMC is paddy rice, but a variety of crops (paddy rice, groundnuts, cassava, tomatoes, aubergines and vegetables) are grown. There are active WUGs which meet regularly. In addition, data is readily available include data on:

- Meteorology (ET, rainfall intensity, etc.):
- Reservoir operation;
- Cropping area/land use
- Cropping patterns;
- Water delivery plan;
- Water Users' Organisation (WUG, IWUG); and
- Yield/productivity.

Viet Nam

This presentation included an introduction to the agricultural situation, in general, in the Mekong Delta, a summary of the selection criteria and a description of the proposed sites. In the past few decades there has been a rapid increase of agricultural production in the delta, accounting for about 40% of the total annual production and about 50% of the rice production of the whole country. About 85% of the rice exported by Vietnam is made up of the 11 million tons grown in the delta. One of the reasons for this success is the improved water resources management.

However, in spite of the many large scale irrigation projects there are still some problems. In terms of the policy, the farmers are still not organised into WUAs, and there is no legal framework in place to take over, operate and maintain the newly controlled tertiary level. Problems in operation and maintenance include the lack of procedures or guidelines, the lack of monitoring systems and the managers do not have sufficient authority to solve conflicts between the water users.

Some lessons had been learnt from the previous study. Some farmers used a quantity of water which was two to three times larger than that calculated for the crop requirement. There is a demand for irrigation water in the coastal zone.
The proposed two sites, named Pilot 1 and Pilot 2 were both in the Tan Hoa Thanh Irrigation Project. The irrigation project itself was of a mixed irrigation type: tidal, semi-tidal and pumping and provided irrigation and drainage, flood control and the control of acidic water. 250 ha of paddy rice were irrigated providing incomes for 325 families in three villages. Pilot 2, about 120 km from HoChiMinh city covers 450 ha on which 583 families cultivate paddy rice. Various water management systems are in place and there are god communication facilities. There is also data and monitoring equipment available.

9. Improving Irrigation Efficiency on Paddy Fields Project (IIEPF)

The AIFP Programme Officer explained that his presentation was very brief and concerned an outstanding activity from the IIEFP - "Guidance for Efficient Irrigation Water Use". During the national meetings in November 2009 the Member Countries were invited to comment on this. It has now been revised and finalised. The NMCs/LAs are now responsible for the dissemination. AIFP has a small budget of US$1,500/country to support this. The budget is to cover the translation of 77 pages of the main report and 14 pages of case studies into the country language, the printing of 50 documents and 50 CDs (2 documents for the MRCS) and the distribution to the relevant line agencies.

The Programme Officer asked if there were any questions or comments. The Member Countries felt that the budget was very small and would be hardly enough to cover the translation and printing costs. Dissemination to the line agencies and the provincial participating agencies would be quite expensive. The AIFP Technical Advisor apologised and said that the amount was set out in the budget. The Chairman added that there could be further discussion on this point.

Secretary General of the Cambodian National Mekong Committee suggested that the AIFP team should send official letter inviting the Member Countries to participate in the next step in the implementation.

10. Closing Remarks

The Chairman thanked the Member Countries for their excellent suggestions and invited the AIFP Technical Advisor to wrap-up the workshop

11. Wrap-up of the Workshop

The AIFP Technical Advisor summarised the presentations and the discussions that had taken place during the workshop. Two topics had been discussed.

The first topic on Tuesday had been the future role of the MRC. He explained that all the comment from the Country Members during the round of national consultations had been incorporated into the Discussion Paper, a copy of which had been provided to everyone. Up to now there had been no objections from the Country Members. He re-iterated that if any Member Country member still wanted to comment then they should submit their comments before 8 May, 2009.

From the discussions it was evident that the national strategies the Lao PDR and Cambodia were somewhat similar. The issues in both countries were quite comprehensive and closely related to the improvement of farmers' livelihoods. In contrast the issues in both Thailand and Viet Nam focused more on water resources development. Thailand was concerned with water shortage, while Viet Nam was more interested in improving agricultural exports and the irrigation structures. All the Member Countries were in agreement that they needed capacity building within their institutions.

The AIFP Technical Advisor thanked the input from the International Organisations. Mr Facon from FAO Bangkok had focused on problems relating to water scarcity and had described some of the tolls available, Dr Noble from IWMI-SEA had talked about some of IWMI's research activates, the management of land and resources and food security, and the two presenters from M-POWER, Mr Bastakoti and Dr Floch, had talked about some of the research activities. The participants then had had the opportunity to hear about some of JICA's experience in the region, in particular n Viet Nam and Cambodia.

These presentations had been followed by Country group discussions on the role of the MRC and of the issues in each of their countries.

The AIFP Technical Advisor then moved on to summarise the morning's activities. The morning session had opened with a presentation of the new AIFP Project - the

Sustainable and Efficient Water Use in Irrigated Agriculture (SEWU) in the LMB. He stressed that although there had been some comments about the project design, the limitations were understood. There would be further discussions with the Member Countries. Each member country than gave on presentation on their proposed Candidate Pilot Sites. The AIFP Team would review these and consult with the line agencies before making the final decisions.

He thanked everyone for their time, their comments and their hard work.

12. Closing Remarks

The Chairman said that it had been a very interesting workshop and full of useful information. He thanked all the presenters and congratulated them on the quality of their presentations. The workshop finished at 17.30 on Wednesday 23 April 2009.

Annexes

Annex 1: Workshop Agenda

Workshop Agenda

The Regional Workshop
on
Strategy Review of MRC's Role in the Agriculture and Irrigation Sector in the LMB
and
Sustainable and Efficient Water Use in Irrigated Agriculture in the LMB Project (SEWU)
22-23 April 2009, MRC Secretariat, Vientiane, Lao PDR

Wednesday, 22 April 2009

Time	Item	Responsibility
08:00 - 08:30	Registration	
08:30 - 09:00	Welcome remarks	MRCS
	Remarks	Embassy of Japan
	Adoption of the Agenda	AIFP
09:00 - 09:30	**Presentation 1**: Strategy Review of MRC's Role in the Agriculture and Irrigation Sector in the LMB	AIFP
09:30 – 10:50	**Presentation 2**: National Strategy and Policy in the Agriculture and Irrigation Sectors (Cambodia, Lao PDR, Thailand, Vietnam)	Member Countries
10:50 – 11:10	*Coffee break*	
11:10 – 12:25	**Presentation 3**: Experience of Agriculture and Irrigation Projects in LMB by International Organizations • FAO • IWMI • M-Power	FAO IWMI M-Power
12:25 – 14.00	*Lunch in the MRC Courtyard*	
14.00 – 14:50	**Presentation 4**: Experience of irrigation and water management projects by JICA • PIM activity in Vietnam under JICA CDPIMS project • Technical Service Center for Irrigation System Project Phase 2 in Cambodia	VAWR JICA
14.50 – 15:10	*Coffee break*	
15:10 – 16:00	**Country group discussions**: The needs of the	Member

	countries and possible activities of MRC based on elements of the strategies	Countries
16.00 – 16.40	Presentation of the group discussion results	
16:40 -16:50	Wrap-up discussion	AIFP
18.00 -21:00	*Reception Diner at the **Kong View Restaurant***	

Thursday, 23 April 2009

Time	Item	Responsibility
08:00 - 08:30	Registration	
08:30 - 09:00	**Presentation 5**: New AIFP project on Sustainable and Efficient Water Use in Irrigated Agriculture in the LMB	AIFP
09:00 - 09:30	**Presentation 6**: Draft TOR on line agency activities	AIFP
09:30 – 10:10	Comments from the floor	
10:10 – 10:30	*Coffee break*	
10:30 – 11:30	**Presentation 7**: Presentation of line agencies on candidate pilot sites **	Member Countries
11:30 – 11:40	Information on IIEPF guidance	AIFP
11:40 – 11:50	Wrap-up of the workshop discussion	AIFP
11:50 – 12:00	Closing remarks	MRCS

** as options, depending on their acceptance by the project

Annex 2: List and Photographs of the Participants

List and Photograph of Participants

List of Participants

No	Name of participants	Position	Contact address
Cambodia			
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3.	Mr. Sok Khom	National AIFP Coordinator, CNMC	khom@cnmc.gov.kh
4.	Mr. Huong Sunthan	Officer of Water Resources Management and Conservation, MOWRAM	
5.	Mr. Sourn Sam Aun	Officer of Water Resources Management and Conservation, MOWRAM	
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17.	Mr. Phoutone	Deputy Chief of Management	

	Siriphanthong	and Maintenance, Department of Irrigation, MAF	
Vietnam			
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28.	Mr. Nguyen Viet Anh	Center for Training and International Cooperation, Vietnam Academy for Water Resources, Ministry of Agriculture and Rural Development	
International Organizations			
29.	Mr. Thierry Facon	Senior Water Management Officer, FAO Regional Office for Asia and the Pacific	Thierry.Facon@fao.org
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31.	Mr. Ruurd Kuiper	Technical adviser at Technical Advisory on Irrigation Strategy sub-sector (AFD Funded), Lao PDR	Rudi.i3s@gmail.com

32.	Mr. Ram C Bastakoti	Coordinator, Mekong Programme on Water Environment and Resilience	ram@sea-user.org
33.	Dr. Philippe Floch	Researcher, Austria National University, based in National University of Lao PDR	floch@gmx.net
MRCS			
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Photographs of Participants

Opening Remark by CEO

Participants

Cambodian Team

Lao Team

Thai Team

Vietnamese Team

JICA Participant from Hanoi

JICA Participant from Cambodia

Participants from International Organization

Technical Advisor, AIFP,MRC

Participant from AFD, Lao PDR

Programme Officer, AIFP,MRC

Annex 3: Opening Remarks

Note for Opening Remark by Mr. Jeremy Bird
CEO of MRC

First item of this workshop is the MRC's role in agriculture and agricultural water management.

While AIFP has its overall objective for achieving "cooperative and sustainable agricultural development, current three projects are implemented independently, and look like a collection of projects, rather than a set of activities directed to a common goal.

[Challenges in MRC]
mid-term review of the Strategic Plan and formulation of next plan,
the longer term core functions, etc.

In response to such situations, and to provide the direction for MRC's future work, this initiative has started on Dec 2008.

With a brainstorming workshop with national and international stakeholders in December 2008 MRC began to scope out a more strategic role in agriculture, with a focus on agricultural water management. It was clear from the outset that there are many national, international and bilateral agencies that are deeply involved in various aspects of agricultural development and management in the LMB. It remains clear that further work is required in understanding the range and depth of agricultural assistance across the basin, and that future initiatives by MRC in agriculture need to involve strategic partners, and a clear analysis of the roles, goals and programmes of major agricultural players in all four countries.

A subsequent round of national consultations was held with Member Countries, over the period from the end of February to early March. During the meetings, four key elements for the MRC's role in the agricultural sector were proposed.

A clear outcome of the consultations was that member countries would like an active engagement in agriculture by the MRC. Foremost, they would like to see a much closer two-way collaboration on agricultural sector planning so that national agencies can understand and build in basin level perspectives, and in turn, basin level planning better reflects national agricultural plans.
The consultations also confirmed that MRC should strengthen its expertise in agriculture, in house, in order to better inform and interpret development scenarios, and to provide a continuous and active link with national agricultural planners.

In this workshop MRCS will explain the revised version based on the comments from national consultations. In order to proceed to next step to formulate the programme and projects of AIFP, MRCS wants to submit the paper to development partners and ask them to provide the fund for programme formulation. For doing that, MRCS would like to ask your further contribution for finalizing the paper.

Second item in this workshop is the kick off of the new project in irrigation sector, the Sustainable and Efficient Water Use in Irrigated Agriculture project. This project is a three year project funded by Japanese Government.
MRCS highly appreciates Japanese continuous contribution to the MRC, particularly in the agriculture and irrigation sector.

The overall objective of this project is;
- To contribute to securing food supply and alleviating poverty through sustainable water use in irrigated agricultural sector in Lower Mekong Basin

In order to achieve this objective, this project focuses on water use efficiency (WUE) and drought management in irrigated agriculture with particular emphasis on water management practices, and implements various activities which include:
-sector review to identify issues and policy needs on water use efficiency (WUE) and drought management in irrigated agriculture sector;
-field activities to observe water management performance and other things relevant to WUE and drought management at the pilot site;
-basin wide socio economic analysis of the irrigation development;
-proposing future direction in irrigated agriculture development, based on the basin wide analysis and pilot site findings

During the national consultations meetings held in February and March, member countries generally agreed on the project concept.
MRCS prepared detailed project document and work plan for your discussion. We hope that this new project would have good kick-off through the discussion in this workshop.

Remarks by Mr Metoku Yuichi
Second Secretary, Embassy of Japan in Lao PDR

Mr. Jeremy Bird, Chief Executive Officer, MRC Secretariat,
Mr. Do Manh Hung, MRC Secretariat,
Participants from the MRC member countries,
Ladies and Gentlemen,

It is my honour to share time with you today at the Regional Workshop on Strategy Review or MRC's Role in Agriculture and Irrigation Sector in the Lower Mekong Basin, and Sustainable and Efficient Water Use Efficiency in the Lower Mekong Basin Project. This SEWU Project has been funded by the Ministry of Agriculture, Forestry and Fisheries Japan since 2008. On be half of the Government of Japan, I would like to deliver a few remarks on this occasion.

It was decided at the Japan-Mekong Foreign Minister's Meeting held in January 2008 to celebrate the year 2009 as "Mekong-Japan Exchange Year", in order to promote further exchanges between Japan and Mekong Region Countries (Kingdom of Cambodia, Lao PDR, Union of Myanmar, Kingdom of Thailand, and Socialist Republic of Viet Nam). Japan consistently places great importance on the Mekong Region and continues to play an active role in order to strengthen the relationship between Japan and the Mekong Region Countries. It is extremely meaningful for the future cooperation with the Mekong Region, to promote exchanges in various fields between Japan and the Mekong Region Countries in collaboration with both the public and private sector.

Development in the Mekong Region, a late starter within ASEAN, will be of direct benefit to ASEAN as a whole by redressing intra-ASEAN disparities, and in turn will benefit Japan itself, given its strong ties with ASEAN in the political, economic and cultural spheres. In 2009, designated as the "Mekong-Japan Exchange year," events to be held will include political dialogues, economic events, cultural exchanges, promotion of tourism, youth exchanges, etc. In this line, the Government of Japan keeps steady support in Economic Cooperation including agricultural development in association with the MAFF, JICA and other Government Organizations.

The MAFF Japan is especially active in land and water resources development in agriculture. It has started to provide trust fund to the MRC since 1998 and by now it has kept stable contribution year by year. It is forth series of contribution focuses on irrigation water use, which is the current project – SEWU. The MAFF Japan still understands effective water management for agriculture requires further challenges in this region. I hope the SEWU project will contribute to

the development of agriculture and irrigation in the Mekong Region. The project has just begun activity of the project term. I would expect today that the Secretariat well organizes this workshop and provides opportunity to discuss the project with all the participants and to go forward putting into the project future outputs.

On the other hand, now the World Food Security is notable matter because of recent price soaring. I understand that the heaviest water user is of Agricultural and Irrigation sector. To discuss openly for Strategy reviewing of MRS's role in the Agricultural and Irrigation Sector is well timed opportunity.

I wish this workshop today may provide significant contribution to the project and the Strategy reviewing through your active participation.

Thank you.

Annex 4: Presentations

Annex 4.1: Strategy Review of the MRC's Role in Agriculture and Agricultural Water Management in the LMB

MRC's Role in Agriculture and Agricultural Water Management

MRC Regional Workshop
MRC Secretariat
22 April 2009

Contents

1. Outline of the strategy review
2. Issues and opportunities in agriculture and irrigation sector in LMB
3. Member countries expectations
4. Proposed Strategy
5. Results of the Member Countries consultations
6. Next steps for formulating programme/projects

1. Outline of the Strategy Review

AIFP Current Structure
Watershed Management Project (GTZ)
Irrigation water use efficiency Projects
Challenge Program on Water and Food

MRC's processes
Mid-term Review of Strategic Plan,
Long term Core function,
Preparation for Strategic Plan
(2011 – 15)

Strategic Review of MRC's role in Agriculture and Agricultural Water Management

Objective : to provide the direction for MRC's future work in the sector

Process :
Dec. 2008 Brainstorming Meeting
Feb - Mar. 2009 National Consultation Meetings
Mar. 2009 Joint Committee (report of the progress)
Apr. 2009 Regional Workshop

2. Issues and opportunities in agriculture and irrigation sector in LMB

Agriculture sector provides 70% of livelihoods, however…

- 45% of rural population is below the "poverty line"
- Population in LMB is projected to increase to 80m in 2020
- While irrigation accounts for 70% of water utilization, ratio of irrigated land is 27%, lower than 45% of whole Asia
- Climate variability and Climate change impact on agriculture
- World food price increased in 2007 - 08, revival of food security agenda
- World food demand will be doubled by 2050, with population increase(8.9b in 2050) and economic growth
- increased river flow in dry season by hydropower development

3. Member Countries Expectations

- To develop Basin Development Plan outputs/findings into concrete national sector plans;
- To facilitate the funding of the implementation pipeline, in cooperation with development partners;
- To provide technical assistance on agricultural and natural resources management strategies and programmes; and
- To assist and facilitate with the preparation and development of transboundary agricultural development and management projects

4. Proposed Strategy

[Principles]

Future programme and projects should:

- contribute to MRC's overall objectives (economic prosperity, social equity and environmental soundness);
- have basin-wide relevance and meaningful contribution to national sector management and development;
- focus on water related issues (e.g. irrigation and water quality) as well as related cross-cutting issues (e.g. farming systems, livelihoods);
- be relevant to MRC core functions; and
- Build on MRC's comparative advantages (strengths) and entry points (opportunities).

[Key Elements of the strategy]
- What is MRC's Role as a regional organization?

Agricultural Knowledge Base	A development of stronger capacity & institutional memory in sector related information and knowledge within MRC itself
Planning Support	Stronger linkage between basin wide water resources planning and national agricultural sector management and planning
Support to agricultural management and development	Support project activities with basin wide relevance, through knowledge generation, active learning on cumulative and transboundary issues, or by piloting replicable solutions.
Capacity development and building	- Irrigation & rainfed area management & planning - Improving the productivity of agricultural systems - Understanding and monitoring land use change and its nexus to poverty

5. Results of the Member Countries consultations

[Summary]

- Strengthened expertise in agriculture, in house, in order to better inform and interpret development scenarios, and to provide a continuous and active link with national agricultural planners.
- an interest in "learn by doing", including pilot projects,
  - efficient use of irrigation water;
  - land and water management in rainfed areas; and
  - utilisation of agricultural areas for flood mitigation and management.

- Modest level of interest in agricultural knowledge management
- Support to capacity building over a range of topics;
  - agricultural water management and improved productivity;
  - agricultural responses to climate change, and
  - monitoring of land use change
- a clear understanding that funding for the implementation of physical projects does not fall within MRC's mandate, but that in certain circumstances, MRC could facilitate funding.

[Poverty alleviation]

- the role of agriculture in improving livelihoods and meeting MDGs
- Basin wide scenario for poverty focused agricultural development planning, through agricultural development

[Climate Change]

- Climate could exacerbate existing problems of drought and flood management in agriculture.
- understanding the implications of climate change for agriculture and for agricultural development plan
- The likely impacts of climate change on irrigation and irrigation potential

[Drought management]

- the need for assistance in planning drought responses that address:
  - Agricultural zoning and farming systems;
  - Drought hop spot mapping;
  - Potential adaptations (season, crop mix etc, improving rainfed water use and productivity); and
  - Other changes such as labour shortage, economic crises and reverse migration to rural areas.

[Irrigation]

- Irrigation development with respect to poverty alleviation, and also in options to manage drought
- MRC could play a clear and impartial role in EIA process, demonstrating whether projects comply with required environmental safeguards.

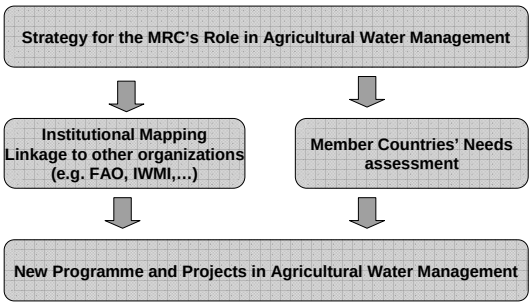
[inter‐sectoral coordination and cooperation in the BDP scenario analysis]

- hydropower development and agriculture;
- environmental impacts of land use change; and
- climate change

[land use change]

- monitoring, applying a consistent methodology; and
- understanding the impacts (for instance of deforestation on wetlands).

6. Next steps formulating programme and projects



Expected outputs of the Workshop

- To proceed to next step
  - Seeking funding support for programme formulation
  - Finalizing the paper for discussion with development partners
  - Further comments to MRCS
- Trial application of the proposed strategy for formulating programme/projects through country group discussion
  - Presentations on the member countries strategies/policies
  - Presentations on the activities in other organizations
  - Group discussions on possible future programme/projects
  - Inputs for the next initiative

Guidance for country group discussion

- Select one or two issues which are crucial to your country in agriculture and agricultural water management
- Consider what policy measures/actions need to be done for addressing the issues
- Propose the possible role of member countries, MRC as the regional organization and other relevant organizations

(ref) Proposed activities in the paper

Monitoring of agricultural water management practices, rainfed agriculture, soil type, land use

- a functional description of each production system
- Categorization and estimation of each systems' socio - economic importance and potential for further development
- Mapping in GIS on soil type, agro - ecology, market access, income, population density and trends, and other important variables

[Expected outputs]

- The relative importance and sustainability of production systems in terms of food security, poverty alleviation, environment, etc.;
- Identification of where remedial action and protection are required;
- Identification where there is potential for further development;
- A clear understanding of links between production systems (fish, livestock, cropping) and between agricultural systems and other aspects of water management (flood and drought management)

Irrigation potential

- irrigation inventory undertaken by AIFP, BDP2 and the portfolio of planned irrigation development projects and investments
- Elaborating the existing typology of major farming systems in the irrigation system

[Expected outputs]

- A clear understanding and mapping of irrigation potential, with respect to country and basin - wide priorities; poverty alleviation, food security, export potential;
- assess the scope to minimise new irrigation development through improving the productivity of existing systems;
- A clear understanding of the groundwater systems and of their connections to surface water, potential yields, economic limits to abstraction, water quality,…
- Identifying irrigation development impacts on other production systems, and estimate the performance;
- Links to drought management;
- …

Linking basin wide water resource planning to national sector management and planning

- to establish a functional process that links basin - wide strategic planning to national sector plans, and vice versa, ensuring a strong three - way communication between MRC, NMC and line agencies through the following activities
- Formulating basin level scenarios from a stronger agricultural development perspective
- Interpreting of scenario outputs in terms of the impacts and implications for agricultural development, productivity, value, food security and rural livelihoods;
- Interpreting the agricultural impacts of other sector development in the basin
- Communication

Basin - wide irrigation sector plan

- New opportunities by hydropower development would be explored through the BDP process, but requires considerable further detail and coordination in the assessment of the true potential that can be developed on the ground
- An appropriate place to start is with a more comprehensive synthesis of the detail in national agricultural and irrigation development plans
- It clearly involves an in - depth look at the sector assistance plans from multilateral and bilateral agencies, and follow - up with them

Project promotion

- Leading from the basin - wide assessment and prioritisation conducted through the BDP, MRC could play a technical role in assisting member countries with funding proposals for (i) actual development or (ii) further investigation
- Particularly useful role for MRC to play in assisting with the environmental impact appraisal that has trans - boundary dimensions

Capacity development and building

Irrigation and rainfed area management and development

- Assistance with improving the management of water resources for irrigation and the development of dry season irrigation
- Assistance with the development of country long - term master plans for agriculture, incorporating
  - An assessment of land use potential, planning and development strategies
  - Explanation and incorporation of the results of BDP scenarios on agriculture and irrigation
  - Evolution of BDP2 scenarios for sub - basin planning and irrigation development

Improving the productivity of agricultural systems

- Drought and flood mitigation for rainfed agriculture: risk mapping and mitigation guidelines, crop options and water saving irrigation techniques;
- Assessment of agricultural strategies to best mitigate poverty through agriculture and irrigation management and developm
- The effects of climate change on seasonality and rainfall regime Support to facilitate funding for modernisation and improvement of existing irrigation systems

Understanding and monitoring land use change and its nexus to poverty

- Support to land use mapping and monitoring
- Monitoring agricultural concessions, plantations and contract farming, using consistent systems across the basin.

Annex 4.2: National Strategy and Policy in the Agriculture and Irrigation Sector of Member Countries

Policy for Agriculture Development in CAMBODIA

Presented by:
Cambodian Team, MAFF and MOWRAM
MRC Meeting, 22-23 April 2009, Lao PDR

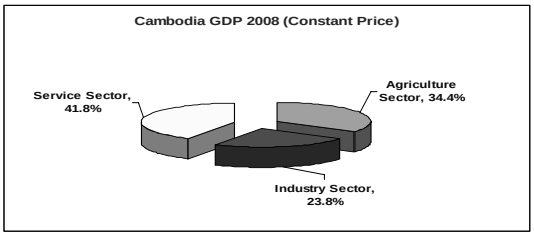
1

Part-A:

Agriculture Sector

2

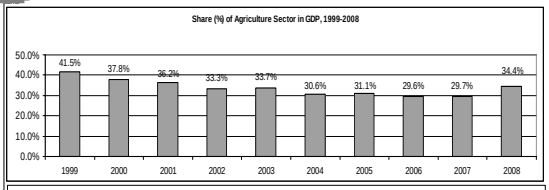
I- Share of Agriculture



The share of GDP contributed by the agricultural sector estimated at 34.4% in 2008 while 23.8% from industry and 41.8% from the services sector

3

I- Share of Agriculture



Share for Agriculture:

Decreased:

- *41.5% in1999 reduced to 29.7% in 2007, BUT*
- *34.4% in 2008: Increased due to recession of industry & service sector (Economic and financial crises)*

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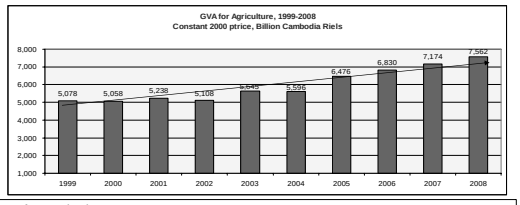
II- GVA for Agriculture



GVA for Agriculture:

Trend for Agriculture GVA increased:

- 5,078 billion Riels,1999
- 7,562 billion Riels, 2008

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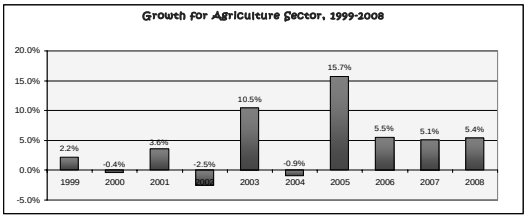
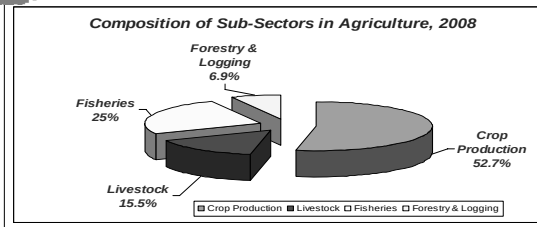
III- Growth for Agriculture Sector



- *Agriculture is highly depending on climate condition*
- *High growth was 15.7% in 2005*
- *Highly affected on agriculture by flood and drought in 2000, 2002 and 2004*

6

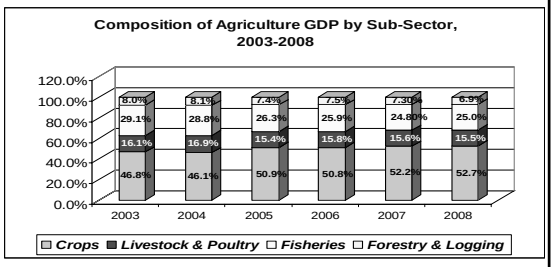
IV- Agriculture Sub-Sector Contribution



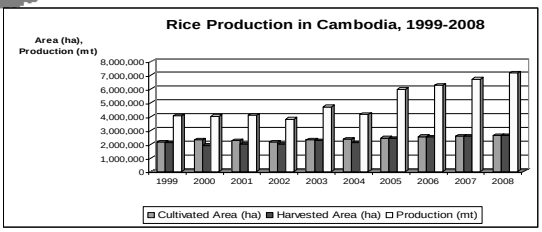
Composition Share (%) in Agriculture by Crop Industry:

- *52.7% for crops*
- *25% for Fisheries*
- *15.5% for Livestock*
- *6.9% for Forestry*

V- Trends of sub-sector contribution, 2003-2008



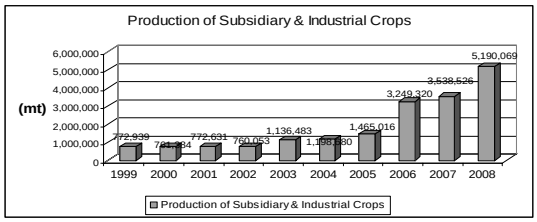
VI- Agriculture: Rice Production



Rice Production 2008:

- ***Cultivated Areas: increased from 2.15 million ha in 1999 to 2.61 million ha in 2008***
- ***Yield: 2.7 ton/ha (1.94 t/ha in 1999)***
- ***Production (paddy) : increased from 4 million tons in 1999 to 7.17 million tons in 2008***
- ***Surplus: 3 million tons of paddy in 2008 (0.4 million tons in 1999)***

VI- Subsidiary & Industrial Crops



Production of Subsidiary & Industrial Crops 2008:

- ***Cultivated Areas: increased from 223,593 ha in 1999 to 596,294 ha in 2008***
- ***Production: increased from 0.77 million tons in 1999 to 5.19 million tons in 2008***

VII- Issues encountered

- ***Capacity of technology transferring, research & development***
- ***Empowerment of Farmer Organization, Cooperatives***
- ***Quality of agricultural products***
- ***Value added of agricultural products (processing, post-harvest technology etc.)***
- ***Access to markets of agricultural products (quality, SPS, standard, high costs of processing, export …)***
- ***Irrigation system and management***

Opportunities:

Land, water resources, manpower

Part-B:

Irrigation Sector

1- Vision for water resources management

- Water resources Road map,
- National water resources strategy and Development of strategy and action plan in specific sub- sector.
- Water for Irrigation (agriculture) is given high priority.
- Ensure effective and sustainable management of water resources in the further 20 years.
- To protect, manage and use of water with effective, equitable and sustainable manner,
- To foresee and take measure to assist related institution to settle the facing problems which might be occurred in water sector,

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2- Goals of water policy

1. *To develop and implement the national strategy and formulate the national policy and sector policy on water resources management;*
2. *To direct the water resources development, management and utilization in the Kingdom of Cambodia to all activities of institutions, private sector and public sector,*
3. *To improve and uplift the people living to achieve the national policy on poverty reduction and sustainable national economy development.*

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3- Priorities Direction of Strategy

- *To provide farmers with the quantity and quality of water they need, when and where they need it, and within the limits of available water resources and technology.*
- *To promote the rehabilitation and construction of irrigation, drainage, and flood management infrastructure, in order to provide sufficient water for agricultural production and to alleviate the adverse consequences of excess water.*
- *To promote the development and extension of appropriate water management technologies that are particularly suited to rain-fed agricultural areas, such as water harvesting, improvements to the moisture-holding capacities of soils and use of farm ponds.*

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3- Priorities Direction of Strategy (Cont.)

•To strengthen and expand Farmer Water User Communities, to enable them to participate in water management and allocation and to maintain irrigation infrastructure with effectiveness and sustainability.

•To minimize the impact on the water resources caused by the uses of chemical substances in the agricultural production by encouraging people to implement diversified agriculture and Integrated Pest Management (IPM).

•Introduction and implementation of IWRM concept into the Priority river basin by establishing RBO.

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4- Trend and Characteristics of Irrigation Sector

Role & demarcation of Government & Farmers for Irrigation Systems in Cambodia

	Management / Construction	Operation (Water distribution)	Maintenance
Large scale (more than 5,000ha)	MOWRAM	MOWRAM	MOWRAM
Medium scale (200-5,000ha)	PDWRAM / MOWRAM	PDWRAM	PDWRAM
Small scale (less than 200ha)	DDWRAM (PDWRAM) (Tertiary canal)	FWUC (Support by PDWRAM & DDWRAM)	FWUC (Support by PDWRAM & DDWRAM)

MOWRAM: Ministry of water resources and meteorology
PDWRAM: Provincial department of water resources and meteorology
DDWRAM: District department of water resources and meteorology
FWUC: Farmer water users community

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5- Issues, Concern and Opportunities of Irrigation

Set up technical manuals

1 Water management
2 Operation and maintenance

Operation and Maintenance Manual

(1) Irrigation System Management Policy in Cambodia
(2) General Guideline of Operation and Maintenance
(3) Case Study of Operation and Maintenance
1) Operation and Maintenance by MOWRAM and PDWRAM
2) Operation and Maintenance by farmers, FWUG and FWUC

Water Management Manual

(1) FWUC and FWUG
(2) Collection and Analysis of FWUG and FWUC activities
(3) Incentive and Good Example of Farmers Participation
(4) Type of Water Resources Management plan
1) Supply Oriented Management
2) Demand Oriented Management

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6. Technical assistance to model site and pilot site for water management

(1) Activity for technical assistance to pilot site

Step	Activities
1 Understanding the irrigation system by farmers	1-1 Explanation of irrigation system
	1-2 Problem and solution analysis
2 Formulation of farmers group	2-1 Group leader selection
	2-2 Development of the leaders capacity
	2-3 Development of rule for farmer water users group
3 Operation and maintenance by farmers group	3-1 Announcement of group decision to group member
	3-2 Canal maintenance work
	3-3 Construction of delivery canal
	3-4 Water distribution work

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Canal maintenance work by farmers

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Part-C:

Strategy for Agriculture and Water 2006-2010

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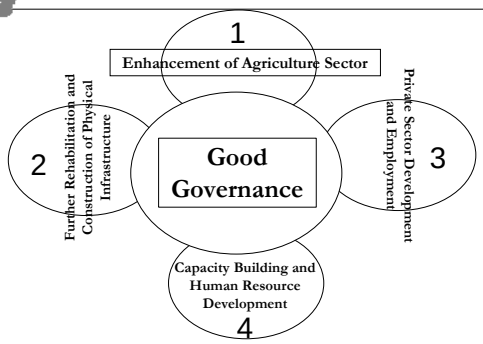
Government Policy: "Rectangular Strategy"



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Rectangular Strategy

1

Enhancement of Agriculture Sector

1. Improving agricultural productivity and diversification
2. Land reform and mine clearance
3. Fisheries reform
4. Forestry reform

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NSDP, 2006-2010 → Strategy for Agriculture and Water

Long-Term Vision for SAW

To ensure enough, safe and access food and water for all people, reduce poverty and contribute to economic growth while ensuring the sustainability of natural resources

Inline with the NSDP, 2006-2010

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Strategy for Agriculture and Water

Goal for SAW:

To contribute to poverty reduction, food security and economic growth through:

(a) Enhancing agricultural productivity, and
(b) Improving water resources development and management.

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Strategy for Agriculture and Water

Goals will be achieved by:

(i) More efficient use and management of water and land,
(ii) Increased agricultural productivity
(iii) Enhanced agri-business processes
(iv) Institutional capacity building, and
(v) Improved access to knowledge and technology.

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Strategy for Agriculture and Water

SAW Programs:

(i) Institutional capacity building and management support program for agriculture and water resources program,
(ii) Food security support program
(iii) Agricultural and agri-business (value chain) support program,
(iv) Water resources, irrigation and land managemnt program, and
(v) Agricultural and water resources research, education and extension program.

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Strategy for Agriculture and Water

Resource requirement:

- *350 million US$ for five-year period*
- *Fully supported by EDPs & RGC*
- *MAFF and MOWRAM will be jointly implementing the SAW*

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Targets set in NSDP, 2006-2010:

Targets	2005 (Estimate)	2010 (Target)
1- Land areas under all crops (million ha)	2.98	3.5
2- Rice cultivated area (million ha)	2.4	2.65
3- Rice production (000' tons)	4,170	5,500
4- Rice yield (t/ha)	1.97	2.8
5- Fish Catch (inland, marine & aquaculture) in ton	374,000	450,000
6- Forest cover (% of total land areas)	60	60
7- Fire wood & charcoal dependency (% of households)	85.5	61

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Thank you for your kind attention

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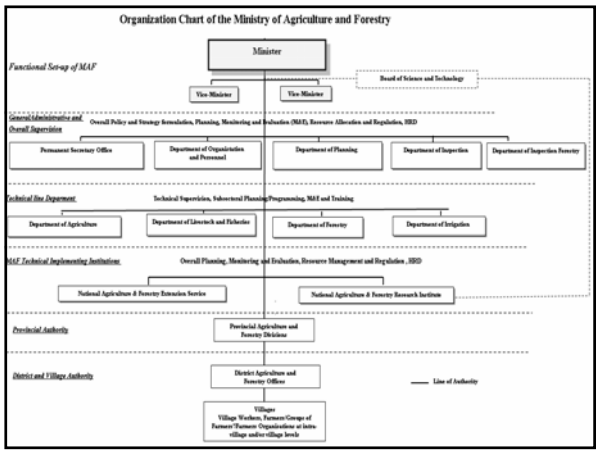
Workshop on Strategy Review of MRS's Role in Agriculture and Irrigation Sector in the Lower Mekong Basin, and Sustainable and Efficient Water Use

MRCs 22-23 April 2008

Presented by: Somnuk CHANTHASETH
Department of Irrigation
Ministry of Agriculture and Forestry, Laos

Contents



Agriculture development

- Agriculture sector, accounting for about 53% of GDP, play important role in the economic development of Lao PDR
- Indicative direction of agricultural and rural development is examined by dividing the country into four regions:
  1. Northern Upland and Highland Areas
  2. Vientiane Plain
  3. Central and Southern Areas
  4. Boloven Plateau

Agriculture Development (Con't)

- Since 1996 rice production has been strong growth, mainly due to substantial investments in installation of water pumps made in recent years
- Trend could continue over the next few years if the weather conditions are favorable
- Commercial crops, mainly coffee, sugarcan, tobacco, peanuts and cotton has shown a steadily increasing trend both in terms of yields as well as planted areas

Farming Systems

- The major farming systems are identified as: i) lowland rain-fed, ii) lowland irrigated, iii) upland and mountain, and iv) plateau
- In the plains, all cultivated land is used for lowland rice production and on the other hand, for irrigated farming, a two-crop system is developed, and many farmers grow irrigated rice in the wet season and irrigated rice or other crops in the dry season
- The upland and mountain farming systems are dominated by wet season single crop. In this farming system, small irrigation areas are developed in valley in valley bottoms for production of paddy
- In the plateau farming system, commercial crops are increasingly produced

Present Conditions and Constraints in Agriculture

- Present Conditions
  - Natural Resources and Environment
  - Institutions and organizations
  - Land tenure
  - Human resource development
- Major Constraints and Development Potentials

Present Conditions and Constraints in Agriculture (Con't)

- Constraints to rice production

  Lowland:

  - farmer's reluctant and/or insufficient extension in using improved variety of rice seed
  - lack of knowledge about improved technologies including crop maintenance, pest control, irrigation management and poor extension services being only at the development stage
  - flood, inundation damage
  - lack of access to credit for new investment and to obtain farm inputs
  - predominance of low productivity labor-intensive farming

Present Conditions and Constraints in Agriculture (Con't)

Upland and Mountain Areas:

- insufficient distribution of credit and fertilizer
- poor road access for purchasing inputs and selling products
- low soil fertility in terms of physical and chemical properties
- lack of technology for cultivating upland rice or alternative crops

Present Conditions and Constraints in Agriculture (con't)

- Constraints of commercial crop production
  - limited or insufficient post harvest and agro-processing facilities for commercial crop
  - limited market channels and market information
  - decreasing price incentive and low international price

Irrigation development

Irrigation sector has been given an important mandate to achieve national food security and commodity production

In 1997, the government initiated a drastic measure to increase rice production by distributing a number of irrigation pumps in the lowland paddy areas. This project boosted the paddy production remarkably, from about 1.4 million tons in 1996 to 2.2 million tons in 2000 and in this year the Government declared rice sufficiency at the national wide

Typology of irrigation system

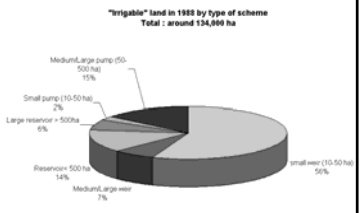
- Irrigation schemes are classified into 3 scales:
  1. Small scale less than 100 ha
  2. Medium scale between 100 ha and 500 ha
  3. Large scale more than 500 ha
- Irrigated areas in 2007-2008

  Wet season: 250,000 ha

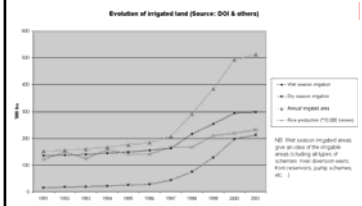
  Dry season: 117,000 ha

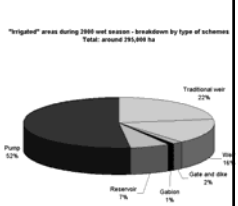
Main trends of irrigation development in Lao PDR
Irrigation before 90's

- Before 60's, irrigation, (with water control) hardly developed:
  - Temporary weirs constructed by village communities (with local material) to manage flooding of paddy fields in small areas (usually < 50 ha).
- First public investments in irrigation schemes started in the 60's, with the support of external aid
  - permanent/concrete river diversion weirs
  - reservoirs,
  - Small pump schemes mostly near Vientiane



Main trends of irrigation development in Lao PDR
Boom in 90's





Main trends of irrigation development in Lao PDR
Boom in 90's

- Approaches tested in 90's pilot-projects soon incorporated into a nationwide IMT policy :
  - Decree 1997 n°156/MAF on water user associations & related DOI guidelines n°976/DOI
  - PM order n°26 (1998) & subsequent Ministry of Finance guidelines :
    - systematic, uniform & quick manner full management transfer to users
    - GoL to withdraw from burden of O&M costs of the recently constructed schemes but also recovering from the farmers part of the investment cost

- 1st batch of full IMT without sufficient support and training of the WUAs
- Relative failure => MAF, with the support of ADB, adopted improved 2000 decrees on IMT and WUAs (n°1149/MAF & n°1150/MAF)

Present situation : main problems and issues for development of the irrigation sector

- **Rice production Vs crop diversification: food security Vs financial/economic viability?**
- **Local level policies regarding irrigation development may differ from one province to another**
- **Degradation of headwork and distribution networks**
- **Full transfer: is it realistic in all cases ?**

- **Labour availability or rigidities in land management sometimes constraints to intensification**
- **DoI mandate & capacities: crop diversification challenges, agro-economic (cropping patterns, marketing) and social (labour, land tenure, farmer's associations) skills ?**

Present situation: main problems and issues for the development of irrigation sector (con't)

- Several constraints to carrying out the IMT process
  - insufficient promulgation of IMT into local authorities as well as farmers
  - lack of accountability of management of VDF and controversial use of fund
  - lack of database on physical and institutional conditions of existing irrigation schemes that require rehabilitation and upgrading before/during IMT process
  - delay of land tenure registration, resulting in reducing farmer's incentive to invest in farming
  - slow progress in forming WUAs
  - lack of agriculture support service (research, extension, credit etc…) as prequisite or sustainable IMT process

National Strategy and Policy direction in Irrigated Agriculture Sector

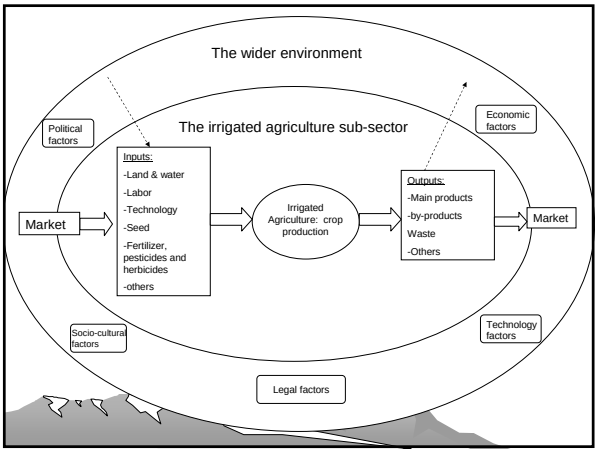
- In 2006 Ministry of Agriculture and Forestry (MAF) decided to review and update its strategy for irrigation sub-sector in order to improve the effectiveness of its program
- MAF intends to better ensure the effectiveness of development partner assistance by establishing the Program Based Approach (PBA) with the action plan and road map providing a national framework

National Strategy and Policy direction in Irrigated Agriculture Sector (con't)

- Irrigated Agriculture is regarded as highly potential and important contributor to the achievement of the goals of NSEDP 2001-2020
- New strategy would need to be more holistic than in the past
- Irrigation development initiatives need to consider many factor, not only those related to the infrastructure aspect
- New strategy should refer to irrigation as" irrigated agriculture" rather than "irrigation engineering"

National Strategy and Policy direction in Irrigated Agriculture Sector (con't)

- New model should be more market oriented and multi-sectoral
- New model should describe the approach to planning, budgeting and implementation of public management initiative
- New model would need to support further modernization of production system by establishing effective linkages between research for technology development, extension for introduction of technology and markets for inputs and outputs



CONTENTS

1. National Policy on Agricultural and Irrigation Development
2. Current Situation
   - Projects and irrigated area, capacity
   - Agricultural area
   - Problem issue
3. Water Resource and Irrigation Development Plan

National and Social Development Plans

NSD Plan	Development Strategy
1st (1961-1966)	extend irrigable area
2nd(1967-1971)	stress on distribution system to accelerate agricultural productivity
3rd (1972-1976)	accelerate the construction of distribution and drainage systems
4th (1977-1981)	construct small scale projects to mitigate water shortage for domestic consumption and cultivation in non-irrigated area
5th (1982-1986)	- planning water distribution systematically for important river such as the Chao Phraya and the Mae Klong Rivers - improvement and extension of existing irrigated area for optimum use - developing of non-fully developed river basins - survey for planning water diversion from the Mekong river - collect water fee in irrigated area

National and Social Development Plans

NSD Plan	Development Strategy
6th (1987-1991)	- develop water resource in river basin - improve efficiency of existing large and medium scale irrigation projects - develop small scale irrigation projects throughout the country - establish water user organizations and their participation in water management
7th (1992-1996)	- allocate budget for water resources development systematically and as its priority, including small water source throughout the country - formulate feasibility study on hydrology, topography, and environmental impacts in the planning stage of medium scale irrigation projects - accelerate construction of potential reservoir prior to distribution system - promote people participation in maintenance of irrigation project

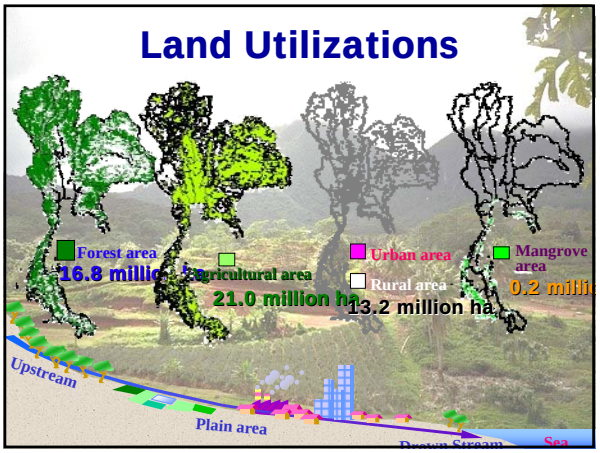
National and Social Development Plans

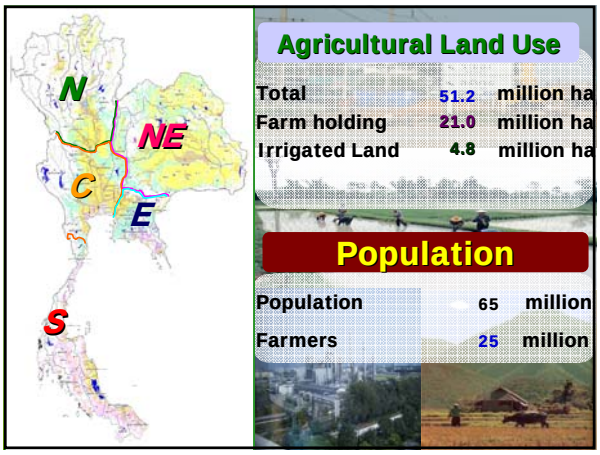
NSD Plan	Development Strategy
8th (1997-2001)	- develop different sizes of raw water source as river basin potential - manage water resource efficiency in river basin systematically - coordinate mechanisms for water resources development by laws - formulate system on water allocation and sharing in activities as proper - improve distribution systems for irrigation and domestic consumption in communities, so as to minimize water leaks
9th (2002-2006)	- improve agricultural production by cultivation crop using less water and increasing water use efficiency in parallel - develop forecasting system to increase efficiency of water management and to solve water shortage. - conduct master plan on integrated water resources management at river basin level, solve serious problem in watershed area, and emphasis on participation of communities and people in water management

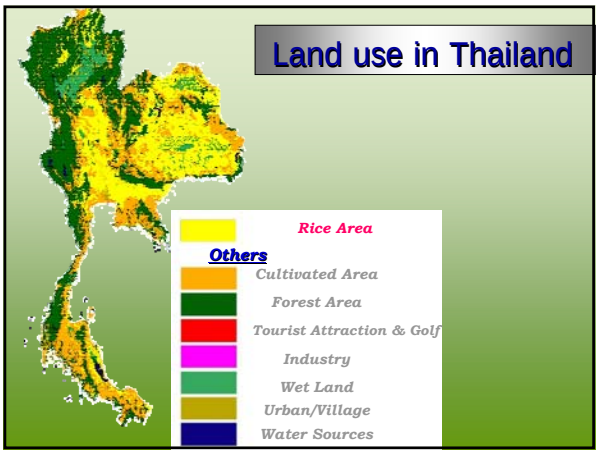
National and Social Development Plans

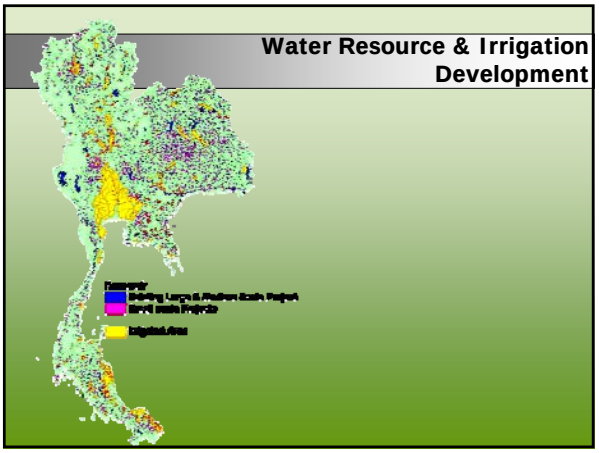
NSD Plan	Development Strategy
10th (2007-2011)	1. Increase of irrigated area at least 128,000 ha by - develop water resource to increase the benefit - develop network of water resource and distribution system - develop new or supplement water resource especially in area where the people accepted 2. Increase an efficiency and effectiveness in water management 3. Develop decision making support in water management, warning and forecasting systems

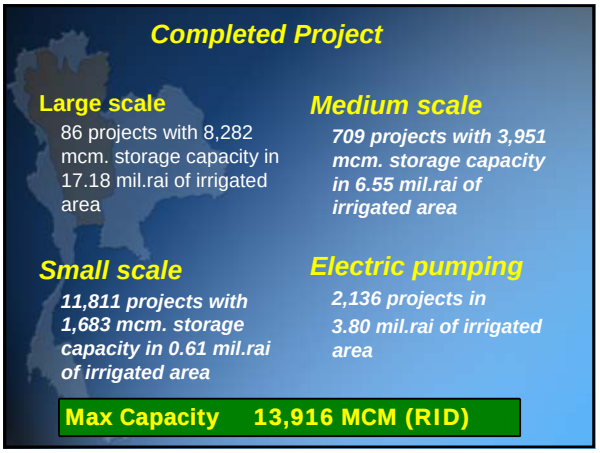

Current Situation


Land Utilizations
Forest area
16.8 millio
Agricultural area
21.0 million ha
Urban area
Rural area
13.2 million ha
Mangrove area
0.2 milli
Upstream
Plain area
Sea


N
NE
C
E
S
Agricultural Land Use
Total 51.2 million ha
Farm holding 21.0 million ha
Irrigated Land 4.8 million ha
Population
Population 65 million
Farmers 25 million


Land use in Thailand
Rice Area
Others
Cultivated Area
Forest Area
Tourist Attraction & Golf
Industry
Wet Land
Urban/Village
Water Sources


Water Resource & Irrigation Development


Completed Project
Large scale
86 projects with 8,282 mcm. storage capacity in 17.18 mil.rai of irrigated area
Medium scale
709 projects with 3,951 mcm. storage capacity in 6.55 mil.rai of irrigated area
Small scale
11,811 projects with 1,683 mcm. storage capacity in 0.61 mil.rai of irrigated area
Electric pumping
2,136 projects in 3.80 mil.rai of irrigated area
Max Capacity 13,916 MCM (RID)

Total cultivated area and irrigated area by each region of Thailand

Region	Farm area (m rai)	Irrigated area (m rai)	% area irrigated
Central	15.31	11.26	73.5
North	27.50	5.63	20.4
East	10.48	2.05	19.6
South	19.14	3.37	17.6
Northeast	57.75	5.83	10.1
Total	**130.28**	**28.14**	**21.6**

Water resource Development

Northern
irrigated Area
6.52 million Rai
Capacity 25,082 MCM.

Central
irrigated Area
9.36 million Rai
Capacity 28,924 MCM

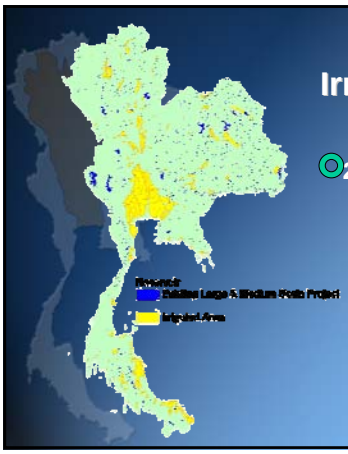
Southern
irrigated Area
3.27 million Rai
Capacity 8.84 MCM

Northeastern
irrigated Area
6.10 million Rai
Capacity 11,718 MCM

Eastern
irrigated Area
2.71 million Rai
Capacity 1,384 MCM

Total Irrigated Area
27.98 million rai

Total Capacity
74,378 MCM.



Irrigation Area

- 22 % under irrigated area (4.8 million ha)
- 78 % rainfed area (Large area in Northeastern Region)

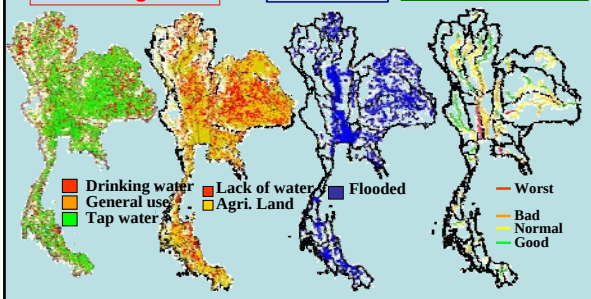
- *5 % is well controlled (Land consolidation, Ditch & Dike)*
- *55 % is partially controlled (Main system sub-lateral canal*
- *40 % is minimal control (inadequate distribution & drainage system)*

Northeastern Region

- Remaining 78% mostly in the northeastern region still under rainfed condition
- Some attractive irrigation possibilities

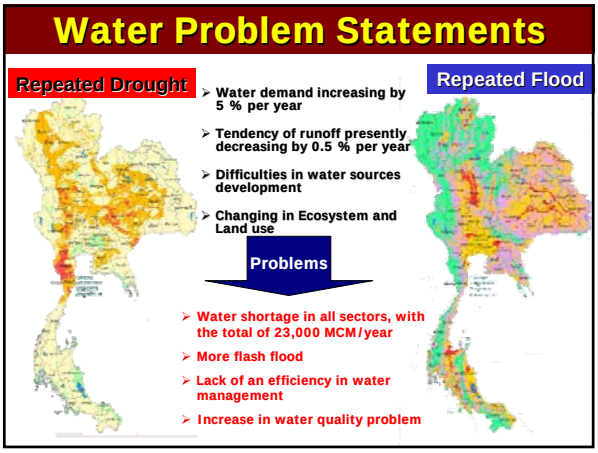
3 Major Water Problems

Drought | **Flood** | **Low Water Quality**

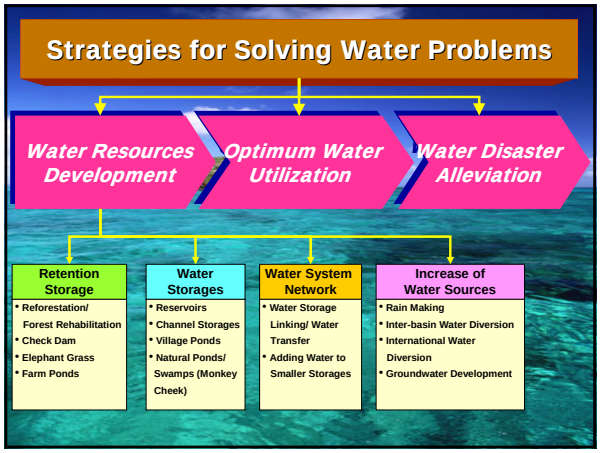


14,580 villages | 14,000 villages | 4.3 million ha 0.5 million ha | 4 Basins

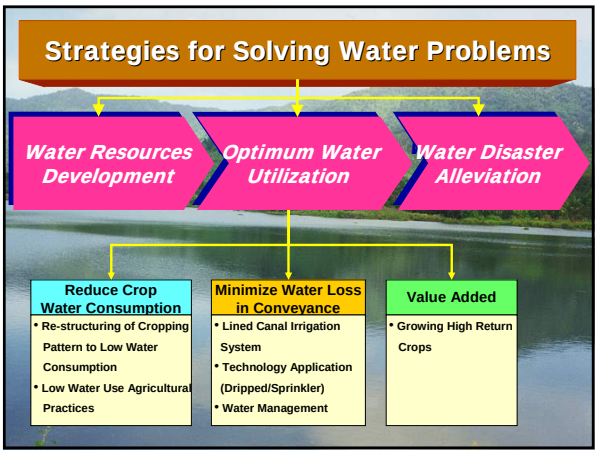
Water Problem Statements



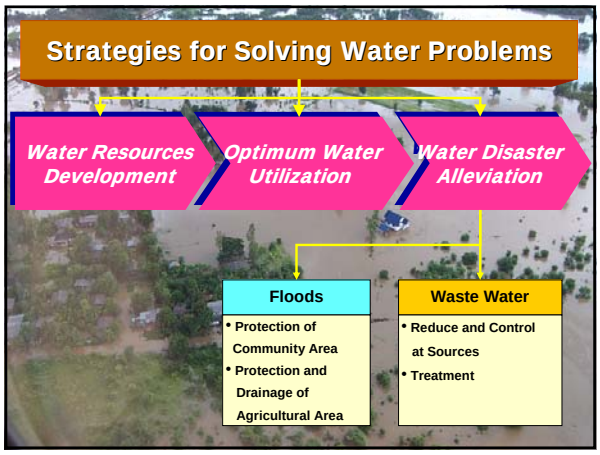
Strategies for Solving Water Problems



Strategies for Solving Water Problems



Strategies for Solving Water Problems



Strategy and Development Approach

1. Increase of irrigated area
2. Development of irrigation project efficiency
3. Water hazard prevention and mitigation
4. Participation in water management and public relations

1. Increasing of Irrigated Area

increase irrigated area to 60 million rai (9.6 million ha)

Agricultural area in Thailand = 130 million rai (20.8 million ha)

Developed area = 28 million rai (4.48 million ha)

Remaining the potential area = 32 million rai (5.0 million ha) shall be developed

In each year RID got the budget for development = 200,000 rai (32,000ha) Thus, MOAC assigned RID conduct the implement plan and budget for full potential area. This plan consists of the main projects such as water resource and irrigation system development both large and medium scale projects, and pipeline system project development.

2. Development efficiency of Irrigation project

RID will promote and support the projects to increase irrigation efficiency in irrigated area by developing and increasing capabilities of operation and maintenance irrigation projects, irrigation system and irrigation rehabilitation projects.

3. Water hazard prevention and mitigation

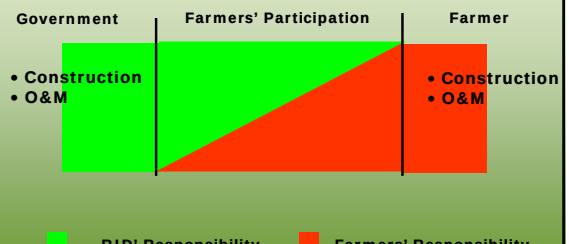
RID will promote and support the construction and installation of a warning system as well as the protection and mitigation of areas affected by flood and other water hazards in both agricultural area and economic zone.

4. Participation in water management and public relations

RID will promote and support participation of all sectors in water management by developing the potential of water users organization in water management, strengthening local communities and enhancing proactive public relations of irrigation works.

Flow Chart of Water Management

Irrigation Management Transfer



Participatory Irrigation Management (PIM)

Water User Organizations

1. Irrigated area 27.98 million rai
2. Number of water user organizations in the area of 8.84 million rai
   - *14,930 basic groups*
   - *410 Integrated groups*
   - *40 associations*
   - *83 cooperatives*
3. Water management direction
   - *Increasing an efficiency of water use*
   - *Qualitative development*
   - *Promote farmer's participation*

8 Activities to be transferred !

1. O&M included improvement of small scale projects.
2. O&M of water way.
3. O&M included improvement of pipe projects.
4. O&M of irrigation roads.
5. Pond & natural channel dredging works.
6. O&M of On-farm and ditch & dike systems.
7. Pumping irrigation projects out side an irrigation boundary.
8. O&M of electricity pumping project.

Regional Workshop
Strategy Review of MRC's Role in the Agriculture & Irrigation
And SEWU Project In Lower Mekong Basin
Vientiane, 22-23 April 2009

Agriculture and Irrigation Development Strategies and Policies in Viet Nam

Viet Nam National Mekong Committee

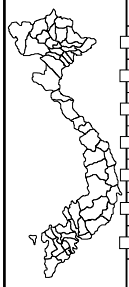
Agriculture

1. **Background**
2. **Issues**
3. **National strategy and policy direction**

Agriculture in general

- Land (agriculture and forestry) small and fragmented: 0.68 ha/hh; 0.27 ha/labour
- Rural population: 80% of VN population, 30 m labour but 73% made use
- Agricultural productivity is generally low
- Agricultural land utilization is flexible (changes of use for different purposes: conditions & opportunities)
- 1986: central planning economy to market oriented.

Agro-ecological zones of VN



Zone	Prov.	People * 10^6 pers.	Area 10^6 ha	Main Soils
VIETNAM	**64**	**79.7**	**33.1**	
N. Mid & Mounts	15	11.5	10.1	degraded grey
Red River Delta	11	17.4	1.5	degraded alluvial
N. Central Coast	6	10.3	5.1	degraded sand
S. Central Coast	6	6.8	3.3	sandy silt
W. Highlands	5	4.4	5.5	reddish basalt
SE region	8	12.6	3.5	degraded grey
Mekong Delta	13	16.7	4.0	fertile alluvial
Mekong Delta = % of Vietnam		**22.0** (* 2002)	**12.0**	> 50 rice, 60 fish, 80 fruits, > 80 rice export

Issues in agriculture

- Land, water, forest resources, gene bank are reduced
- Ecological environment is polluted (seriously in some areas)
- Rural population is below the "poverty line": unemployment, hungry and poverty

Trend

Agriculture of commodity production based on industrialization and modernization at an appropriate level of sustainable development:

- Rice production
- Industrial crops
- Fruit and vegetables
- Forest product
- Livestock
- Aquaculture

Opportunities

- New policy on “Doi moi” (renovation): regional and world-wide integration, ASEAN (AFTA)
- Other physical conditions: climate zones, dense river system
- Infrastructures (structure/schemes, technical farms,…)
- Labour resource (current census)

Strategy and policy direction

- ***Changes in agricultural structure***
  - **Strong**
  - **Diversified**
  - **Sustainable**
- ***Effective use of resources***
- ***Incomes increased***

➢ **Solutions and implementation arrangements with 5 programmes (Markets, Research & Tech transfer, infrastructure development, Reform structures of agricultures, and land policy)**

Irrigation development

1. ***Background***
2. ***Issues***
3. ***National strategy and policy direction***

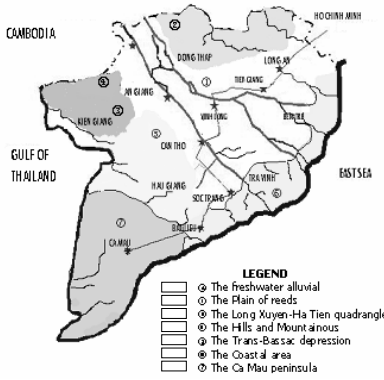
Background

- Expand irrigation and water supply:
  - ✓ *Central HL: 34,224 ha rice crop and 87,148 ha café*
  - ✓ *MD: channel, pump stations (23,380 ha)*
- Prevent & lessen natural calamity (river, sea dykes, sluices, embankment and lakes)
- Effect of irrigation investment & development
- …

Issues / problems

- Natural conditions
- Law on management and exploitation of WR including planning management
- Policy in hydraulic sector (out of date)
- Science and technology

MD agro-ecological zones



Strategy and policy direction

- ***Sustainable development, parallel utilization & protection***
- ***Serving multi-aims***
- ***Disaster mitigation***
- ***Attaching to poverty reduction***
- ***Public participation***

➢ **Solutions and implementation arrangements with 10 progammes**

Strategy and policy direction (cont'd) – 10 programmes

1. ***WR planning and management***
2. ***Science and technology***
3. ***Human resources development***
4. ***Upgrade hydraulic works***
5. ***Upgrade and develop large reservoirs***
6. ***WR for changing agricultural production***
7. ***WR and small-scale HP in mountain areas***
8. ***Disaster mitigation and prevention***
9. ***Water and rural environment***
10. ***WR development with climate changes***

Questions and Answers

Annex 4.3: Experience of Agriculture and Irrigation Project in the LMB by International Organisations

Agriculture and Irrigation Projects in LMB

Regional Workshop
on
Strategy Review of MRC's Role in the Agriculture and Irrigation Sector and SEWU

Thierry Facon
FAO Regional Office for Asia and the Pacific

FAO Strategic Framework and Medium-Term Plan 2010-13

Strategic Objective F: Sustainable management of land, water and genetic resources and improved responses to global environmental challenges affecting food and agriculture
Organizational Results
F1: Countries have strengthened capacities to promote and develop sustainable land management
F2: Countries address water scarcity in agriculture and strengthen the capacities to improve water productivity of agricultural systems at national and river-basin levels including trans-boundary water systems
F3: Policies and programmes are strengthened at national, regional and international levels to ensure the conservation and sustainable use of biological diversity for food and agriculture and the equitable sharing of benefits arising from the use of genetic resources
F4: An international framework is developed and countries' capacities are reinforced for responsible governance of access to and secure tenure of land and its interface with other natural resources
F5: Countries have strengthened capacities to address emerging environmental challenges, such as climate change and bioenergy
F6: Improved access to and sharing of knowledge for natural resource management has been facilitated.

F2: Countries address water scarcity in agriculture and strengthen the capacities to improve water productivity of agricultural systems at national and river-basin levels including trans-boundary water systems
Indicators
Number of countries or river-basin organizations adopting recommendations on water-scarcity coping strategies as a result of FAO policy, legal and strategy support
Number of institutions which have adopted FAO water productivity enhancement tools and approaches.
Uptake of FAO Water information products and global datasets

Primary Tools

- Strengthening of FAO Water platform on the multi-functional use and cross-sectoral management of water
- Provision of water policy services to address water management strategies in support to rural development and agricultural productivity enhancement, and the adoption of effective water allocation under conditions of scarcity. Deployment of water audit, irrigation and water investment framework methodologies.
- Provision of technical support to promote responsive agricultural water management. Strengthening of national capacity to address irrigation performance and modernization, water use efficiency and productivity enhancement, water quality management and technological development using FAO main products (including MASSCOTE, AQUACROP, etc.) and guidelines.
- Networking with key partners for the effective promotion of best practices in agricultural water management. Support to knowledge hubs and communities of practice.
- Provision of water information services (AQUASTAT, FAOSTAT, GeoNetwork), and develop global analysis on status and trends of water resources FAO's AT2030/50 projections ...)

Regional priorities (29th APRC)

► Growing regional water scarcity and competition for water, compounded by the effects of climate change, represents a major threat to future advances in food security and poverty alleviation.

► member countries to develop systemic national responses to water scarcity that address policy, institutional, legal, economic and technical obstacles, adopt more effective and strategically focused investment strategies in water management, assess the potential of international trade to offset water scarcity, and enhance regional cooperation.

► Supply-side responses still an option in some basins, but managing demand for agricultural water use should be the priority in the region.

► Member countries to focus on water-use efficiency and agricultural productivity along the value chain from farm to market, including on-farm water management, irrigation system performance, improved governance and adjustments of national water and irrigation policies.

Member countries to:

- implement service-oriented reforms of irrigation institutions and adopt demand-driven irrigation modernization strategies focusing on cost-effective water service delivery, while recognizing multiple uses and services of agricultural water and extending participatory management to various local actors.
- support needed significant new investments in irrigation systems by strengthening capacity at all levels and adopting benchmarking systems to monitor the effects of policy change and performance improvements in the irrigation sector.

FAO to scale up its regional irrigation modernization programme in support of these efforts.

Member countries to:

- boost the productivity of rainfed agriculture by providing incentives for the adoption of practices that minimize water risks, such as water harvesting, and by developing and promoting the use of seeds tolerant to flooding, salinity and drought.
- develop and report reliable information on agricultural water use,
- facilitate effective dialogue among key water sector interests,
- establish robust and transparent methods to negotiate allocation amongst competing water uses and users,
- and address institutional, technological and economic obstacles constraining progress towards optimal intra- and inter-sectoral water allocations
- consider and develop mechanisms for the compensation of providers of environmental services.

FAO to assist member countries in developing comprehensive policy and strategic frameworks for coping with water scarcity:

- improving water governance at the level of communities, irrigation systems, river basins and aquifers;
- adopting multi-sectoral strategic planning approaches related to food security, agriculture, water, environment and investment;
- adopting demand-driven and service-oriented irrigation development and management;
- modernizing irrigation systems;

- enhancing water productivity in rainfed and irrigated production systems while maintaining environmental protection;
- developing and adopting improved on-farm water management including water-saving practices;
- safeguarding vulnerable agro-ecosystems and populations, such as those in tropical deltas and in arid or semi-arid areas; and
- addressing land tenure and land titling issues and access to natural resources to create a more conducive environment for investment and sustainable use of land and water resources.

FAO to assist member countries in promoting:

- conservation agriculture,
- integrated pest management,
- integrated plant nutrition,
- sustainable forest management,
- best practices in livestock production,
- more efficient processing and marketing processes, water treatment facilities for industrial and marketing complexes,
- other measures to conserve and protect water resources and water quality

inter alia to protect inland fisheries, aquatic resources and aquaculture.

FAO to:

- strengthen AQUASTAT in the region.
- support the establishment of regional networks of experts, to facilitate the sharing of knowledge, information, experiences, technologies and best practices related to water management and approaches for coping with water scarcity.
- in collaboration with other relevant organizations, continue facilitating regional and international dialogue on water scarcity issues and transboundary cooperation in the management of water resources.

- launch a regional initiative (FAO-IWMI …) on re-inventing irrigation and agricultural water governance in Asia and the Pacific.
- support the development of practical adaptation and mitigation strategies for climate change in the region.
- collaborate with regional centers of excellence to develop and promote appropriate and affordable water management technologies and mechanization for effective on-farm water management.
- give high priority to all that and to strengthen its own capacity and resources.

Regional projects/programmes/initiatives

- On-going
  - Regional Irrigation Modernization Programme
  - Study on analysis of sustainable water resources use:
    - Water allocation
    - Regional, China, Malaysia, Thailand, Vietnam
  - IWMI-FAO Knowledge Hub on Irrigation Service Reform
  - Support to ASEAN Food Security/AG policies
  - FAO-ESCAP Water Resources Strategic Planning Network
- Pipeline
  - Capacity building in irrigation modernization
    - China, India, Malaysia, Thailand, Vietnam
  - Development of FAO-IWMI Initiative on re-inventing irrigation and Agricultural Water Governance for MDGs
    - China, India, Pakistan, Indonesia, Malaysia, Thailand, Vietnam
  - Assessing market demand for key agricultural products
    - China (Yunnan), Laos, Cambodia

Country projects

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THANK YOU

Supported Information for FAO Presentation

Title	Donor	Country	Status/date	Objective
Technical Assistance to the Royal Irrigation Department for policies and strategic planning for the Thailand Irrigation Sector Reform Program	FAO	Thailand	On-going July 2006-Juine 2009	Support the emerging Irrigation Sector Reform Program in Thailand. The technical assistance will enable the Royal Irrigation Department (RID) to complete the design of institutional and managerial reforms in the irrigation sector. It will also facilitate adoption of a comprehensive and sustainable Reform Program, at policy, legislative and operational levels.
Irrigation Performance Assessment	FAO	Thailand	Hard Pipeline	Test and Develop principles and guidelines, guide books, training curriculum and materials for irrigation performance assessment and improvement, and a national multi-level tool for monitoring and evaluation.
Special Programme For Food Security in Cambodia	FAO	Cambodia	Completed Oct 1997- Dec 2007	Assist the Government of Cambodia to identify and demonstrate appropriate technologies to better control water for agricultural

				production, to intensify production through improved varieties, soil fertilization and integrated pest management and to diversify farm income through small livestock and aquaculture improvements
Integrated Irrigation Development Project in Battambang Province in Support of SPFS in Cambodia	Italian Government	Cambodia	On-going Jun 2006-May 2009	Improve the hardware and software systems of irrigated agriculture, to Enhancing food security and ameliorating socio-economic conditions of the people at Komping Pouy, Battambang Province
Strengthening the participatory irrigation management and development strategy	FAO	Cambodia	On-going July 2007-July 2009	Improve national capacity on participatory irrigation management and development to improve productivity and sustainability of irrigated agriculture in Cambodia
Agricultural policy and programme support under the Initiative on Soaring Food Prices	FAO	Cambodia	On-going Sep 2008- Mar 2009	Strengthen the overall capacity of the government for policy/programme development in addressing food security through improving Food Security Support Programme document;

				identifying short-medium term water interventions and formulating prioritized project proposals; and formulating the document of the Agricultural Research, Education and Extension Programme
Improve the food security of farming families affected by the volatile food prices	European Commission	Cambodia	April 2009-Oct 2012	Enhance agricultural systems and community arrangements that enable poor and food insecure Cambodians to have substantially improved physical and economic access to sufficient, safe and nutritious food at all times to meet their dietary needs and food preference for an active and healthy life.
Special Programme for Food Security and South-South Cooperation in Lao DPR	Japanese Government	Lao DPR	Completed May 2001-Jan 2008	Increase agricultural productivity and ensure stability through the introduction of appropriate water management practices in irrigation schemes, and through crop intensification and farm diversification in irrigated areas.

IWMI-SEA: An overview of its research in Southeast Asia.

Andrew Noble IWMI-SEA, Vientiane, Lao PDR

Vision: Water for a food-secure world.

Mission: To improve the management of land and water resources for food, livelihoods and the environment.

www.iwmi.org

Content of Presentation

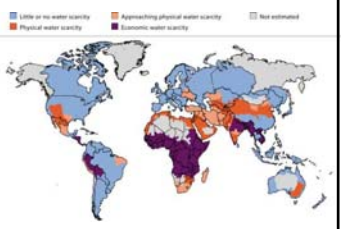
- Background.
- Research activities in the region.
  - Land resources
  - Irrigation
  - Food safety
- Concluding remarks.

www.iwmi.org

Improving water and land resources management for food, livelihoods and nature

We Live in a Water Scarce World – and it is going to get worse.

- As much as 60% of the global population may suffer different forms of water scarcity by the year 2025
- Water resources, both in terms of quantity and quality, will be critically influenced (compromised) by human activities

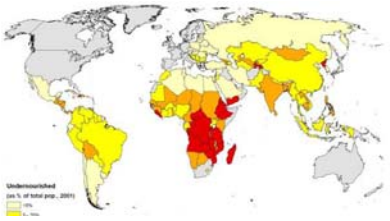


www.iwmi.org

Improving water and land resources management for food, livelihoods and nature

Hunger and Water Scarcity go together.

- Most hungry and poor people live where water challenges pose a constraint to food production
- From a regional perspective China has a significant influence on the region.



Climate Change and other regional drivers are adding a further dimension to the food and water nexus.

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The Question to be Asked

Do we have enough water resources to grow enough food to meet future demand for food and biofuels in the context of a range of regional drivers?

No!

unless ….

We change the way we think and act on land and water issues.

Consider the China and future demand for food

- If China grows at only 8 per cent per year
- If the pattern of Chinese food consumption in 2031 emulates current US consumption patterns.
- China's grain consumption will rise to 1.35 billion tonnes (from 382 million tonnes) equal to **two thirds of current global grain harvest.**

Brown, 2005

The region is critical in meeting future food demand.

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1. Land Resources

Inappropriate land management results in increased sediment transfer.

Results in the transfer of fertility and water quality issues.

Accelerated sedimentation of water storage structures.

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ment for food, livelihoods and nature

"Off-site effects" of Sediment Discharge

Since reservoirs are located at the outlet of cultivated watersheds, runoff and soil erosion may alter the quality of water, thereby generating "off-site" effects

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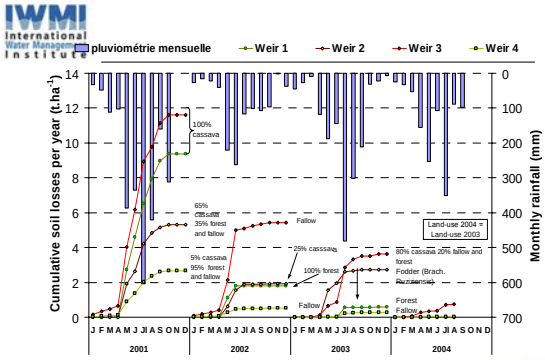
Improving water and land resourc nature

IWMI International Water Management Institute



Changing cropping patterns has a direct impact on sediment discharge in sub-catchments.

IWMI International Water Management Institute

1. Land Resources

Protection through the planting of grass species such as *Bracharia ruziziensis.*

ADOPTION RATE IS LOW as farmers do not see erosion as an issue. Need for incentives

IWMI International Water Management Institute

Livestock production ⇒ feedstock

HOUSEHOLD
- Problem with respect to health-sanitation
- Night soils in rice crops
- Store feed animals

UPLANDS
- Fodder can be used to manage the uplands for a sustainable agriculture.
- Compost addition increase the soil quality on LT

Which institutional structures?

Biogas generators

PES

Indicators for sustainability

Q1: Does biogas reduce Helminth? increase health?

Q2: How efficient is Biogas to meet household requirement?

Q3: Can we use the Biogas/animal waste on a mean of nutrient management for crops/fisheries?

Q4: What are the Carbon budgets?

Q1: Potential buyers of services? The HP sector.

Q1: Soil rehabilitation?

Q2: Crop yield enhancement?

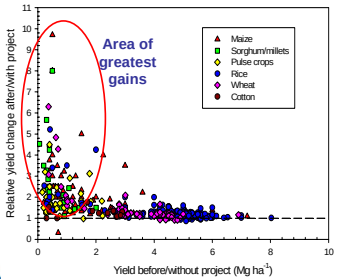
Q3: Sediment and water discharge for lowlands?

Q4: Water quality?

urces management for food, livelihoods and nature

IWMI International Water Management Institute

Global assessment of 'Bright' spots – cause for optimism in adaptation



Comprehensive study of 286 cases in 57 countries where individuals and communities that have adopted simple, non-exploitive, innovations to their production systems that have increased incomes and enhanced food security at the household level.

Bright spots influenced: **10.9 million households** covering **31.6 million hectares**.

Pretty et al., 2006; Noble et al, 2006; 2008; ul Hassam et al., 2005.

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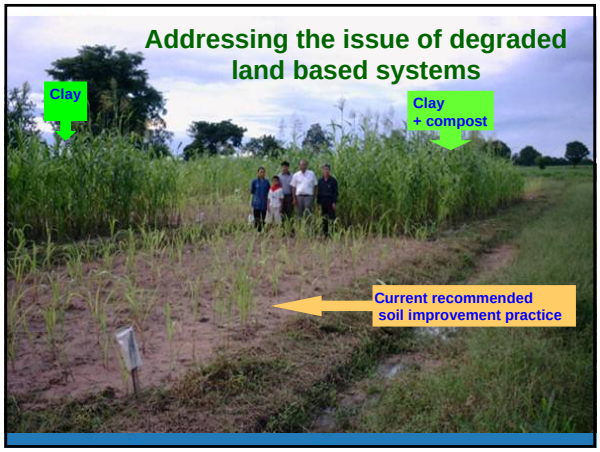
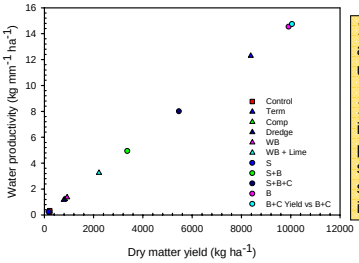
Addressing the issue of degraded land based systems



Water productivity – synergistic effect of soil productivity.



- Synergistic effect of **soil** and **water** productivity under **rainfed** conditions.
- Addressing land based issues that enhance the productivity of degraded systems will have significant positive implications.

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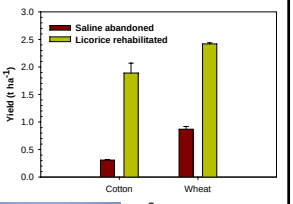
Addressing degraded irrigation production systems

Central Asia 30 000 ha go out of production annually from salinity.

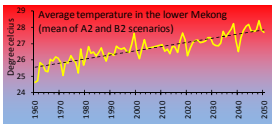
Reverting saline lands back into agricultural production is an important strategy.

Example – cost effective bioremediation through salt tolerant licorice results in improved hydraulic conductivity and lowering of water table.

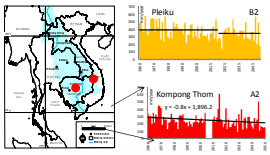


Improving water and land resources management for food

Climate change 1960 - 2050 (MRC/CSIRO/IWMI)



- *Analyses based on downscaled ECHAM4 climate model data*
- Temperature increase linear, 0.02 – 0.03ºC per year
- **No significant change in annual rainfall**
- Significant rainfall decrease during dry season in some areas (Cambodia, southern Vietnam)



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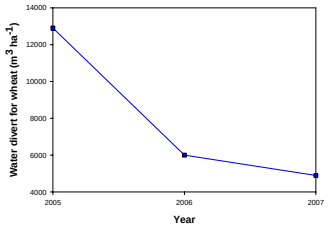
Improving farmer based irrigation institutions

- **Empowering farmers to manage irrigation systems.**
- **Changing approaches to irrigation planning and water allocation.**
- **Water divert for wheat production reduced by > 50%.**
- **In Cambodia assisted in drafting PIM policy and implementation manuals and assisted government in establishing pilot PIM schemes with FAO.**
- **Irrigation knowledge hub IWMI/FAO.**



Institutional changes are an imperative in reforming irrigation

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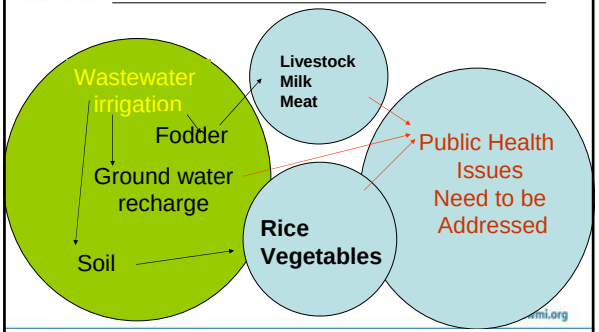
View Waste Water as a Valuable Resource



Need to manage this resource in a sustainable manner

Irrigation and cadmium contamination.

- Consumption of rice grain with elevated cadmium (Cd) concentrations can have a negative impact on human health.
- Quantification of Cd contamination in an isolated area of western Thailand.
- Studies undertaken to understand and predict Cd distribution within irrigated paddy rice systems – development of zoning maps.

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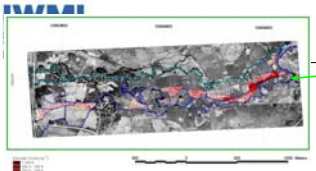
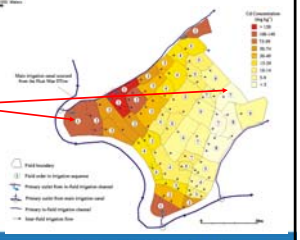


Sediment containing Cd has its source in a naturally mineralized anomaly upstream of the command area.

Have determined that the concentration of bio-available Cd can be predicted based on irrigation sequence in a cascade system. Model developed to predict the distribution in the field.



Improving water and land resources management for food, livelihoods and nature

Concluding Remarks

- Sustainable water and land resources management are the key to addressing food security both in the region and globally.
- There is a need for a transformative approach to agriculture in the region in order to meet this demand.
- There is no longer the luxury of lateral expansion of the agricultural sector in Southeast Asia.
- Adoption of adaptation/transformative strategies has a cost. Who pays?
- We should not loose sight of the fact that the poor and marginalized are the most vulnerable to the impacts of change drivers in the region.

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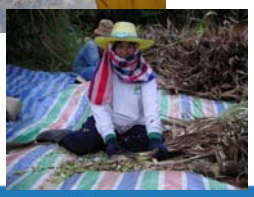
Improving water and land resources management for food, livelihoods and nature

Thank you



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Improving water and land resources management for food, livelihoods and nature

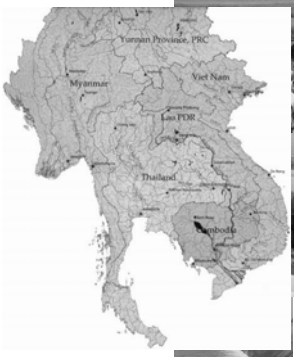
Irrigation in M-POWER framework: Participatory and optimal water use

MRC Regional Workshop
Vientiane, Lao PDR
22-23 April 2009

M-POWER
Mekong Program on Water Environment and Resilience

About M-POWER

- M-POWER, a regional network of organizations and individuals
- Mekong region, not Mekong basin
- Improved livelihood security, human and ecosystem health in the Mekong Region through better water governance



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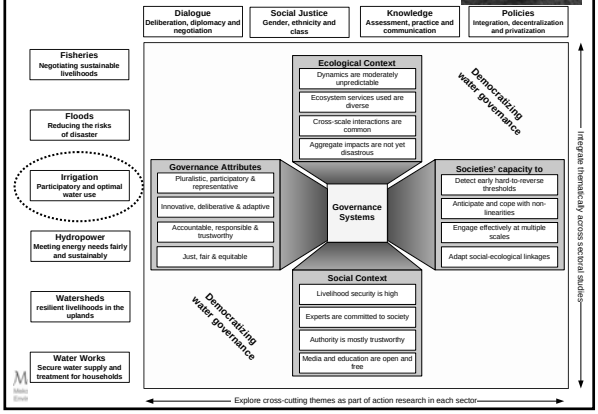
Research Framework



Irrigation in M-POWER framework

- Specific strategic objective **for irrigation sector** :
  - 'Open up for public deliberation plans for large-scale water infrastructure for irrigation and suggest alternative approaches for securing adequate water supplies for agriculture'
- Focused on the rationales and processes for decisions about large-scale water infrastructure developments

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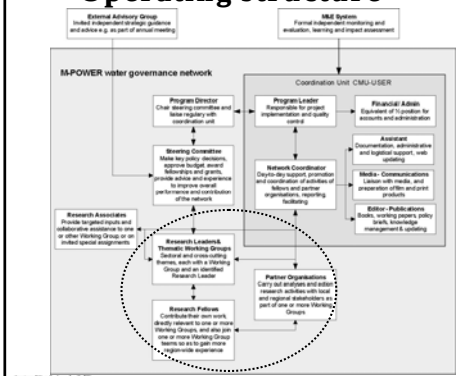
Operating structure



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How the research conducted?

- Theme leaders leading working group
  - Theme leader: Irrigation
  - Theme leader: Policies
- Partner organizations contributing comparative studies
  - IRD/France, IWMI-SEA, CEDAC-Cambodia, and USER-Chiang Mai University Thailand
- M-POWER research fellowship
  - Conduct empirical studies

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Joint efforts from theme leaders, partner organizations and research fellows

Fellowship research on irrigation

Name of fellow	Research title	Country	Status
Philippe Floch	The dynamics of water resources development and institutional change in Northeast Thailand	Thailand	Complete
Try Thuon	Comparative Study on Irrigation Management System in Cambodia	Cambodia	Complete
Surangrut Jumnianpol	Politics of Water Governance in Thailand: A Case Study in Eastern Region	Thailand	On-going
Man Purotaganon	Negotiating Water Policy: Multi-stakeholders negotiation in Prachinburi sub watershed, central Thailand	Thailand	On-going
Kim Thu Duong Thi	Review of water-pricing policy in the Red River Delta over the last five decades	Vietnam	On-going
Philippe Floch	Pump Irrigation and the Dynamics of State and Non-State Water Resources Developments: The Lam Se Bai River, Northeast Thailand	Thailand	Complete
Xuan Quach Thi	An estimation of the deadweight losses caused by a policy of exempting the irrigation fee in some irrigation schemes – A case study in the Red River System (RRS) of Vietnam	Vietnam	On-going

Research under PN67

- Irrigation expansion in Vietnam (IWMI-SEA) and Cambodia (CEDAC)
  - Processes and tools to make decisions about their grand expansion of irrigation
- Case study from Chi-Mun basin in NE Thailand
  - Political drivers of water allocation

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Major findings

- Water Grid and Irrigation development in NE Thailand
- Irrigation in the Lower Mekong Basin Countries: The Beginning of a New Era?
- Participation, Fit and Integration: Early lessons from SCIP, Cambodia

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Irrigation in the Lower Mekong Basin Countries: The Beginning of a New Era?

- Chapter in M-POWER book 2
  - Revisited the irrigation in the Mekong part of LMB countries in the past and analyzed the trend of irrigation in the future under several drivers, in particular the recent increase of food price in the global market
- Irrigation systems in LMB countries not performing as expected
- Fluctuations in food prices affect investment

M-POWER

New investment should shift from the supply-driven irrigation to demand driven irrigation

Participation, Fit and Integration: Early lessons from SCIP

- Stung Chinit Irrigation Scheme and Rural Infrastructure Project, Cambodia
  - Analyzed the key issues related to project fit: cost overruns and shortfall of benefits; social, economic and environmental impacts; scheme modernization Vs local adaptation
- Should consider the real need and interest of the local farmers and types of their livelihood

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Alternate small scale than large scale irrigation

On-going activities

- Politics of Water Governance and Multi-stakeholder negotiation in Thailand
  - Two fellowship research in Thailand: interaction among multi-stakeholders involved; and policy process, negotiation process of different stakeholders
- Water pricing policy in Red River Delta, Vietnam
  - Two fellowship research: review the experiences of water-pricing policy implementation; and exemption of irrigation fee and its impact

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On-going activities

- Irrigation inventory in Cambodia
  - To assess the situation of irrigation in Cambodia
  - Case study on best irrigation schemes
  - Case study on poorest irrigations schemes
  - Case study on collapsed irrigation schemes
- Capacity building of water user community
  - Capacity building and management assistance
  - Farmer and water learning network: to connect the FWUC each other

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What next

- Synthesis write-up of M-POWER irrigation research and activities
- Mini dialogue of irrigation researchers-managers

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Thank you

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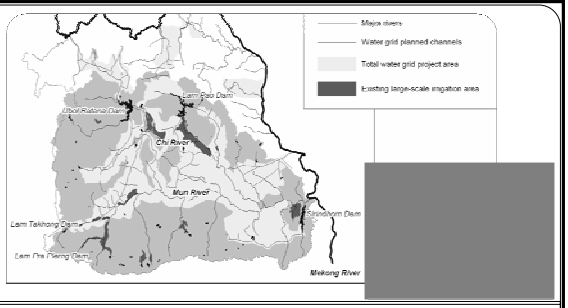
Irrigation in NE Thailand: some remarks

Philippe Floch

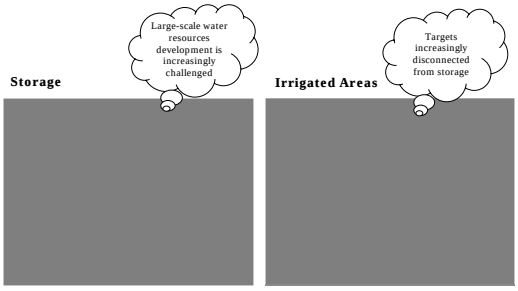


Watergrid: some remarks

In July 2003, the **Water Grid** is launched at a workshop on "Sustainable Water Resource Management". Current 30 million rai to be incremented by an additional 103 million rai within 5 years, with the expected benefit of enabling farmers to cultivate and access water all year round. "

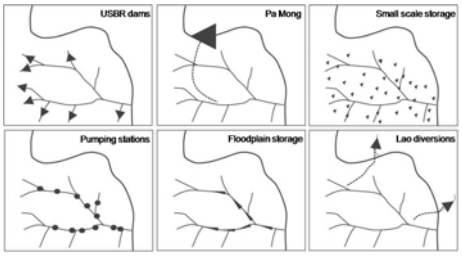
"Water Grid," to describe a set of **interconnected** reservoirs and basins allowing the movement of water from sources to water-short areas, although its official name ("Sustainably holistic water management project"). The project came **under fire** from academics, environmentalists, and a few water experts.

Planning Irrigation in the Chi-Mun Basin



A remarkable consistency

Pa Mong dam, storage in the flood plain, small and medium reservoirs, pumping, siphoning water off Lao rivers, tunnel into the Chi-Mun river basin … **everything has been envisaged!**



The Water Grid: 4 reasons to be worried

- **Water storage**
  - NE Thailand does not offer adequate storge.
  - Diverting water from the Mekong is problematic and costly
- **Labor shortage**
  - Exodus of young labor in rural Isaan (urbanization)
  - Lao labor for harvesting
  - Quick spread of direct seeding in lieu of transplanting
- **Environmental Change / Salinity**
  - Salinity identified early as a constraint
  - KCM project demonstrated the extent of the problem
  - Soil constraints substantial increases in yields
- **Agricultural Production and Markets**
  - Only 14% of the total irrigated areas are cultivated in the dry season
  - Pumping stations underutilized
  - Lack of capital, shortage of labor and soil salinity, hinder the adoption of dry-season cropping.

State and Local approaches to irrigation

A glance at the Lam Se Bai river

- **Two sub-projects of the Khong-Chi-Mun (KCM)** project aim to increase the area under irrigation from 9000 ha → 39,000 ha.
- A look at three pumping stations:
  - Utilization of existing pump-irrigation infrastructure is **marginal**
  - **farm ponds and individual pumping** allow farmers to draw from different sources of water individually and flexible. Farmers invest significantly in this type of infrastructure on their own.
  - **Direct seeding** has often replaced transplanting
- The hypothesis (yields, adaptation of dry season cropping …) that inform the KCM project neglect these transitions and are heavily biased to justify a project that appears to miss the needs of a region

Non-agricultural employment in rural NE Thailand

Investment alternatives?

- Massive injection of public **investments** in irrigation infrastructure is **unsound where there are no large contingents of unemployed people**.
- Irrigation in Isaan found to yield the lowest **return to investment** (0.76 baht for one baht invested), while corresponding figures for roads, education, and electricity are 1.23, 1.26 and 8.66, respectively (Fan et al. 2004).
- World Bank and NESDB (2005): **no priority to expand irrigation** but, necessity of improving the skill of workers (education), of a better targeting of poor segments of the population by existing rural support programs, of strengthening and empowering public administrations from villages to provinces, and of an increased integration within the Mekong subregion
- Up-to-date in-depth **assessment** of all the small- or medium-scale projects, including deep or shallow wells, weirs, pumping stations, farm ponds and other reservoirs is lacking.

Annex 4.4: JICA's Experience in Agriculture and Irrigation Projects

Vietnam

ON-FARM IRRIGATION DEVELOPMENT AND IRRIGATION MANAGEMENT VIET NAM

Vientiane
April 22-23, 2009

TABLE OF CONTENTS

A. INTRODUCTION

- In many decades, the Government of Vietnam and water users concentrated investment on construction and rehabilitation of irrigation systems with a policy on "the Government and water users working together", farmers in different regions have contributed significantly to the investments in irrigation systems with various levels ranging from 12% of the total investment in the Red River Delta, to 30-50% in other regions and to 80-100% for small-scale irrigation schemes managed by their own.
- About 91% of the irrigation systems managed by State-owned enterprises serves about 80% of the country's irrigated area. The remaining 9% of irrigation systems managed by farmers irrigates for about 20%;
- In Vietnam, almost on-farm irrigation facilities in commune, village scale is mainly managed by farmers. It is the fact that the irrigation facilities are highly effective because of appropriate operation among headwork's, main canals and on-farm irrigation facilities. Farmers also take an indispensable part in construction, management, operation and maintenance of on-farm facilities.
- In that situation, on-farm irrigation development relates closely to implementation of PIM in Vietnam.

B. GOVERNMENT'S POLICIES REGARDING ON-FARM IRRIGATION DEVELOPMENT

Legal system

Almost current policies concerning on-farm irrigation are usually parts of legal documents about water management such as Law on Water Resources, Ordinance on Exploitation and Protection of Irrigation Works or fairly independent documents together with PIM-related document and Law on Cooperative. The legal documents are as follows:

- The Law on Water Resources (No. 8/1998/QH10 of May 20, 1998)
- Frame work Strategy on Development of Participatory Irrigation Management in Vietnam (Enclosed by official dispatch No 3213/BNN-TL dated December 30, 2004 by Ministry of Agriculture and Rural Development).
- Circular guidelines on establishment, strengthening and development of water user organization
- Ordinance on Exploitation and Protection of Irrigation Works, (No. 32/2001/PL-UBTVQH10 of April 4, 2001)

Duties of farmers in on- farm development

- Participating in making plan of exploitation and protection of hydraulic works;
- Having plan of water use, waste water discharge under signing and contract with State-owned enterprises for hydraulic works exploitation, water user organization;
- Using water reasonably, saintly and protecting water environment;
- Paying irrigation fee, water fee, waste water fee following the contract;
- Protecting irrigation facilities in applied area;
- Being compensated for damage caused by State-owned enterprises for hydraulic works exploitation, water user organization with faulty actions from contract, except for other rules of law;
- Having rights and obligations complying with the law;
- Organization, individual who manages and exploits irrigation facilities also has to be responsible for protection of those ones;
- People's Committee at all level conducts approved protection plan for irrigation facilities complying with:As for irrigation facilities belonging for commune, town, the People's Committee of commune, town has to conduct protection plan;

Performance record and others

Forms of on-farm water management organizations

- In Vietnam, there are 6 current forms of Water User Organization *for irrigation service or combination with irrigation for on-farm system*, with diversified scales, names and operation manner (Table) including: (1) Cooperative, (2) Cooperation organization, (3) Management Board, (4) Joint-stock company, 5) Commune People's Committee, (6) Village.
- According to the investigation of 63 provinces, only 11% of them has 6 forms, the remaining 89% has 1 to 4 forms, majority form is cooperative.

	Forms	Abbreviation	Characters
I	**Cooperative**		**Operation and organization under Law on Cooperatives**
1	Agriculture Production Cooperatives	APC	Irrigation services at commune, village scale
2	Water User Cooperatives	WUC	Specialized in irrigation services at inter-commune, commune and village scale
3	Irrigation Cooperatives	IC	Specialized in irrigation services at commune and village scale
4	Irrigation and Electricity Cooperatives	IEC	Integrated services at commune and village scale
5	Agriculture and Electricity Cooperatives	AEC	Integrated services at commune and village scale
6	Agriculture and Forest Cooperatives	AFC	Integrated services at commune scale
II	**Cooperation organization**		**Pursuant to Law on Civil and Law on Cooperatives**
1	Water User Association	WUA	At inter-commune, commune and village scale
2	Water User Group	WUG	At commune and village scale
3	Water Management Group	WMG	At village scale
4	Water Management Team	WMT	At village scale
5	Water Delivery Group	WDG	At village scale
III	**Management Board**	MB	At inter-district, inter-commune, commune, inter-village, village or independent MB
IV	**Joint-stock, Private**		**Pursuant to Law on Civil and Law on Cooperatives**
1	Cooperatives – Private organization	CP	
2	Hiring contract with irrigation group, private organization	HC	At inter-village and village scale (some spontaneous cases)
V	**Communal People's Committee**	CPC	Not service organization
VI	**Village**	Village	Head of village in charge of this duty, no formation of service organization

WUGs by region in Vietnam

No.	Region	Agricultural Cooperatives		Other organizations				
		Quantity	*Rate %*	*Water users' cooperatives*		*Association, Board, Team, Group*		*Rate %*
				Quantity	*Rate %*	*Quantity*	*Rate %*	
1	Northern Mountainous Region	3788	**91.0**	144	3.5	230	5.5	**9.0**
2	Red River Delta	2006	**96.7**	29	1.4	40	1.9	**3.3**
3	Northern Central	3631	**86.5**	256	6.1	311	7.4	**13.5**
4	Coastal Central	994	**67.0**	331	22.3	158	10.7	**33.0**
5	Eastern South	236	**62.8**	101	26.9	39	10.3	**37.2**
6	Mekong River Delta	406	**58.5**	54	7.8	234	33.7	**41.5**
7	Central Highland	189	**73.0**	42	16.4	27	10.6	**27.0**
	Total	**11249**	**76.5**	**958**	**11.5**	**1039**	**12.0**	**23.5**

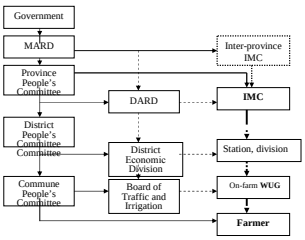
According to baseline survey of MARD – 2003, Integrated ACs serving irrigation have considerably developed

Role of decision and execution of tasks

Role of decision /execution	Forms	Managers	Water distribution	Dispute settlement
Decision	**1) Village**	Head of village; Head of water delivery group	Head of village; Head of water delivery group	Head of village; Head of water delivery group
	2) Commune	CPC, Head of village	CPC, Head of village	Commune People's Committee (CPC), Head of village
	3) Agriculture cooperative(AC) at village scale	AC management board, Head of village	AC management board, Head of village	AC management board, Head of village
	4) AC at inter-village scale	AC management board, Head of village	AC management board, Head of village	AC management board, Head of village
	5) AC at commune scale	AC management board, Head of village	AC management board, Head of village	AC management board, Head of village
	6) Farmer association at commune scale	CPC, farmer association (FA)	FA, Head of irrigation group	CPC, Head of village, FA

Role of decision /execution	Forms	Managers	Water distribution	Dispute settlement
Execution	**1) Village**	Head of village; Head of water delivery group (Dau Tieng)	Irrigation group (or mobilize people at irrigation time)	Security of village, Irrigation group (or mobilize people at irrigation time)
	2) Commune	CPC, Head of village	Irrigation group (or mobilize people at irrigation time)	Security of village, Irrigation group (or mobilize people at irrigation time)
	3) Agriculture cooperative(AC) at village scale	Management board of AC, Head of village	Irrigation group	Security of village, Irrigation group
	4) AC at inter-village scale	Management board of AC, Head of village	Irrigation group	Security of village, Irrigation group
	5) AC at commune scale	Management board of AC, Head of village	Irrigation group	Security of village, Irrigation group
	6) Farmer association at commune scale	CPC	Irrigation group	CPC, Head of village, Farmer association

Typical chart of water management system in Vietnam



Means supporting of on-farm irrigation development

- *Budgeting*
- Vietnam pursue the policy on joint-development of small I&D schemes between GoV and the people. Farmers contribute in developing works in various levels, depending on specific regions (in the Red river delta, farmers contribute 12% of the investment, in other regions they contribute in range of 30÷50%). In many small I&D works, farmer finance themselves (80÷100%) and also arrange to manage the works.
- According to the survey data, so far, up to 91% of works are managed by IMCs that irrigate for 80% of total irrigated area, and 9% of works are managed by farmers but irrigate 20% of total irrigated area. In case of large I&D schemes, the on-farm works in the territory of commune or village are mainly managed by farmers.
- The share of responsibilities in the I&D development is embodied by the contribution of farmers to build up I&D works. Out of 170,000 billion VND building up I&D systems, the contribution of farmers makes up about 25-30%[1].
- The share of responsibilities in the I&D development is also indicated with the contribution of farmers in operation and management of I&D schemes. In 2006, the total water fee contributed by farmers via their WUAs[2], to IMCs is 640 billion VND[3]. Compared with the common rate in other countries in the region and in the world, the fund contributed by farmers in O&M is quite effective.
- [1] Total investment in I&D works is estimated to 120,000 billion VND (Loi, 2007). The investment in on-farm works which are managed by farmers is estimated approximately 50,000 billion VND, estimated based on the averaged value of 452.5 million VND/WUA (Hoa, 2007).
- [2] About 13,273 WUAs, comprising of 11,249 agricultural cooperatives, 958 WUGs and 1,039 I&D teams (Tiep, 2004)
- [3] Calculated with the data reported from 42 provinces.

Technology

- The technology of on-farm irrigation system in Vietnam is actually not yet developed because of the restricted fund and the limited study and technology transfer. The technologies are only applied individually in projects such as save-water irrigation or application of technologies in construction of intakes, etc.
- *In addition, GoV provide**[1]** technical assistance to small I&D works in the following cases:*
- Checking the safety of dams before annual flood season;
- Checking for damages, evaluating quality of I&D works as requested by the commune people's committee;
- Providing instructions on repair, upgrading, and rehabilitation works that are damaged or destroyed by natural disasters;
- Training, fostering the O&M skills; on management of water resources, water operation and distribution and water-saved irrigation techniques;
- Provincial people's committees, based on specific characteristics in the provinces, assign relevant agency in charge of implementing the provisions specific in Clauses 1, 2, 3 and 4 of this Article.
- [1] District people's committee, DARD

Training

- The training for on-farm I&D workers is usually carried out via PIM organization or agricultural cooperatives in the commune. The training usually has two parts:
- *Technical part:*
- Irrigation and drainage technologies, O&M technologies;
- Plant and animal care;
- Agricultural extension, cultivation and husbandry.
- *Management and financial management*
- Participatory management and protection of works
- Financial management
- Trainers:
- There are two sources of training staffs:
- (i) Technical staffs of IMCs, of district agricultural departments (some from agricultural cooperatives), district agricultural extension stations;
- (ii) Projects financed by oversea donors: Presently, training staffs at grass-root level is very concerned and cared of by foreign-invested projects. These projects provide trainers in form of TOT. One of TOT training projects in a large scale is the project coordinated between VAWR and JICA (CP_PIM Project). This project is implemented in 5 years (2005-2010). The project is implemented initially in 3 pilot areas in 2 provinces (Hai Duong and Quang Ninh) in the Red river delta, then extends to 25 provinces in Vietnam (after year 2009, the project shall select 10 provinces to be trained in the first phase). VAWR engineers are trained and become the trainers who will train IMCs, WUAs staffs and these staffs, in turn, will train farmers.

Problems of on-farm irrigation development

Physical works

- The canal systems are severely degraded, lack of regulation structures, sluice gates, measure devices, or lack of structures for water flow control and regulation;
- In the entail of canals, irrigation is unreliable, therefore, the irrigated area of the irrigation schemes only approximately covers 50% of total command area;
- Lack of on-farm canal systems
- Fields are small and disordered. Field boundaries and levees are incomplete so it is incapable to retain water on fields.

Institution/management

- The management of canal operation is not yet clearly distinguished, particularly in the inter-commune canals, so the irrigation and drainage is inefficient and unfair. The quality of irrigation and drainage services is poor.
- As reported by the localities in nation wide, by April 2007, about 20 provinces have regulations on the decentralization in management of irrigation and drainage works (including interim regulations) for IMCs and WUAs. Meanwhile, the northern mountainous region has the highest rate of decentralization with 8/15 provinces, or making 53.33%. The southeastern region in the South has not yet any province that decentralizes the management of irrigation and drainage works, and in the Red River delta, only 01 province (Hai Duong province) makes a pilot on the decentralization (*Table*).

Finance, income and cropping diversity

- Financial management is incapable.
- In many localities, the local policy and mechanism is rigid, though farmers are wiling to contribute to the on-farm irrigation (in places where water is rare) but they can not.
- Total income from rice farming of farmers is about 30 million VND/ha/year on average of which the cost makes up about 55%. The profit, including the entire family labour, is about 13.5 million VND/ha/year or 82,000 VND/person/month (If only living on rice farming, all farmers in Vietnam live under the poverty line). The value of labour day varies from 10,000 to 15,000 VND.
- The income gained from rice production is low so farmers do not want to pay the fee. The collected fee is not enough to cover necessary O&M cost. The income from the irrigation and drainage services from grass-root WUAs is limited so it results in lack of responsibility of I&D workers, and in some places, I&D workers / I&D teams do no longer exist.

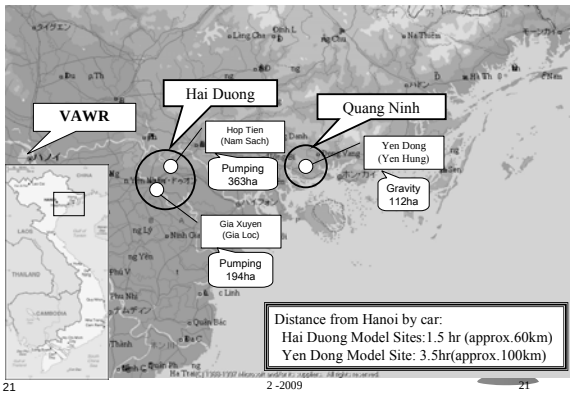
C. ON-FARM IRRIGATION DEVELOPMENT REGARDING CD-PIM PROJECT OF JICA IN VIET NAM

PROJECT (CD-PIM)

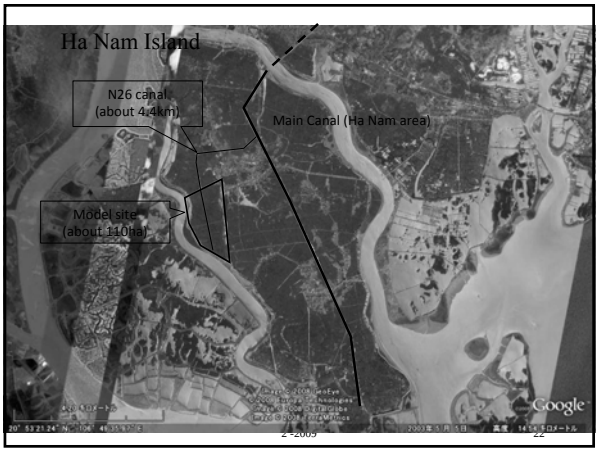
CAPACITY DEVELOPMENT OF PARTICIPATORY IRRIGATION MANAGEMENT SYSTEM THROUGH VTWRR FOR IMPROVEMENT OF AGRICULTURAL PRODUCTIVITY IN VIET NAM

CD-PIM PROJECT AREA

Model Sites



Ha Nam Island



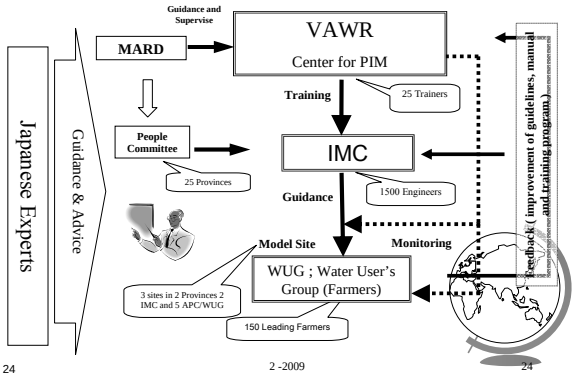
Yen Lap Dam

Reservoir and dam crest

Dam body

- Gross capacity of reservoir is 120millions m3 of water
  Active capacity of reservoir is 114millions m3
  Crest elevation is 33m
  Crest length is 276m

Organization of Project Implementation



Cooperation Scheme

- Implementation Agency : Vietnam Academy for Water Resources (VAWR)
- Cooperation Period : 5 years
- Target Area : 25 Northern Provinces
- Model Site : 3 sites in 2 provinces
- Target Group :
  - Model Sites Farmers : 150
  - IMC Engineers : 500 (Hai Duong+Quang Ninh: 150 Northern 10 provinces: 350;
  - Trainers in VAWR : 15

CAPACITY DEVELOPMENT OF PARTICIPATORY IRRIGATION MANAGEMENT SYSTEM THROUGH VTWRR FOR IMPROVEMENT OF AGRICULTURAL PRODUCTIVITY IN VIET NAM

Objectives of the Project

- In order to realize effective water management, conduct a training program to IMC engineers
- In order to solve problems of water shortage, expand the water users' group(WUG) management areas from tertiary canal to 2nd and 3rd canals
- In order to meet farmers' demand for cropping during no-paddy season, promote a farmers' meeting to discuss farming and water distribution among farmers

Project Purpose

- Participatory irrigation management (PIM) is promoted and agricultural productivity is improved in terms of both yield and cost through enhancement of the capacity of leading farmers and water resources engineers in the model sites.

Overall Goal (attained after 3 - 5 years from the termination of the project)
Agricultural productivity is improved in terms of both yield and cost through improved irrigation management in the area where participatory irrigation management (PIM) is promoted.

*Indicators will be defined based on the results of the baseline survey.

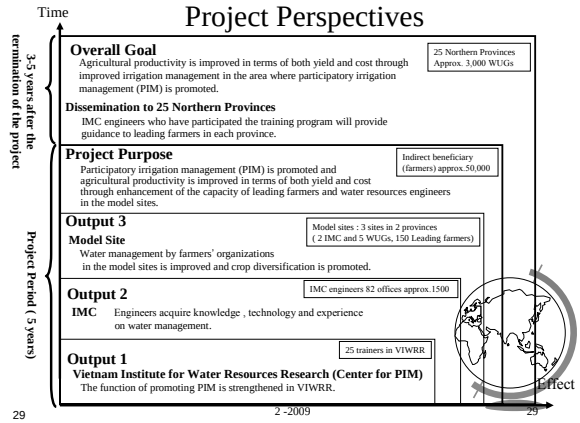
Outputs

Output 1 The function of promoting PIM is strengthened in VAWR.
- Study methods practiced by other donors
- Preparation of guideline, manuals, training program
- Implementation of training for trainers

Output 2 Engineers of Irrigation Management Company (IMC) acquire knowledge, technology and experience on water management.
- Implementation of training for IMC engineers
- Organization of PIM seminars

Output 3 Water management by farmers' organizations in the model sites is improved and crop diversification is promoted.
- Implementation of baseline survey at the model sites
- Promotion of leading farmers by IMC engineers
- Promotion of farmers' meeting and practical application of PIM
- Supporting improvement activities of farming practices in APC
- Improvement of water management by APC and application of crop diversification

Project Perspectives



C. ON-FARM IRRIGATION DEVELOPMENT IN YEN DONG MODEL SITE; JICA PROJECT

Issues on irrigation management in the model site

① Lack of irrigation water due to improper irrigation management

④ Neglect of the deteriorated facility and Destruction of facility for intake of water

Vicious circle

② Low yield of agricultural product

③ Decrease of farmer's consciousness

Inefficient usage of water resources
Increase of management cost
Decrease of farmer's profit

31

FIELD ACTIVITIES

VOLUM MEASUREMENT N26

2 -2009

32

Yen Lap Irrigation canal (Model site)

Tertiary canal in model site

Division work in model site

2 -2009

33

One year ago, there were many trouble (uninstalled gates of tertiary canal, holes of canal wall, low capacity of canal and so on) in N26 canal area.

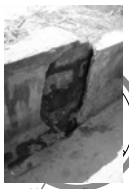
Intake gate (grass and soil instead of gate)

Intake gate (grass and soil instead of gate)

Uninstalled gate (grass-roots

Overflow point (narrow sluice)

Hole of canal

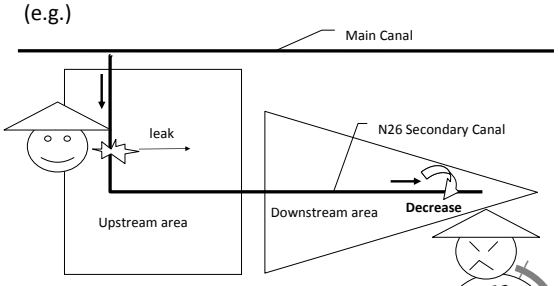


Mortar peeling

2 -2009

34

(e.g.)



- If there are any troubles in upstream area, farmers can not irrigate enough water in downstream area.
- Problems of a canal system are not only troubles of each plot, but also all area's troubles.

2 -2009

35

Efforts on this project in the model site

Necessity of improvements in the model site

1．Irrigation facilities
2．Check and maintenance
3．Water distribution (management)

Discussion
among farmers and irrigators
(APCs, IMC, CPC and DPC)

2 -2009

36

In Yen Dong model site, IMC, APCs, CPC and DPC organized monthly meeting every month.

The understanding for irrigation management in N26 area deepened.

In the monthly meeting, attendances (farmers, irrigators and representatives of each organization) discussed current issues of irrigation management and worked on planning appropriate water distribution with VAWR staff.

Explanation of irrigation management by farmers

Measuring water flow supported by VAWR staff

Yen Lap Irrigation tertiary canal

Tertiary canal without gate

Tertiary canal and Gate

- Tertiary canals with a length of 275km on whole district area.

Efforts for improvements of issues in the model site

1 . Efforts for facility improvement

- Local people decided priority of facility improvements through monthly meetings.
- The cost of facility improvements were shared by local people.

2 . Efforts for check and maintenance

- Local people discussed the rule about check and maintenance for irrigation facilities.
- IMC and APCs set forward consideration and coordination of new procedure, and made it known to farmers.

3 . Efforts for improvements of irrigation management

- Local people discussed issues of irrigation management.
- Local people are arranging the rule (who?, How to?, when?, How much?) based on actual irrigation condition.

Achievement until now

① Participation of farmers

- Meetings where farmers attend were organized regularly (each month) by local people (APCs, IMC, CPC and DPC) and they discussed improvement of irrigation management.
- Local people implemented their improvement plan by their budget because of deepened understanding about necessity of improvement.

❑ Role sharing of the facility improvement

Local people contributed their budget and labors, and improved their irrigation facilities by themselves.

Facility	Material	Labor & Machine	Design & investigation	Total
Yen Lap IMC	-	-	4,266,000 (100%)	4,266,000 (5%)
APCs	-	45,000,000 (100%)	-	45,000,000 (54%)
Yen Hung DPC	34,636,000 (100%)	-	-	34,636,000 (41%)
	100%	100%	100%	83,902,000 VND

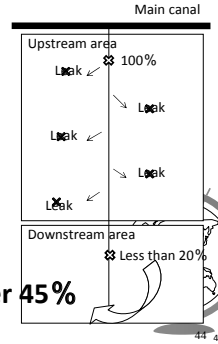
❖Except CD-PIMS support

② Improvement of Irrigation efficiency

- Before in Yen Dong model site the irrigation water reached less than 20% of the quantity that drew water from the main canal.
- After facility improvement, it is improved that over 45% of quantity can reach to Yen Dong model site.

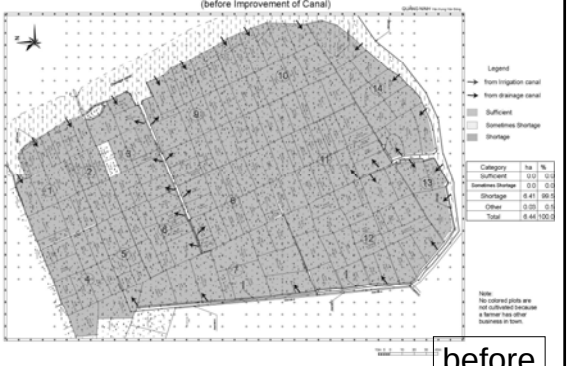


Improvement of irrigation efficiency because of facility improvement

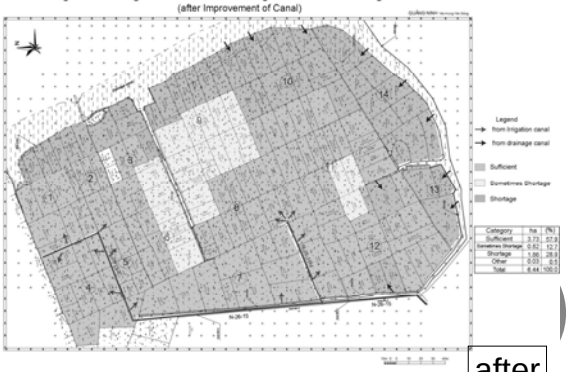
Over 45%

Figure 7-2 Irrigation Condition of Target Area in Yen Dong Model Site
(before Improvement of Canal)



before

Figure 7-3 Irrigation Condition of Target Area in Yen Dong Model Site
(after Improvement of Canal)

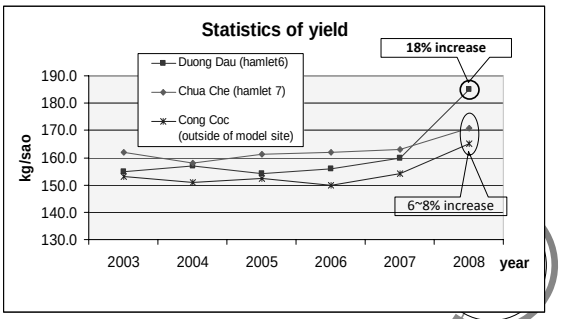


after

③ Improvement of productivity

- In the model site, yield of paddy increased about 20% (in some places).
- Yield of last crop season was higher compared with that of recent year.
- However in the model site, it was better than another area.
- Due to the improvement of water distribution, many farmers got possible to use enough irrigation water.

Improvement of productivity



Development of achievement

☞ For sustainability (independence possibilities)

1；Revision the irrigation fee

- Revision of irrigation fee (including allowance for irrigators) was approved by general meeting through discussions among all farmers.

2；Maintenance (construction) of farm road

- Regarding farm road in the model site, APC constructed it by themselves based on farmers requests.

3；Discussion about institution (organization)

- Local people started to consider their suitable and sustainable organization (e.g. WUA of four APCs) in this area, and are discussing it now.

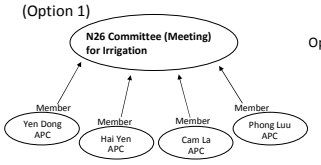
Farmers came to plan an improvement of working efficiency and constructed the farm road by themselves.

2007.June

2008.July

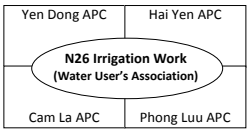
Study about institution of irrigation system

(Option 1)



Option1；The committee composed by APCs for N26 irrigation system such as 'monthly meeting' organizing regularly.

(Option 2)



Option2；Establishment of new user's association unifying irrigation sector of each APC for management of N26 irrigation system.

Continuation of check and maintenance

IMC and APCs have checked and adjusted the bad conditions.

Checking holes by IMC and APC members

Adjusting with fish pond's owner by IMC and APC member

Conclusion 1

- **What is Water (Irrigation) management?**

✓Irrigation control

✓Facility maintenance

In the model site (N26 canal area)

- Farmers implemented their facility improvement, and they control their irrigation system by themselves based on farmer's opinion through discussion.
- APC (farmers) implements the irrigation management.

Conclusion 1

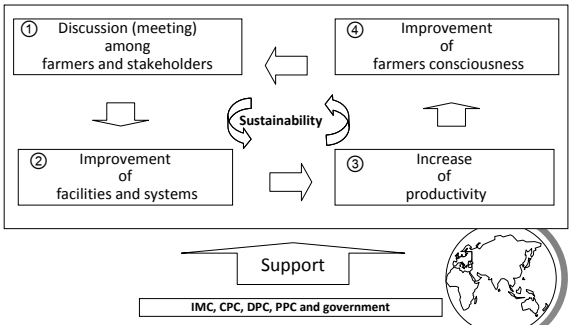
☞ **What is Participatory?**

✓Farmers, APCs, IMC, CPC, DPC, PPC and government…all people participate

In the model site (N26 canal area)

- Farmers and stakeholders managed their irrigation system by themselves based on farmer's opinion through discussion.
- Farmers and stakeholders implement the Participatory Irrigation Management.

Conclusion 1



OTHERS ACTIVITIES

- **Training course for (staff IMC & district)**
- **Training course in Japan**

VISITING THANH HOA PROVINCE - NB8a

Conclusion 2 and Recommendation 2

Conclusion

- In the last 10 years, the I&D systems of Vietnam are invested by GoV in upgrading or building up in order to improve the quality of irrigation and services and to extend the cultivated area. Most of invested works are the headwork or main canals which are financed by GoV or by foreign donors. The on-farm irrigation schemes have the following features:
- Most of on- farm irrigation systems are financed and managed by the cooperatives and farmers. Due to the limited fund, the on-farm irrigation systems are severely degraded so far;
- In most of irrigation systems, due to the incomplete on-farm system while the headwords are invested quite well so the on-farm system does not function to full benefits;

- The decentralization on management in the I&D systems is not clear so the management is overlapped and confused;
- Presently, PIM is being developed at the grass-root level. MARD issue the PIM development framework which facilitates the provinces to develop the on-farm irrigation systems.
- The policy on irrigation fee exemption and reduction reflects in both negative and positive sides: positively, GoV are concerned to minimize the costs of farmers, meanwhile, negatively, farmers may not be encouraged to participate in O&M and PIM actively, because being exempted or reduced with the irrigation fee, and farmers may rely on GoV.
- Training to management staffs of on-farm irrigation systems and farmers is not adequate.

Recommendation

- The on-farm I&D systems should be invested, strengthened in order to maximize the water use efficiency in the system, from the headworks to the on-farm;
- It is necessary to have a clear definition of management in each I&D system;
- It is necessary to undertake training courses on technical matters, institution and management to farmers;
- Improving capacity for staffs who are in charge of on-farm irrigation and drainage and for staffs of agricultural cooperatives, not only in I&D techniques, management skills but also knowledge on cultivation and agricultural extension;
- Complying with the roadmap on PIM development strategy which is issued by MARD and improving the legal framework;
- Closely coordinating between the water management and distribution of WUAs and IMCs.

Experiences of Irrigation and Water Management Projects by Technical Service Center for Irrigation System Project Phase 2 (JICA/TSC2) MOWRAM, Cambodia

Abbreviation and Acronyms

MOWRAM	Ministry of Water Resources and Meteorology
TSC	Technical Service Center for Irrigation and Meteorology
PDWRAM	Provincial Department of Water resources and Meteorology
MAFF	Ministry of Agriculture, Forestry and Fisheries
PDA	Provincial Department of Agriculture
JICA/TSC2	Technical Service center for Irrigation System Project Phase2 (JICA technical cooperation)
PS	Pilot Site
MS	Model Site
FWUC	Farmer Water User Community
FWUG	Farmer Water User Group
CARDI	Cambodia Agricultural Research & Development Institute
ITC	Institute of Technology of Cambodia
AQIP	Agriculture Quality Improvement Project
CEDAC	Center for Education & Development of Agriculture, Cambodia

Background information for Project

Problems of human resources development in irrigation and water sector in Cambodia

- No university and institute for irrigation engineer
- Recruit of MOWRAM are another specialty in recent year
- Lack of systematic human resources development & training for newcomer & existing technical staff in MOWRAM

Comparison of MAFF & MOWRAM

	MAFF	MOWRAM
University	Royal University of Agriculture, Prek Leap Agricultural College, Kampong Cham Agricultural College	N.A (Irrigation subject in Institute Technology of Cambodia (ITC) was reorganized (abolished) in 2001)
Institute	CARDI & etc,.	N.A

Solution of these problems

- Technical Service Center for Irrigation & Meteorology (TSC), MOWRAM was established in December 2006, to tackle & resolve these problems

What is TSC

- TSC is human resources development center for MOWRAM, PDWRAM & Farmers for sustainable irrigation systems development & Management
- Through JICA technical cooperation, TSC was established in Dec, 2006 as official department in MOWRAM

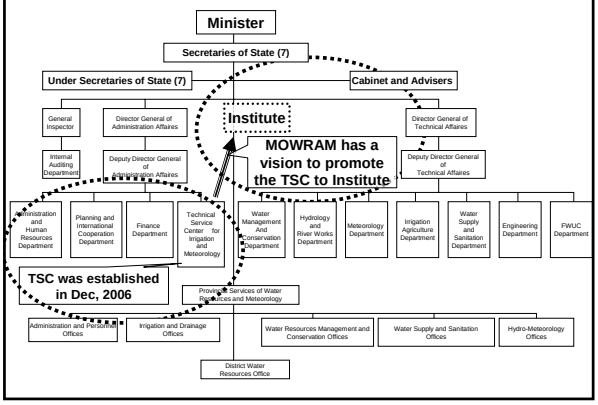
Function & role of TSC

- Identification of human resource development
- Implementation of the technical training course & on site training course (OJT)
- Produce the Technical Manual
- Information Management
- Study & Research for water resources, irrigation & meteorology
- Technical assistance to Engineer & Farmers in Irrigation System Project

Future role of TSC

- MOWRAM has a vision to promote the TSC to Institute for enhancement of irrigation system development & management

Organization chart for MOWRAM

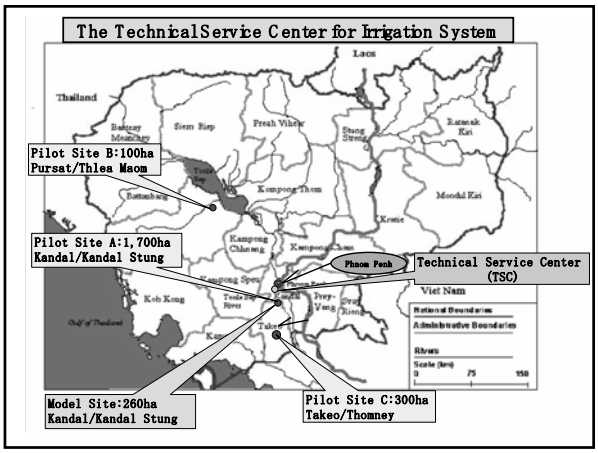


Summary of JICA/TSC2

Cooperation Period	2006.1~2009.7
Implementation Agency	TSC/MOWRAM
Cooperation field	Training Course: TSC Water Management Activities: 3 PS (Thomney, Thlea Maom, Kandal Stung & 1 MS (Kandal Stung)
Number of CPs (Counterpart)	TSC:11, Pursat:10, Takeo:10, Kandal:10

Main activities

- Implementation of 39 training course
- Compile the 9 technical manual
- Provide the on site training course and technical assistance to 3 Provincial C/Ps and farmers group for water management
- Making the basic design document for 3 irrigation system rehabilitation projects
- Technical information management (Establishment of the technical library with list)



Summary result of water management activities in 3 PS

Result of Water Management Activities in Kandal Stung MS & PS

Result of Kandal Stung MS and PS

PM Hun Sen was enjoyed transplanting & meeting with farmers in MS & PS. PM ordered Minster of MAFF & MOWRAM to research and protect the MS & PS as advanced irrigated agricultural land for effective & efficiency water use

7 farmers group are established and 5,700m tertiary canal are rehabilitated.

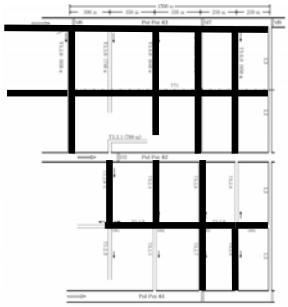
In Model Site, over 70% of farmland are planted the double crop of rice in rainy season

Some farmers have started the upland crop in dry season

Rice yield of some farmers have reached over 5 ton/ha and farmers income have increased double

In August, we could see & enjoy the beautiful contrast landscape by green (growing) and yellow (harvesting) in Model Site

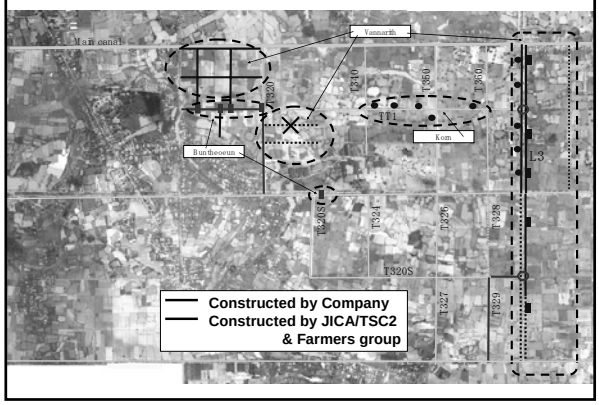
Construction of tertiary canal in MS & PS



Phase1 (Length=about 4,300m)

Phase2 (Length=about 8,500m)

Rehabilitation plan of Kandal Stung in 2009



Construction of Delivery Canal in Kandal Stung PS

Maintenance of tertiary Canal in Kandal Stung MS

Effect & necessity of tertiary and delivery canal through the research result from Kandal Stung irrigation System Project

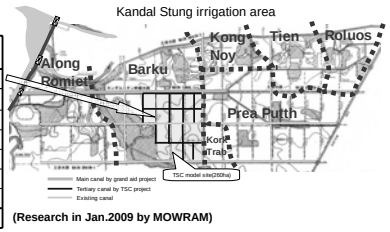
At TSC model site located in Barku commune, double crop of rice and upland cropping are proceeding compared with other areas in Kandal stung irrigation system.

This is because tertiary canals are constructed by TSC project and farmers can get water easily from main canal.

In the other area, there are only Pol Pot canal system (1km grid canal system) and farmland gets water by plot to plot. It is difficult for farmers to change cropping pattern without tertiary and delivery canal.

Double rice cropping in Kandal Stung irrigation area

Commune name	Double rice cropping area
Barku	210 ha
Along Romiet	0 ha
Prea Putth	50 ha
Kong Noy	14 ha
Kork Trab	2.5 ha
Tien	15 ha
Roluos	15 ha
Total	306.5 ha



(Research in Jan.2009 by MOWRAM)

Sample hearing result of 21 farmers in 7 commune in Kandal Stung MS & PS (Implemented on January 2009)

Increase of Rice production

No	Commune Name	Local Variety			Short Term (IR) Variety		
		Before Project	After Project	Ratio	Before Project	After Project	Ratio
1	Barku	3 ton/ha	4.17 ton/ha	139%	3.5 ton/ha	4.33 ton/ha	124%
2	Along Romiet	2.5 ton/ha	3.17 ton/ha	127%	2.67 ton/ha	3.5 ton/ha	131%
3	Prea Putth	2.1 ton/ha	3.73 ton/ha	178%	2.1 ton/ha	4 ton/ha	190%
4	Kong Noy	3 ton/ha	3.9 ton/ha	130%	3.07 ton/ha	4.23 ton/ha	138%
5	Kork Trab	1.67 ton/ha	3.4 ton/ha	204%	2.17 ton/ha	3.43 ton/ha	158%
6	Tien	2.5 ton/ha	3.53 ton/ha	141%	3.07 ton/ha	4.27 ton/ha	139%
7	Roluos	2.43 ton/ha	4.1 ton/ha	169%	2.5 ton/ha	3.63 ton/ha	145%
Average		2.45 ton/ha	3.71 ton/ha	151 %	2.72 ton/ha	3.91 ton/ha	144 %

Increase of Farmer Income

No	Commune Name	Before Project	After Project	Ratio
1	Barku	258 US$/year	500 US$/year	194%
2	Along Romiet	300 US$/year	1,227 US$/year	409%
3	Prea Putth	417 US$/year	750 US$/year	180%
4	Kong Noy	542 US$/year	817 US$/year	151%
5	Kork Trab	1,372 US$/year	1,932 US$/year	141%
6	Tien	409 US$/year	657 US$/year	161%
7	Roluos	583 US$/year	1,000 US$/year	172%
Average		554 US$/year	983 US$/year	177%

First time rice harvest and second time rice planting in TSC model site (Aug. 2008)

Upland cropping around T340 canal at TSC model site (Feb. 2009)

Result of Water Management Activities in Pursat PS

Result of Pursat Pilot Site

4 farmers group were established and over 180 farmers have participated water management activities.

3,376m delivery canal was constructed and 2,433m second & tertiary canal were rehabilitated

Some farmers are trying the double crop of rice in rainy season through rice bank project (2008:1ha, 2009: 10ha)

PDWRAN & PDA conducted the workshop and decided to conduct the demonstration farm in pilot site for extension service

Delivery Canal Construction by Farmers Group

Canal Rehabilitation by Farmers Group

Canal Rehabilitation by Farmers Group

Effective & Efficiency of Delivery Canal

Commencement of the rice bank project for double crop of rice (Site survey for advanced area & start the double crop of rice test)

High school student attend the canal maintenance work with farmers (Around 800 people attended)

<Site survey by key farmers to advanced area>


Training by AQIP staff
for rice planting method



Training by CEDAC advanced farmer
(Rice planting, organic farming, vegetable)

< Double rice cropping test in Pursat pilot site>


Double rice cropping test
paddy field(1ha)


1st time harvest
on Oct. 2008


2nd time planting on Oct.
Local variety not yet harvest.

Farmers activity plan and progress in 2009

Farmers activity plan at Pursat pilot site

	Jan	Feb	Mar	Apr	May
1. Trial of short-term variety(IR66)		2nd time harvest			
2. Joint OJT and workshop of PDWRAM and PDA		○ 5 Farmer OJT ○ 20 Joint workshop			Demonstration farm by PDA
3. Farm road construction along tertiary canal	21			Put grass along farm road	
4.Canal rehabilitation by soil cement		○ 12			
5 Check structure construction along tertiary canal (2place)					
6. Rehabilitation of check structure along secondary canal					
7. Delivery canal maintenance work					

Result of trial short-term variety(IR66) 2nd time harvest


2nd time harvest was finished
on beginning of Feb.


Farmer reported result of 2nd
harvest on workshop 20th Feb.

Over 70 farmers request the IR66 seed to Rice Bank Project of FWUC

<Yield of 2nd time harvest>

One farmer got 150kg rice from 0.07ha field from 2nd harvest. That means yield is 2.1ton/ha.

This is lower than first time yield (4ton/ha).
Water could not be delivered at the beginning of 2nd rice cropping. Other paddy was under harvest and no water in the canal at the period.

Result of farm road construction along brick canal by farmer water users group




Farm road along brick cana(1,200m)l and pipes for delivery canals were completed on 20th February.
But some parts like pipes under brick canal were not yet set.

< Site survey by farmers to test paddy of PDA in Pursat >


Meeting with PDA
for extension service


Explanation by PDWRAM
about irrigation system


Explanation by PDA
about test paddy field

<Joint workshop by PDA and PDWRAN for extension service>


Over hundred farmers
participated in the workshop

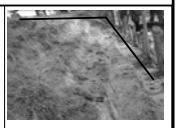


Pursat PDA explained important point of agricultural method and proposed demonstration farm idea.

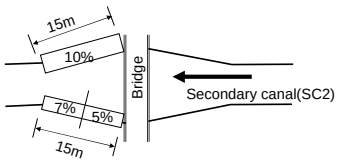
Rehabilitation of secondary canal by soil cement test in Pursat pilot site

Explanation to group leaders about soil cement test in SC0 canal on 12th February, 2009

1	Explanation to group leaders how to repair canal by soil mixed with cement and decide volume of soil and cement. (Example of calculation) For Soil 1,000kg ; Cement(5%)1,000kg×5/100=50kg(1pack) Cement(10%)1,000kg*10%=100kg (2 pack)	
2	Measure the soil weight per 1 bucket 1 bucket = 37.5 kg For Soil 1,000kg; 26.5 buckets is needed.	

3	Convey soil from paddy field or canal (26.5 bucket = 1,000kg)		6	Cut slope of the canal embankment One layer 20cm.	
4	Put cement to soil (for right side 10%) 2 pack (100kg) cement was put to 1,000kg soil		7	Put soil mixed cement to slope and compact	
5	Mix soil and cement		8	After rehabilitation	

Condition of rehabilitation work by soil cement on 26th Feb



Get soil from canal bottom at SC2.

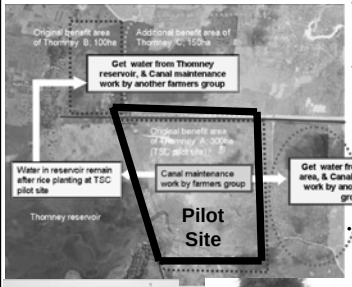
Many ladies joined the rehabilitation work.

10% soil cement finished 15m. Condition is good

5% soil cement is little bit weak, & it's ratio change to 7%

Result of Water Management Activities in Takeo PS

Result of Takeo Pilot Site



- **Over 211 farmers have participated water management activities and 2,750m second & tertiary canal were rehabilitated**
- **Effective & efficient water management by farmers group, Tomney reservoir save the water in dry season of 2008 & 2009 (It was dried up in every year before TSC2 cooperation)**
- **Water management activities in PS have spread to surround irrigation area**
- **Some farmer have challenged the double crop of rice in dry season (2008: 2ha, 2009: 10ha)**

Result of Efficiency & Effective Water Use by Water Management Activities

Before TSC2 cooperation

No Water in Thomney reservoir in March, 2007

After TSC2 cooperation

Water still remain in Thomney reservoir in March, 2008 & 2009

1. *Some farmers have started double crop of rice in commanded area*
2. *Remain water are used by other commanded area farmers*

Inside of pilot site

Second crop of rice in dry season started at paddy field along concrete canal.

Farmer is casting rice seed.

Village chief estimated that farmers would try double crop of rice in 2009 around 10ha

This is bigger than last year double cropping area(2 ha.)

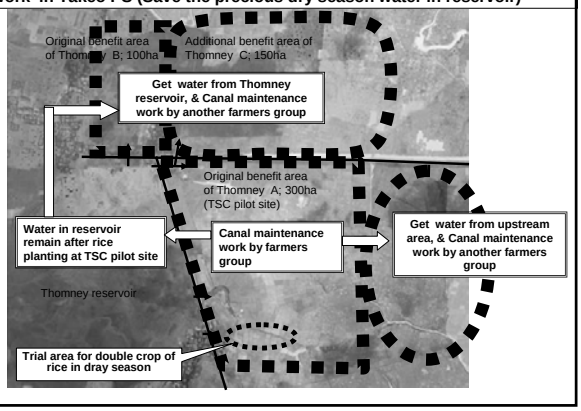
Outside of pilot site

Rice planting area of Thomney reservoir is spread to north and east area

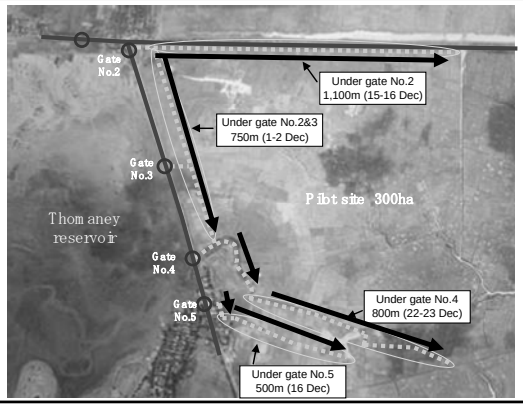
Water is delivered from Thomney reservoir in 2008 and 2009

(It is difficult to deliver the reservoir water before 2007, because of shortage of water in reservoir).

Result of effect & efficient water management by farmers participation work in Takeo PS (Save the precious dry season water in reservoir)



Canal maintenance work by farmers group at Takeo PS in 2007-08



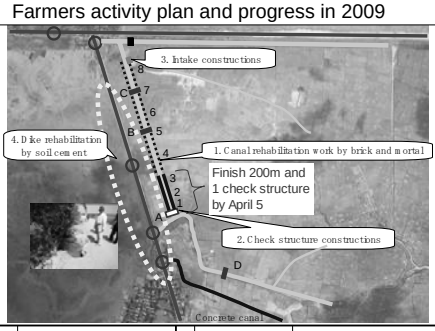
Before	Maintenance work by farmers group	After
		
Many soil and sediment in the canal	Dredge the canal and put soil to the embankment	Dredged canal Water flow smoothly
		
Embankment is too low and no pipe. It is difficult to control water	Farmers set pipe and put sandbag and soil.	Water level can be controlled with improved embankment and pipe

Before	Maintenance work by farmers group	After
		
Many grass along the canal	Mowing grass and put to other place	Cleaned canal Water flow smoothly
		
Canal is too small and no canal on the way	Farmers excavate canal	Excavated canal

Canal maintenance work by other farmers group in outside of PS (Northern and Eastern area of PS)

		
Farmers dug field to keep soil for embankment	Farmers convey soil to embankment	Farmers compacted the embankment
		
Farmers put sand bag along canal	Get water from canal using pomp machine	Seeding move to downstream at northern area of Thomney

Farmers activity plan and progress in 2009



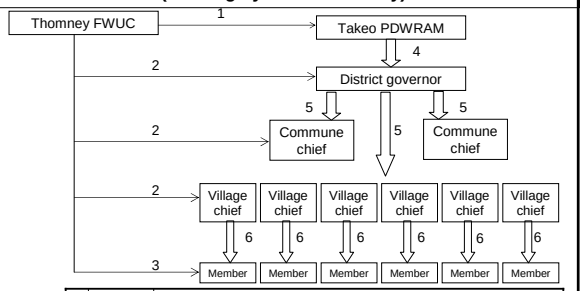
(Work plan)

	Date	Activity		Date	Activity
1	Mar20-23	Canal 50m	5	Apr18-24	Canal 100m, Check C
2	Mar24-27	Canal 50m	6	Apr25-May1	Canal 100m, Dike rehabilitation
3	Mar28-Apr5	Canal 100m, Check A	7	May2-May9	Canal 100m, Dike rehabilitation
4	Apr6-13	Canal 150m, Check B&D	8	May10-May20	Canal 150m, Intake

Picture of the canal rehabilitation work at Takeo pilot site

		
Remove water by pumping	Put mortal under brick	Put brick on the slope
		
Covered by mortal	Completed 200m by 5th April	Construction of check structure

Cooperation among FWUC and local authority for activity (Leading by Local Authority)



1	17th Feb	Meeting among FWUC, PDWRAM
2	25th Feb	Meeting among FWUC, PDWRAM, DOWRAM, Commune, Village chief
3	1-3 Mar	Meeting among FWUC and member (Each village)
4	3rd Mar	Meeting among PDWRAM and district governor
5	10th Mar	Meeting among District governor, commune and village
6	20th Mar	Start activity (Village chief call member)

Proposed & Successful Facilitation Way for Farmer's Participation for Sustainable Water Management by TSC

Proposed facilitation way for Farmer's Participation by TSC

Workshop 1	**Explain the FWUC & FWUG activities Discuss the problem in target are**
Farmer to Farmer OJT	**Key farmers study the advanced FWUC & FWUG activities through visiting the advanced area**
Workshop 2	**Key farmers explain the study result of FWUC &FWUG activities to farmers**
Set up FWUG through Group leader election	**Nominees of group leader are selected by local authority and are approved by farmers**
Water flow, trouble area & solution map making by key farmers	**Select the key farmers who know the situation of target area, and they make the trouble & solution map**
Workshop 3	**Key farmers explain the trouble & solution map to farmers and group leaders integrate the construction & rehabilitation plan with schedule**
Starting the canal construction & rehabilitation work	*Farmers participate canal construction & maintenance work, also farmers provide their land with free of charge without trouble*

1. 1st Workshop: Discuss the problem & solution for good irrigation system in target are


Address by deputy commune


Agenda and expected output


Introduction of other areas activities


Explanation of problem


Participants understood the problem


Record of problem and its solution

2. Study the advanced irrigation project site (Farmer Group to Farmer Group OJT)

(1) Site survey and get information of farmers participation activities from farmers

- Understand the irrigation system.
- Delivery canal construction by farmers participation
- Land acquisition for canal construction
- Method of canal system maintenance

(2) Discussion with farmers about their experience

- Formulation of FWUC and FWUG
- Making water distribution plan
- Problem and its solution

Facilities	Construction	O&M
Reservoir	MOWRAM	PDWRAM
Main canal	MOWRAM	PDWRAM
5 Secondary canal (5 drainage)	MOWRAM	FWUC,FWUG
48 Tertiary canal (46 drainage)	MOWRAM	FWUC,FWUG
Delivery canal (drainage)	Farmers themselves	FWUC,FWUG

Study the advanced irrigation project site

Explanation of project outline to participants on the reservoir

From tertiary canal to delivery canal

Entrance of delivery canal

Tertiary drainage canal

Meeting at Stung Chinit FWUC office

Explanation by Barku commune deputy the activities of Kandal Stung model site

Study the advanced irrigation project site

Farmer visit protection dam and the gates

Discussion and exchange experience in Prey Nob FWUC office

3. 2nd Workshop: Farmers representatives transfer the experience in Farmer to Farmer OJT to all members

(1) Explanation of farmers participation activities in proceeding area

a) Operation and maintenance of canal should be done by farmers group

b) We need sub-group leaders. After selection of leaders, members must cooperate with leader.

c) Delivery canal is important for water distribution. Group member have to join the construction of delivery canal

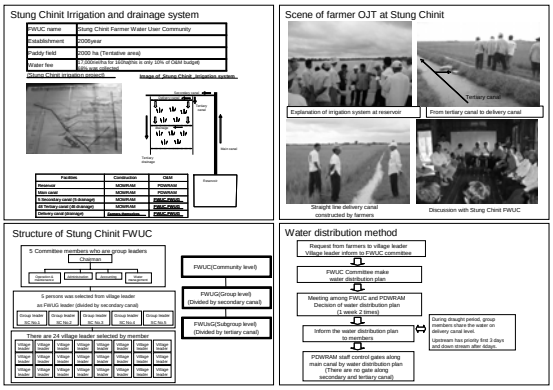
(2) Consideration of activity in pilot site Participants agreed to join the activities

a) Selection of sub-group leaders

b) Construction of delivery canal by farmers

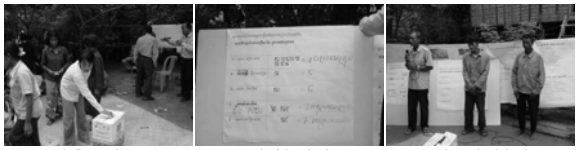
Farmers representatives transfer the experience of Farmer Group to Farmer OJT to all members

3-1. Used document for explanation by farmers leaders



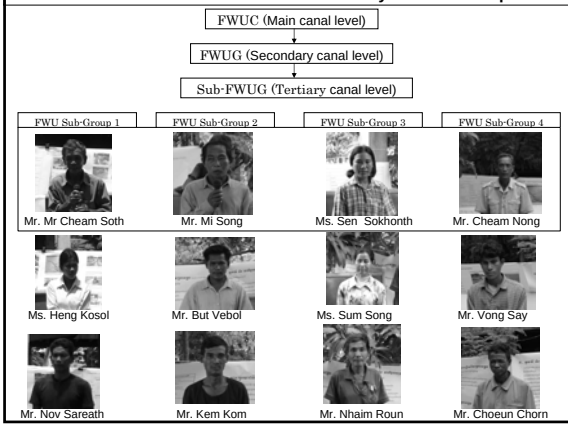
4. Set FWUG: Decision of Group Reader by Election

Explanation about role of leaders | Decision of candidates | Entry to a ballot



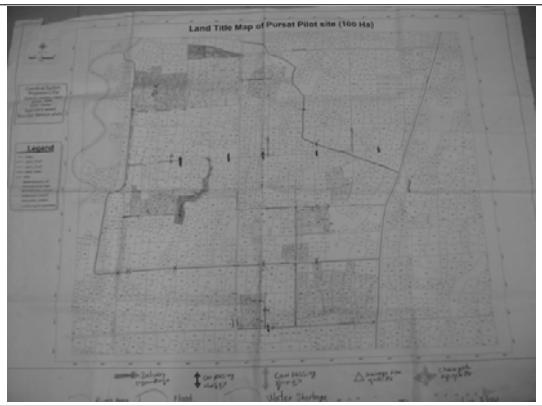
Put ballot to a box | Result of the election | Leader and sub-leaders

Structure of Farmer Water User Community For Sub-Group 1 ~ 4

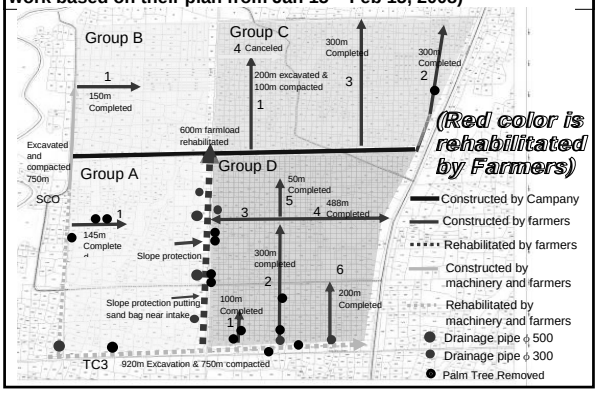


4. Water flow, trouble & solution map making by key farmers

Water flow, trouble & solution map made by key farmers



Irrigation facilities rehabilitation & construction plan by farmers group (Farmers participate canal rehabilitation & construction work based on their plan from Jan 15 ~ Feb 15, 2008)

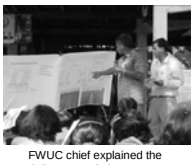


5. 3rd Workshop: Decision & participation for water management activities

Workshop for making delivery canal construction plan at Pursat pilot site

50 farmers were joined on 5th Dec,2007

57 farmers were joined on 6th Dec,2007



FWUC chief explained the delivery canal plan

PDWRAM deputy director explained the delivery canal plan

Participants agree to the plan.

Confirmation of place, length and date of delivery canal construction

Delivery Canal Construction by Farmers Group

Farmers rehabilitated and constructed irrigation facilities

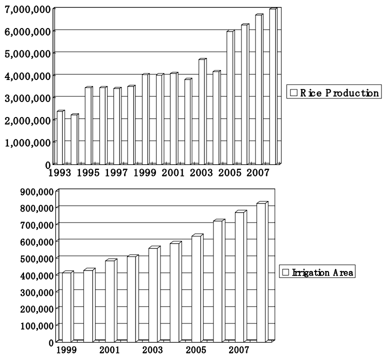
Canal	Group	Canal No	Type of construction	Excavate	Compaction	Remove palm tree	Setting pipe
Delivery canal	A	1	New canal	145 m	145 m	2	
Delivery canal	B	1	New canal	150 m	150 m	0	
Delivery canal	A&B	SC0	Existing and new canal	750 m	750 m	1	
Delivery canal	C	1	New canal	200 m	100 m		
Delivery canal	C	2	New canal	300 m	300 m	1	
Delivery canal	C	3	New canal	300 m	300 m		
Delivery canal	C	4	New canal	Canceled			
Delivery canal	D	1	New canal	100 m	100 m	2	1
Delivery canal	D	2	New canal	300 m	300 m	2	1
Delivery canal	D	3&4	New canal	488 m	488 m		
Delivery canal	D	5	New canal	50 m	50 m		
Delivery canal	D	6(New)	New canal	200 m	200 m		1
Tertiary canal		3	Existing canal	926 m	750 m	3	
Secondary canal			Existing canal	600 m		4	5
Total				**4,509 m**	**3,653 m**	**15**	**8**

Result of farmers participation for water management

	Group A	Group B	Group C	Group D	Total
Jan 15th	41	14	18	33	106
Jan 16th	25	15	20	33	93
Jan 17th	18	19	16	24	77
Jan 18th	4	8	9	21	42
Jan 21st	17	17	16	30	80
Jan 22nd	16	13	15	32	76
Jan 23rd	19	19	19	31	88
Jan 24th	12	9	16	25	62
Jan 25th	4	8	9	21	42
Jan 28th	10	14	19	22	65
Jan 29th	10	9	20	31	70
Jan 30th	12	9	22	32	75
Feb 1st	11	12	12	23	58
Feb 4th	12	11	15	15	53
Feb 5th	13	11	13	14	51
Feb 6th	21	14	9	10	54
Feb 7th	22	16	16	21	75
Feb 8th	21	15	15	22	73
Total	288	233	279	440	1,240

Irrigation is High Priority in Cambodia

Increase of Rice Production and Irrigation Area in Cambodia



Priority of Irrigation Project in Cambodia

National Strategy and Plan	Priority
Rectangular strategy(2004-2013)	Irrigation and agriculture are high priority
National Strategic Development Plan (NSDP; 2006-2010)	Irrigation and agriculture are high priority
Public Investment Plan for Year 2009 (1 billion US$)	Irrigation, transportation and infrastructure
Public Investment Plan for Year 2010 – 2012 (2.8 billion US$)	Irrigation, transportation and infrastructure

Government set to double public investment in 2009

Finance Minister announces plan to spend US$1 billion mainly targeting transport, infrastructure and irrigation projects

PNH POST Feb. 26 '09

BY CHUN SOPHAL

FINANCE Minister Keat Chhon announced Wednesday that the government would spend around US$1 billion this year on public investment. He said the money would be focussed mainly on transportation, infrastructure and irrigation.

Keat Chhon, who is also a deputy prime minister, said during a review of the United Nations Development Assistance Framework that the public investment total would be double that of last year.

"I hope that we can also discuss the implementation and achievements of the important and ongoing UN reforms intended to ensure that the UN delivers as one," Keat Chhon said.

Wednesday's joint review between the government and the UN officials – described in a UNDAF press release as "frank, open and lively" – was designed to assess how well the 23 UN agencies, funds and programs in Cambodia were helping the Kingdom meet its development goals.

Keat Chhon said the review provided a good opportunity to identify new challenges and emerging risks, thereby helping to ensure that UN support remains effective.

Keat Chhon, deputy PM and finance minister, at a UN review Wednesday. HENG CHIVOAN

Douglas Broderick, the UN's resident coordinator, said the UN's duty was to be a good facilitator in addition to a financial backer.

"As the world economic crisis deepens, it is more important than ever that the UN be a stronger partner and continue to give voice to the poorest of the poor," Broderick said.

The UNDAF guides the UN's development work in Cambodia. The UN focuses its efforts on four key areas: agriculture and rural poverty; capacity building and human resources development; development of the national strategic development plan; and good governance and human rights. ■

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Govt to request nearly $3b on infrastructure projects

Investment planned from 2010 to 2012 represents sharp increase on money spent on development in previous years

PNH POST MARCH 4, 2009

BY CHUN SOPHAL

OFFICIALS are seeking approval to spend US$2.8 billion on public investment between 2010 and 2012, Minister of Planning Chhay Than told the Post this week.

His comments came five days after Finance Minister Keat Chhon said the government would spend $1 billion on public investment in 2009, doubling the total spent in 2008. That money, Keat Chhon said, would be spent primarily on transportation, public infrastructure and irrigation projects.

Chhay Than said the money for 2010-12 would be allocated to similar projects, which he said would create a friendlier environment for small businesses.

"We have included 530 projects in our public investment program, and we hope that all projects can be carried out," Chhay Than said. Of those, he said, 60 percent are to be implemented in rural areas.

Chhay Than said he expected the spending plan to be approved by the Council of Ministers on March 5.

The year-by-year breakdown of the plan is as follows: $920 million for public investment in 2010, $930 million in 2011 and $950 million in 2012. Of the $2.8 billion total, about half will come from the government and half from development partners, Chhay Than said.

PROJECT 2010-2012

Next three years of investment spending set to increase on recent injection of capital:

- **Double spending** in 2009 compared with last year's $500 million investment
- **$2.8 billion** planned for the next three years on transport, irrigation and other public works
- **Government** to invest half the total capital, the other half to come from backers

"IT WILL NOT BE A PROBLEM FOR THE GOVERNMENT TO FIND $3B FOR THREE YEARS."

Theng Panhathun, a ministry official who works on public investment projects, said the government tends to spend less than it plans to because some projects cannot be carried out on schedule.

"From 2006 to 2008, the government had planned to spend a total amount of $1.90 billion on public investment, but the real expenditure was only $1.86 billion," Theng Panhathun said.

Keeping projects small

Yang Saing Koma, president of the Cambodian Centre for Study and Development in Agriculture (Cedac), said the government should spend more money on small-scale development projects in rural communities than on the type of large-scale projects it has favoured in the past.

"The government must invest its capital in training farmers all over the country in techniques for growing rice and maintaining small-scale irrigation systems, which are the core of economic growth," Yang Saing Koma said.

"I think it will not be a problem for the government to find $3 billion for three years because it has a lot of development partners, and the international community supports it." ■

A building site in Phnom Penh. The government is planning to significantly increase spending on the construction of public infrastructure over the next three years.

Lessons Learns

Lessons Learns of JICA/TSC2

- Farmer Group to Farmer Group OJT (Study tour for advanced agricultural irrigation system project) is effective for efficiency water management in Cambodia (TSC developed facilitation way for farmer's participation is simple & effective way in Cambodia)
- Second & tertiary canal rehabilitation & development by Government or Government support is important in Cambodia for sustainable irrigation system management
- Farmer group should take more responsibility for construction of terminal (delivery) canal and operation & maintenance of second & tertiary canal
- Pilot activities (technical assistance to farmer group) is effective before commencement of rehabilitation project
- Involvement of local authority is also important for sustainable irrigation system management
- Before IMT, Government should check the capacity of FWUC (Technical assistance for PIM is needed at least 5 year)
- Cambodian farmers are talented and work hard, if we could provide the small incentive & technical assistance

Thank you very much for your kind attention & cooperation and
Please visit TSC, MOWRAM for your farther information

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Technical Service Center for Irrigation System Project Phase 2 (TSC2)
Ministry of Water Resources and Meteorology (MOWRAM)
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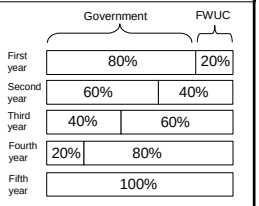
Irrigation management transfer to FWUC

"Circular No.1 on the implementation Policy for Sustainable irrigation system" issued by Royal Government of Cambodia in 1999, showed transfer irrigation system management to FWUC.

According to Circular No.1, government pays 80% O&M cost in first year, 60% in second year ….to reduce government responsibility. FWUC has to carry out O&M by only water service fee collected from members from fifth year.

However, government could not keep budget to support FWUC so far and it is difficult to implement irrigation management transfer to FWUC smoothly.

Prey Nob FWUC, supported by AFD for activity like water service fee collection, and government signed Memorandum of Understanding in 2008 and completed irrigation management transfer to FWUC in the area.




Prey Nob FWUC office


Gate structure along dike

Tum Lop FWUC (Well management FWUC which leading by local authority)

1. Outline of Tum Lop FWUC

Title	Contents
1. Establishment of FWUC	Dike of reservoir was constructed in Pol Pot regime. After dike rehabilitation work, FWUC started water fee collection on 2000. FWUC was established officially on 2004 supported by Takeo PDWRAM.
2. Facilities operated by FWUC	Dike(7km), Main canal(6.3km), Gate(5), Diversion works(4), Check structure(3)
3. FWUC committee member	4 Committee member (Allowance is 240,000 riel/year) 6 Gate operator (Allowance is 120,000 riel/month)
4. Maintenance activities	a. Repair of dike by company(over 1 million riel) or hired labor b. Main gate painting and putting grease
5. Rice plant season	Dry season (January to April) , Short term rice (IR variety)
6. Related village	21 villages
7. Benefit area	2,196.5 ha (This area paddy can get rice 5 - 5.5 ton/ha)

2. Water fee collection condition

(1) First FWUC made land title map. This was not so correct because measured by farmers eye not using machinery like total station.
80-90% of land title was completed.

(2) FUWC member decided yearly water fee on 2000 following;

Gravity area 80kg/ha, Pomp area 50kg/ha

(3) But it was too expensive to collect from members, so FWUC, district and PDWRAM discussed again and changed the water fee to 20,000riel/ha.

(4) Water fee collection rate on 2008 was **77%**.

Reason why not 100% is;

a. Some paddy field don't use water from reservoir.

b. Some farmer could not get enough rice by insect disease.

c. Land title data is not clear.

(5) Administration work such as account management was trained by district chief mainly and PDWRAM.

3. Water fee collection method by Tum Lop FWUC

(1) 21 villages select 3 persons as water fee collectors

(2) Meeting for decision of water fee among FWUC committee and local authorities (Commune chief and village chief)

(3) Water service fee is informed to all members through village using information board or directly.

(4) Collectors of each village collect water fee.

If someone doesn't pay water fee, collectors inform to local authority.

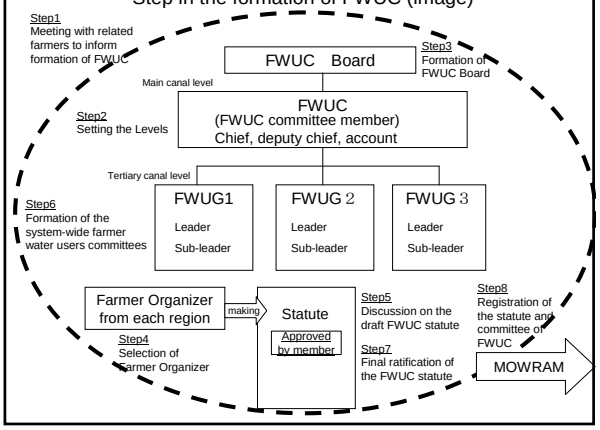
Local authority asks the person about reason why didn't pay water fee.

FWUC holds meeting to solve the problem with local authorities.
If the member has right reason, FWUC reduce water service fee.

(5) Collectors get 12%, Local authority get 3% from collected water fee.

Tum Lop FWUC closely cooperate with local authority for water fee collection.

Step in the formation of FWUC (image)



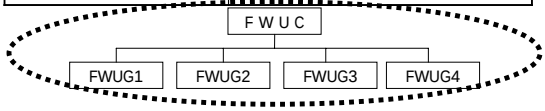
Role & demarcation of Government & Farmers for Irrigation Systems

	Management / Construction	Operation (Water distribution)	Maintenance
Large scale (more than 5,000ha)	**MOWRAM**	**MOWRAM**	**MOWRAM**
Medium scale (200-5,000ha)	**PDWRAM / MOWRAM**	**PDWRAM**	**PDWRAM**
Small scale (less than 200ha)	**(Tertiary canal) DDWRAM / PDWRAM or FWUC (Delivery canal) FWUC**	**FWUC (Support by PDWRAM & DDWRAM)**	**FWUC (Support by PDWRAM & DDWRAM)**

MOWRAM: Ministry of water resources and meteorology
PDWRAM: Provincial department of water resources and meteorology
DDWRAM: District department of water resources and meteorology
FWUC: Farmer water users community

Water management by farmers in Cambodia

FWUC (Farmer water users community)	**Formulated by commune or main level** **•Registered by MOWRAM** **•Manage whole irrigation area** **•Hold a general meeting** **•Decide annual activity plan, water distribution plan & rule of FWUC & FWUG** **•Water fee collection**
FWUG (Farmer water users group)	**Formulated by village or second/tertiary canal level** **•Operation & maintenance of irrigation facilities such as tertiary canal & delivery canal**



Sustainability of FWUC, enhancement of FWUG is important approach in Cambodia

Strategy for agriculture and water(SAW;2006-2010)

MOWRAM and MAFF prepared Strategy for agriculture and water (2006-2010) to promote efficient and effective use of natural and human resources.

1.Target of the strategy

Poverty reduction, food security and and economic growth through

(1) enhancing agricultural productivity and diversification
(2) improving water resources development and management under the agricultural river basin approach

2. Program

5 programs are established to carry out the strategy.

(1)Institutional capacity building and management support program for agriculture and water

(2)Food security program

(3)Agri-business support program

(4)Water resources, irrigation and land management program

(5)Agricultural and water resources research, education and extension program

TSC takes charge of the main role for capacity development of water and irrigation under the program 1, 4 and 5 of SAW

Annex 4.5: Group Discussion

Group Discussion (Cambodia)

- Issues

1. Lack of institutional capacity building of water management and farming technique.

2. Water resources, irrigation and land management.

- Policy measurement/action need

1. Institutional capacity building and management support programme for agriculture and water resources programme
2. Water resources , irrigation and management programme.
3. Agriculture and water resources research, education and extension programme.

- Role of member countries

1. Technical exchange (experience)
2. Data and information sharing
3. Technical assistance.

- Role of MRC

1. Technical assistance
2. Facilitate in seeking fund
3. Assist in preparing and developing project.

- Others:

1. Technical support (AFD; JICA; AusAid, FAO, IWMI….)
2. Investment agencies (ADB, WB, JICA, IFAD).

Country group discussion: Lao PDR

- Water Resources & Availability of water for Irrigation
  - Deforestation, Watershed Management
  - Climate Change
- Policy action
  - Establish clear authority and regulation, issue not yet fully clear
  - Implement programme to manage watersheds: not enough budget, how to enforce?
- Roles
  - Lao PDR: (1) plan a programme, (2) strenghtening the existing mechanisms for enforcement
  - MRC: (1) facilitate sharing of experience / knowledge in WSM, (2) Monitor progress if each member country, (3) Intermediate to get information on developments in Upper Mekong Basin, (4) provide information and data on climate change
  - Other: budget for development partners

Group Discussion - Thailand Crucial Issues

Future development

Future Development

- Sustainable agriculture development
- Expansion of irrigated area
- Water use efficiency

Measures/Actions for Future Development

Comprehensive agricultural development
-Maintain & Improve agricultural land,
- Increase water resources
- Identify available water resources and actual potential irrigated area for expansion of irrigation area

Comprehensive agricultural development (Continue)

- Apply appropriate technique for increasing water use efficiency
- Apply appropriate technique for rain fed agriculture development
- Increase productivity per area per drop
- Farmers poverty alleviation
- Etc.

Request to MRC

- Support academic/ technique and facilitate such propose for comprehensive agriculture development in Mekong Basin with national participation
- Formulate network for future development with other international organizations with related to these issues

Vietnam Group Discussion

VTE 22 April 2009

WATER RESOURCES ISSUES

- Water quality: water resources is being degradated/polluted due to over exploitation– impact to difference sectors: agri., fishery, water supply.
- Water quantity: potention water resource are being reduce due to deforestation, soil degradation and the increasement of water demand in the Mekong River Basin

WATER RESOURCES MANAGEMENT ISSUES

- Integrated water resources management is not yet considered approprially
- Policy measures:
  - Exiting the water resources law, but the managers don't have power to implement the law... -> -
    - Institusion improvement
    - Capacity building

LAND USE ISSUES

- Loss of agriculture land due to urbanization and industrialization
  - E.g Long An province has plan number of goll courses

ROLE OF MENBER COUNTRIES

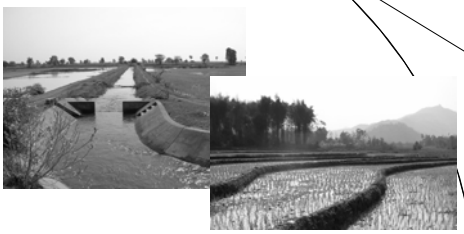
- Each country has to implement relevant activities
  - Intergrated water resource management implement in small catchments with consideration of step toward to apply for larger scale
  - Land management: aforestation, conservation
  - Water quality and hydrology monitoring
  - Develope and update landuse and water resource database

ROLE OF MRC/IAFP

- Harmoniza/co-ordinate the activities/developement in LMB
- Develope and update landuse and water resource database in the basin

Annex 4.6: Sustainable and Efficient Water Use in Irrigated Agricutlure in the LMB Project (SEWU)

Sustainable and Efficient Water Use in Irrigated Agriculture in the LMB Project (SEWU)



AIFP Team

Content

- Brief outcomes of previous projects
- Outline of SEWU project
- Issues and concerns of irrigated sector
- SEWU project concept
- Comments from national consultation meetings
- Implementation Plan
- Draft TOR of implementing activities

Major Outputs of Previous Projects

DMPF (2003-05)

- Basin wide irrigation scheme data base 2003-04 *(currently being updated by BDP)*
- On-farm data sets at 6 schemes in 4 countries
- 2 analysis reports on the multiple functioning of paddy field in pilot sites of Thailand & Vietnam

IIEPF (2003-05)

- Empirical analysis works on irrigation efficiencies & water productivity at 4 pilot sites in 4 countries,
- Guidance for Efficient Irrigation Water Use at project level

Outline of SEWU Project

- Project period:
  July 2008 – June 2011 (3 years)
- Budget:
  US$ 300,000 per year
- Implementation Phase:

1st year	: Detailed design phase
Feb. – Mar. 2009	: National Consultations
Apr.2009	: Regional workshop
May 2009	: Implementation phase

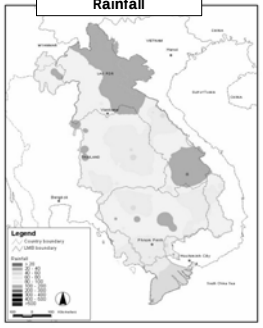
Situation of Irrigated Agri.Devt. in LMB

- **Majority of areas in rain-fed agriculture with various farming types from up land to low land in Delta**
- **Irrigation water use: <10% of total mean annual flow (DMPF/AIFP 2004)**
- **The ratio of irrigated land**
  LMB : Asia as a whole
  27% : 45%

April

Rice Planted Areas

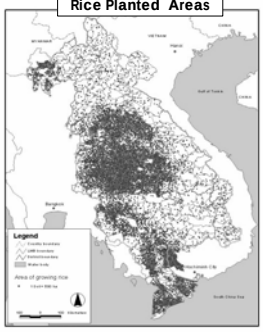
Rainfall



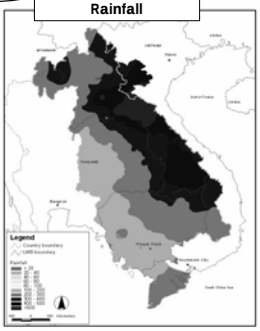
Source: DMPF/AIFP 2004

August

Rice Planted Areas



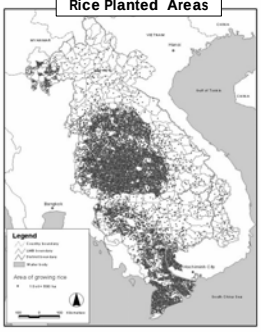
Rainfall



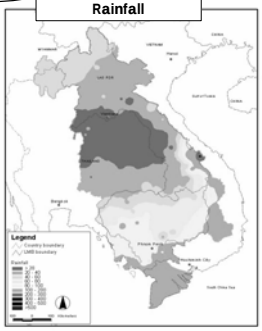
Source: DMPE/AIFP 2004

November

Rice Planted Areas



Rainfall

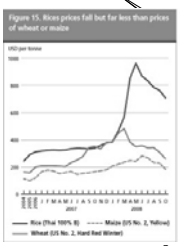


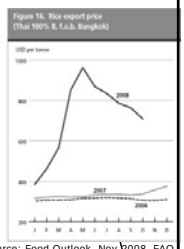
Source: DMPE/AIFP 2004

Issues & Concerns of Irrigated Sector

World Food Crisis in 2008

- price for major cereals decreasing recently,
- but rice still remain higher than previous years (FAO 2008)





Source: Food Outlook, Nov 2008, FAO

World Population Increase

6.1 billion (2000) ⇨ 8.9 billion (2050)

Food demand will be doubled by 2050 (FAO 2008)

Issues & Concerns of Irrigated Sector

Climate Change

If temperatures rise by more than 2°C, global food production potential is expected to decline by 20-40 % in Africa, Asia and Latin America (IPCC 2008)

Climate Change also affects water availability through lengthening the drought period

Hydropower Development

9 storage type dams are under construction, about 30 dams are planned or proposed (ISH/MRC 2009)

Such dams would improve flow regime in dry season

Questions are:

- **How is the future food supply and demand situation in LMB?**
- **How will agriculture in the LMB be affected by climate change and extend droughts?**
- **Could the LMB contribute to world food security?**
- **Could the LMB benefit from the tightening world food situation?** *(e.g. facilitating agricultural, rural development, alleviating poverty)*
- **What interventions are more effective & efficient in the irrigation development?**

Project Overall Objectives

- **To contribute to securing food supply and alleviating poverty through sustainable water use in irrigated agricultural sector in Lower Mekong Basin**

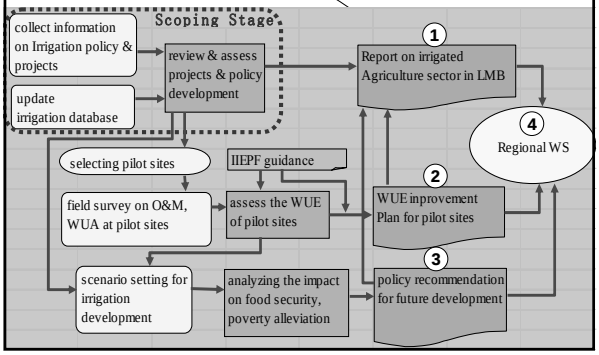
Immediate Objectives

1) **To identify issues and policy needs on WUE and drought management in irrigated agriculture sector;**
2) **To build the capacity of line agencies for improving WUE and drought management at irrigated agricultural sector;**
3) **To provide recommendations for future direction in irrigated agricultural sector;**
4) **To facilitate the dialogue among Member Countries and partners about future directions.**

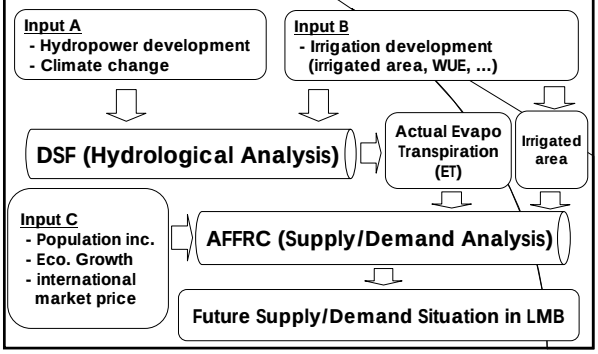
Project Activities & Outputs

Outputs	Activities
Identify issues and policy needs on WUE, drought management	(1) Collecting information, updating database (2) Reviewing irrigation policies and projects in MC (3) Report on irrigated agriculture in LMB
Capacity building of NMCs and line agencies	(4) Setting up pilot sites for field observation (5) Field survey on O&M, WUA, etc (6) proposing WUE improvement plan
Recommendations for future policy direction	(7) Scenario analysis on irrigation development and food security (8) Policy recommendations for future irrigation development
Dialogue with Development Partners	(9) Workshop to discuss future direction of irrigated agriculture sector

Project Activity Flow Chart



Option for Scenario Analysis ③



Major comments from National Consultation Meetings

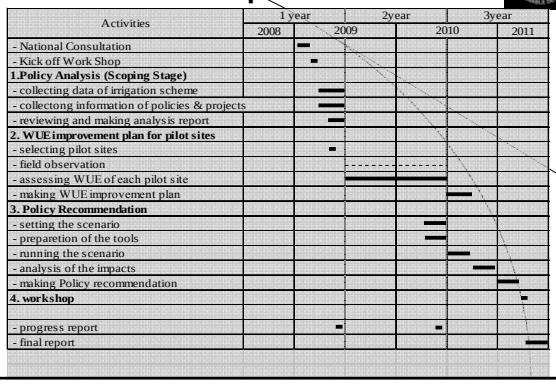
- Agreed on the project concept in principle
- ***Scoping Stage:***
  - Drought management should be added
  - Use result of BDP work (Irrigation Sector Review)
- ***Scenario Analysis:***
  - Policy directions of Member Countries should be respected when considering polices recommendation
  - Farmer's satisfaction should be considered as area function of AFFRC model
  - Scenario setting up should be done before analysing
- ***Pilot Sites:***
  - Capacity building of local people/WUGs/farmers is important

Major comments from National Consultation Meetings

- Agriculture and irrigation should be treated together with agriculture extension service to farming practice and others to support farmers
- Drought management issues shall be added in the project activities
- Not only technical and institutional aspects, but also need to consider socio-economic aspect, e.g. marketing, agriculture extension, etc.

- ***Others:***
  - The linkages of previous activities and this project activities
  - Coordination with other programmes in MRC
  - Considering project objectives with budget availability

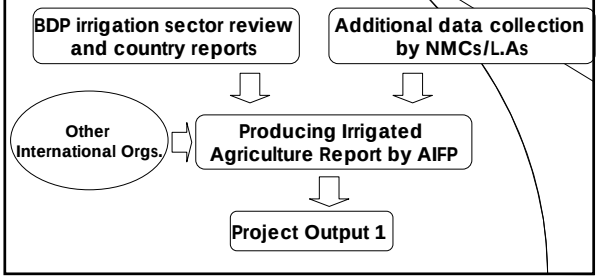
Implementation Plan



Draft TOR of Implimenting Activities

1. **Project Title: Sustainable and Efficient Water Use in Irrigated Agriculture in the LMB Project (SEWU)**
2. **Title of Consultancy: Data Collection on Irrigated Agriculture in the LMB, and Field Observation and Introduction of WUE Improvement Plan at Pilot Site**
3. **Duty station: Member countries**
4. **Duration:**
   (1) Data Collection:
   2.5 working months (mid May to end of August 2009)
   (2) Field observation & improvement plan:
   1 year (Oct 2009-Sep 2010)

5. **Purpose and objective:**
   (1) data collection:
   background, issues, trends, opportunities on irrigation O&M, draught management *(not overlapped with BDP, but supplemental)*



5. **Purpose and objective:**
   (2) Field observation and making WUE improvement plan:

   to identifying actual irrigation water management performance at irrigation scheme pilot site and then to introduce WUE improvement plan by applying ***"Guidance for Efficient Irrigation Water Use"*** under IIEPF

6. **Outputs**

(1) A full set of data collection on irrigated agriculture in the LMB; and

(2) A country report on field observation and WUE improvement plan of the pilot site

7. **Responsibilities and Tasks**

Refer to printed handout of the TOR

Activity 1: page 3

Activity 2: pages 3-5

Activity 1: Data Collection

(1) Collecting information listed below; and
(2) Complying all collected information into a set of information with short brief summary of information arrangement.

Data collection shall be included but not limited to the following items.

i. National strategies for irrigation development, improving O&M, strengthening WUGs, and improving drought management;
ii. National policies (laws, programs, budget systems, regulations, etc) for irrigation development, improving O&M, strengthening WUGs, drought management;
iii. Project documents for selected individual projects which include the components of improving O&M, establishing/strengthening WUGs, improving drought management (latest report within Master Plan, feasibility study, detailed design, implementation report, evaluation/assessment reports, etc);
iv. National statistical data and/or data of specified projects related to land use in irrigated areas (ratio of design-command area and actual irrigated areas, harvested areas, abandon/damage crop areas, etc), and national statistic data related to WUGs, PIM/IMT, etc (number, figures, areas, etc),
v. Papers, guidelines, evaluation reports, etc related to irrigation performance assessment with indicating the degrees of scheme performances and functions;
vi. Others information (cost recovery, Irrigation Service Fee rate, government's subsidies in irrigation investment and rehabilitation, etc) related to irrigation O&M, PIM, WUGs, and performances.

⇦ **Activity 1**

Activity 2

(1) Selecting pilot site
(2) Preparing general information of pilot sites
(3) Field survey planning
(4) Conducting field survey
(5) Introducing WUE improvement plan
(6) Complying results into country report

(7) Facilitating blacktopping/field visit by MRCS
(8) Taking part in regional workshop organised by MRCS

Frequency & workload of field survey

- **2 times field surveys/season: beginning and end of the season**
  - **Technical aspect**
  - **Institutional aspect**
  - **Socio-economic aspect**

- **Making H-Q curves by conducting flow measurement at major selected points (should not be more than 10 points)**
- **1 time flow measurement**
- **Monitoring and recoding flows by WUGs/Farmers when changing rate of water supply**

8. Itinerary

Activity 1

Listing up the information/data to be collected	**: 15-31 May 2009**
Conducting data collection	**: June- July 2009**
Submission of draft version of data collection	**: 10 August 2009**
Submission of final version of data collection	**: 25 August 2009**

Activity 2

Preparing general pilot site information	**: 15-30 Aug. 2009**
Planning for field survey	**: 1-30 Sep. 2009**
Conducting field survey in dry season	**: Oct. 2009- Apr. 2010**
Submitting interim country report	**: May. 2010**
Conducting field survey in wet season	**: May- Oct.2010**
Making WUE improvement plan	**: Sep.-Nov.2010**
Submitting final country final report	**: Dec. 2010**

9. Main Deliverables

(1) Set of information and data on irrigated agriculture with attachment of all relevant collected information including GIS, maps, and other necessary hard copies; and,

(2) Country report on field observation and introduction of WUE improvement plan attachment of necessary information

10. Arrangement

- NMCs, AIFP identify Implementation Team/ L.A
- Contract to be signed with MRC
- Activity 1 & 2 should be implemented by the same team/persons
- A team: a manager, an engineer, project staffs

11. Working Principles/ Reporting line

The team will report to the National AIFP Coordinators and Heads of National AIFP units

Close interactions and consultation with AIFP team will be required.

12. Qualification/Requirement

familiar with national irrigated agricultural policies, plans and projects

able to cover a wide range of experience and skills in irrigated agriculture and planning, including soils, water diversions, drainage, irrigation engineering, on-farm irrigation, agronomy, participatory irrigation management, GIS, mapping, and economics

willing to work in the field for long hours, and willing to learn new concepts and tools

12. Qualification/Requirement

Team's head should hold master degree or equivalent with minimum 7 years of experience in irrigation planning, water resources development or other relevant fields,

Others:

- water resources development and management,
- irrigation project appraisal and survey,
- irrigation or water resources development project planning,
- hydrological observation and analysis.

13. Condition of payment

40% of the contract value, after signing of the agreement

30% of the contract value, upon submission and acceptance of the draft final report

30% of the contract value, upon submission and acceptance of the final report

Annex 4.7: Candidate Pilot Sites

KINGDOM OF CAMBODIA
NATION RELIGION KING

MINISTRY OF WATER RESOURCES AND METEOROLOGY

Regional Workshop
on
Strategy Review of MRC's Role in Agriculture and Irrigation Sector in Lower Mekong Basin
(AIFP)

Pilot Site In Cambodia

22-23April2009
Vientiane, Lao PDR

Contents

1. Demarcation & Agreement for O&M among MOWRAM, PDWRAM and FWUC

Definition of irrigation system

Definition of the irrigation systems is as follows:

(1) "Irrigation Project" is the project related to water which serve the cropping activities, constructed by the Royal Government of Cambodia.
(2) "Irrigation scheme" is the combination of the constructions which related to regulator of water, storage of water, and distributor of water including large scale, medium scale, and small scale.
(3) "Main canal" canal taking water from the headworks or supply source or reservoir.
(4) "Secondary canal" canal taking water from the main canal
(5) "Tertiary canal" canal taking off from the secondary canal
(6) "Quarterly canal" (delivery canal) canal taking off from tertiary canal conveying into the fields.

Scale of Irrigation System

(1). Large scale (more than 5,000ha),
(2). Medium scale(200-5,000ha),
(3). Small scale (less than 200ha)

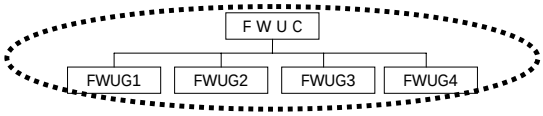
2- Role & demarcation of Government & Farmers for Irrigation Systems in Cambodia

	Management / Construction	Operation (Water distribution)	Maintenance
Large scale (more than 5,000ha)	**MOWRAM**	**MOWRAM**	**MOWRAM**
Medium scale (200-5,000ha)	**PDWRAM / MOWRAM**	**PDWRAM**	**PDWRAM**
Small scale (less than 200ha)	**DOWRAM (PDWRAM) (Tertiary canal)**	**FWUC (Support by PDWRAM & DDWRAM)**	**FWUC (Support by PDWRAM & DDWRAM)**

MOWRAM: Ministry of water resources and meteorology
PDWRAM: Provincial department of water resources and meteorology
DDWRAM: District department of water resources and meteorology
FWUC: Farmer water users community

3- Water management by farmers in Cambodia

FWUC (Farmer water users community)	**Formulated by commune or main canal level** **•Registered by MOWRAM** **•Manage whole irrigation area** **•Hold a general meeting** **•Decide annual activity plan, water distribution plan & rule of FWUC & FWUG** **•Water fee collection**
FWUG (Farmer water users group)	**Formulated by village or second / tertiary canal level** **•Operation & maintenance of irrigation canal & facilities**



Sustainability of FWUC, enhancement of FWUG is important approach in Cambodia

4- Agreement O&M among MOWRAM, PDWRAM and FWUC

In February 2008, with the support of the Agence Française de Développement, a sharing of the maintenance responsibility of the *Prey Nup* polders between the MOWRAM, the Municipality of Sihanoukville and the community of polder users was set up and endorsed through a memorandum of understanding (MoU).

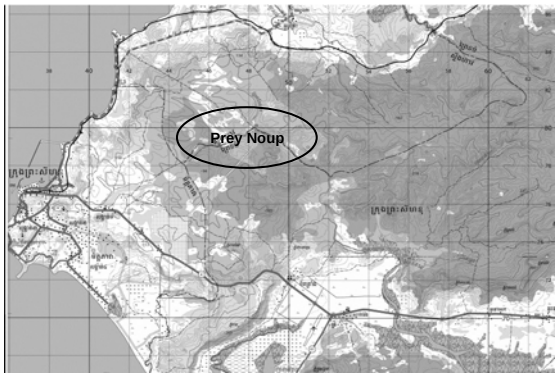
This MoU is the first in Cambodia to clarify the maintenance responsibility and to commit the Government and the farmers to maintain their irrigation infrastructures.

It is now the objective of the MOWRAM to work with other FWUCs to develop maintenance agreements in the next years. The success of these maintenance agreements with the farmers will greatly depends on the capacity of the Royal Government of Cambodia to respect its financial commitments.

5- Candidate for pilot site

1- Prey Nob Sihanoukville
Water Sea Prevention and drainage rainfall
Prey Nob FWUC established in 2000
Formulated by polder There is technical team for O&M
10,500 ha
Dike 90km Gate for control water 36
3,600 Riel/ha Increase every year
Only drainage rainfall water, Water depth in paddy is controlled.
From secondary level=> FWUC, Main dam => MOWRAM
1998 - 2007 By MOWRAM,AFD,GRED

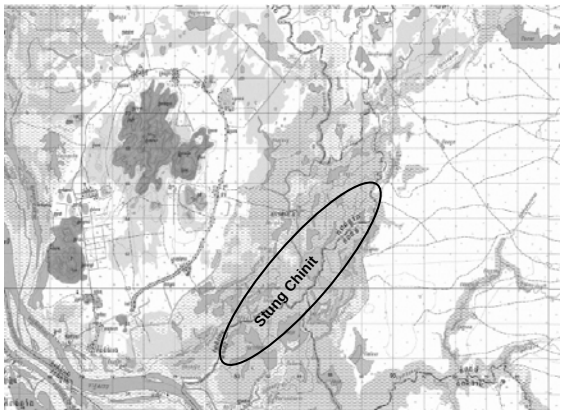
1- Prey Noup



2 . Stung Chinit irrigation system in Kompong Thom province

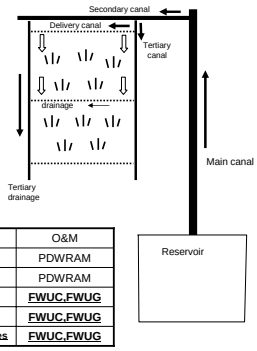
a) Project outline

Project Purpose	Improve the Irrigation and drainage system and enhance participation of farmers for irrigation system management
Project period	2001 - 2007
Facilities	Reservoir (storage is 35 million m3) Main canal (length 6,990 m) 5 secondary canal 48 tertiary canal 5 secondary drainage 46 tertiary drainage
Project implementation organization	MOWRAM supported by AFD,GRED and CEDAC GRED supports construction of canal CEDAC supports the FWUC activities



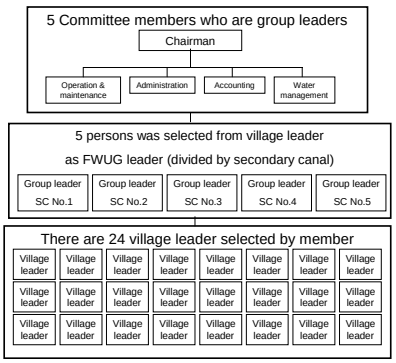
(Stung Chinit irrigation project)

Image of Stung Chinit Irrigation system



Facilities	Construction	O&M
Reservoir	MOWRAM	PDWRAM
Main canal	MOWRAM	PDWRAM
5 Secondary canal	MOWRAM	**FWUC,FWUG**
48 Tertiary canal (46 drainage)	MOWRAM	**FWUC,FWUG**
Delivery canal (drainage)	**Farmers themselves**	**FWUC,FWUG**

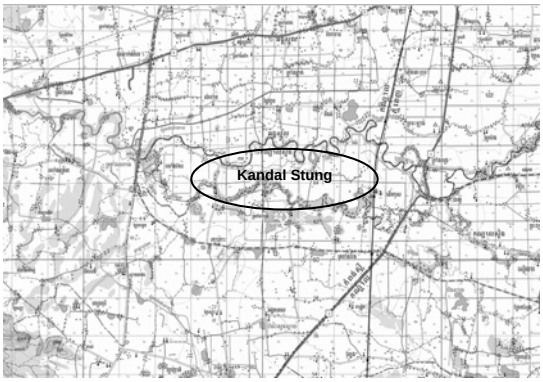
Structure of Stung chinit FWUC



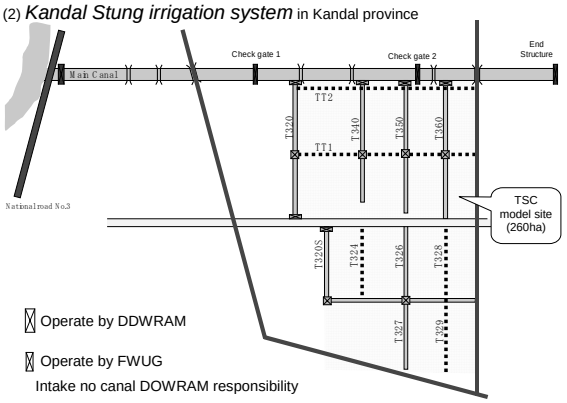
3. Kandal stung irrigation system

Canal	Structure	Operation by
Water resource (Reservoir)	Tuk Thula regulator Kandal Stung head work	MOWRAM Operation and Maintenance team
Main canal	Intake gate Check structure1 Check structure2 Check structure3 Canal maintenance	PDWRAM/DOWRAM Under technical advisor of O&M team
Tertiary canal	Intake gate Check gate Distribution box Canal maintenance	Farmer water user group (FWUG) PDWRAM/DOWRAM or commune council

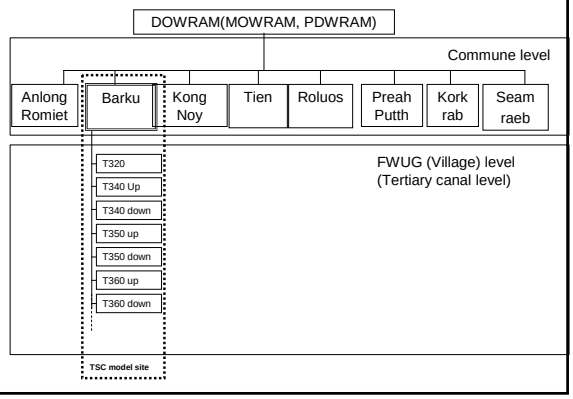
2- Kandal Stung



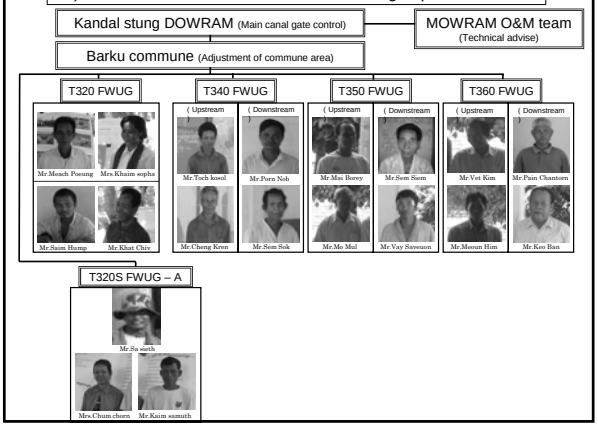
(2) *Kandal Stung irrigation system* in Kandal province



Structure of related organization in Kandal stung irrigation area (Tentative)



b)Tentative structure of farmers water users group at model site



Water distribution rule of Kandal stung irrigation system (Idea)

<Case1> **Water is enough** in the canal

FWUG leader (Village chief)	
1.Check water use condition in the area 2.Compile request of group member 3.Inform group request to commune	1.Inform operation schedule to members 2.Operation of tertiary canal facilities

Commune	
1.Compile request from each group 2.Inform commune request to PDWRAM	1.Inform operation schedule to members

DOWRAM
1.Compile request from each commune 2. Decision of the gate operation 3. Inform to related organization (Commune, PDWRAM, TSC) 4. Operation of main facilities (Open or close gate)

Water distribution rule of Kandal stung irrigation system (Idea)

In case of **Water shortage** in the canal

FWUG leader (Village chief)

1.Check water use condition in the area 2.Compile request of group member 3.Inform group request to commune	1.Inform operation schedule to members 2.Operation of tertiary canal facilities

↓ ↑

Commune

1.Compile request from each group 2.Inform commune request to DOWRAM	1.Inform operation schedule to members

↓ ↑

DOWRAM

1.Compile request from each commune	1. Inform to Commune 2. Operation of structure (Open or close gate)

↓ ↑

DOWRAM,PDWRAM, TSC

1. Discussion and decision of the gate operation

General information of site

	Kandal Stung	Prey Nob	Stung Chinit
Province	Kandal	Sihanoukville	Konpong Thom
Objective	Supply Water for Irrigation for both season	Water Sea Prevention and drainage rainfall water	Supply Water for Irrigation for both season and Fish Migration
FWUC	FWUC is not yet established	Prey Nob FWUC established in 2000	Stung Chinit FWUC established in 2006
FWUG	Formulated by tertiary canal	Formulated by polder There is technical team for O&M	Formulated by secondary canal
Target area	260 ha	10,500 ha	2,000 ha
Facilities	Main canal 8 Tertiary canal	Dike 90km Gate for control water 36	Reservoir (storage 35 million m3) Main canal (length 6,990 m) 5secondary canal, 48tertiary canal 5secondary drainage, 46tertiary drainage
Water fee collection	No yet collected	3,600 Riel/ha Increase every year	1,700 Riel/ha (2006,166ha) 20,000 Riel/ha (2008, plan)
Water distribution	Group leader control the gate.	Only drainage rainfall water. Water depth in paddy is controlled.	Only intake gate from main canal is controlled. (No gate under secondary)
Maintenance	Tertiary canal; FWUG Main canal: PDWRAM	From secondary level; FWUC Main dam ; MOWRAM	From secondary level ; FWUC, Main canal, dam and gate; PDWRAM
Related project	Construction of canal system and water management activity by farmers group to transfer technique	Water Sea Prevention Dam and Drain rainfall water to the Sea	Improve the Irrigation and drainage system Enhance participation of farmers for irrigation system management
Project period	2001 - 2009 By MOWRAM, JICA	1998 - 2007 By MOWRAM,AFD,GRED	2003 - 2007 MOWRAM,AFD,GRED,CEDAC

Canal Maintenance work by farmers group at Kandal Stung model site

Clean and repair the canal before planting season

Cut grass and [illegible]

Dredging in canal

Put grass to protect from erosion on the canal slope

Repair the embankment of canal

Thank you for your attention

Regional Workshop on Strategy Review of MRC's Role in Agriculture and Irrigation Section in Lower Mekong Basin, and Sustainable and Efficient Water Use Efficiency in the Lower Mekong Basin Project "SEWU". 22-23 April 2009, MRCS, Vientiane, Lao PDR

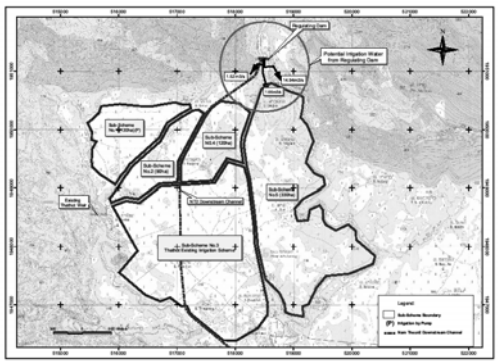
THATHOT IRRIGATION PROJECT

Phouthone SIRIPHANTHONG
Operation and Maintenance Division
Department of Irrigation

Project Location:

Thathot Irrigation Project is located in Khammouane Province, Central Part of Laos and far from Vientiane Capital about 300 KM

2



3

Project Background

The Thathot Irrigation Scheme was constructed in the early 1990s.

The scheme has been providing critical irrigation services to about 470 ha of command areas in the wet season and about 150 ha in the dry season.

Mainly for rice farming of both seasons.

The beneficiary villages of the scheme are 6 villages, i.e. Ban Thathot, Ban Nalakhouay, Ban Sangkeo, Ban That, Ban Gnommalat-Neua and Ban Lao with a total population of about 5,000 and over 1,000 households

4

Project Background (*continue)*

The head work of the scheme is concrete weir with 50 m crest length and 2 sluice gates of size 1.5 m x 1.5 m.

The intake structure of main canal (2 gates of size 1.0 m x 2.0 m) is located at about 180 m upstream of the weir to convey the irrigation water to seven (7) tertiary canals through 6.6 km length of main canal

Most part of the system has deteriorated seriously and need major rehabilitation

5

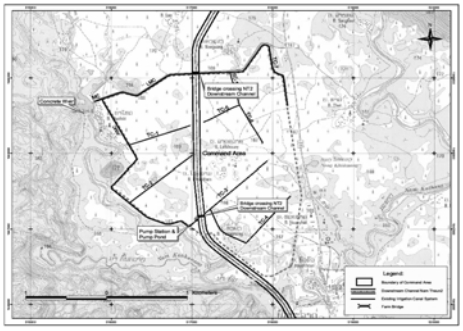
Project Background (*continue)*

The scheme has been proposed for rehabilitation under the Agriculture Development Project (ADP) in early 2000s. The scheme has been dropped as it would be affected by the Downstream Channel to be constructed under NT2 hydropower project.

The restoration of main irrigation canals of the scheme would be completed shortly. A siphon of the left main canal (LMC) on the Downstream Channel would be constructed by NTPC during this coming dry season in order not to interrupt irrigation for the dry season rice farming. The need of another siphon of the tertiary canal-3 (TC-3) on the Downstream Channel, which should cover about 150 ha of the command areas under TC-3 and TC-4.

6

Rehabilitation canal layout



7

Objectives of the Study

To update and increase the scope of detailed design carried out in 2004 for possible funding under the Xebangfai Irrigation Component.

The study would adjust the original system layout, update the cost estimate for rehabilitation, and carry out economic analysis to confirm economic viability.

The study includes an operational plan to demonstrate financial affordability and technical feasibility for the concerned water user group (WUG) to operate and manage the system upon rehabilitation

8

Background of Operation and Maintenance

Year	Institution for Operation and Maintenance	Reference/ Remarks
1993	First dry season irrigation was started.	
1993 to 1999	Under the control of PAFO of Khammouane province and managed by DAFO in cooperation with the village authorities	Decree on WUA Articles of Association, 0156/AF, 1997
2000	The WUA was established based on the Decree on "Establishment and Operation of WUAs".	Decree on Establishment and Operation of WUAs 1150/AF, June 2000
2001 and 2002	ISF was collected with a rate of 200 kg paddy/ha for only dry season. (1 kg of paddy = about 420 Kip, 200 kg paddy = 84,000 Kip)	After 2003, no ISFs were collected by WUA. Presently, the WUA has 8,000,000 Kip on deposit in a bank.
2004	The ADP identified Thathot irrigation scheme as a target project in 2004 and re-registered the WUA for strengthening the WUA function of the operation and maintenance of the facilities.	WUA registration document on 18 August 2004.
2004 to present	Due to the construction of the downstream channel in the area by NT2 Project, the rehabilitation plan of Thathot scheme was cancelled.	Construction works of the downstream channel started on 01 October 2005, and the provision of rice seeds for the affected people started in 2006 wet season under the compensation program by NTPC.

9

Background of Operation and Maintenance *(continue)*

In August 2004, based on the former WUA established in 2000, a new WUA officially registered supported by ADP.

The total registered WUA members are 200 households with a total command area of 239.7 ha with an average land holding of 1.2 ha/HH.

10

Present Condition of Operation and Maintenance System

There are 7 board members of the WUA committee of Thathot Irrigation Sub-scheme, consisting of 5 representatives of each beneficiary village, and another 2 members from Ban Thathot

Due to limited institutional support by PAFO/DAFO and serious damage of the canals and their related structures, the WUA's function for O&M is very limited, just before dry season irrigation, the WUA organizes the meeting to ensure the canal cleaning based on the allocated sections to each beneficiary

11

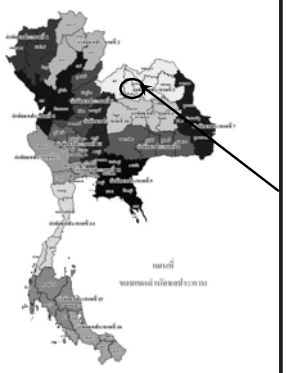
Rehabilitation Plan

- Review of Existing Data and Reports
- Review of Hydrologic Study
- Proposed Irrigation Rehabilitation Works
- Cost Estimate of the Rehabilitation Works
- Impact of the Downstream Channel and Proposed Mitigation Measures

12

Selection Criteria

- Locating at the LMB area
- Surface Irrigation System (Typical System in Thailand)
- On-going PIM activities
- Well participation of farmers
- Easily access to the area
- Availability of data
- Good cooperation from the Project



Huay Luang O&M Project

Udon Thani Province, Thailand

Latitude : 17.3 N.

Longtitude : 102 E.

Huay Luang Reservoir

Project feature

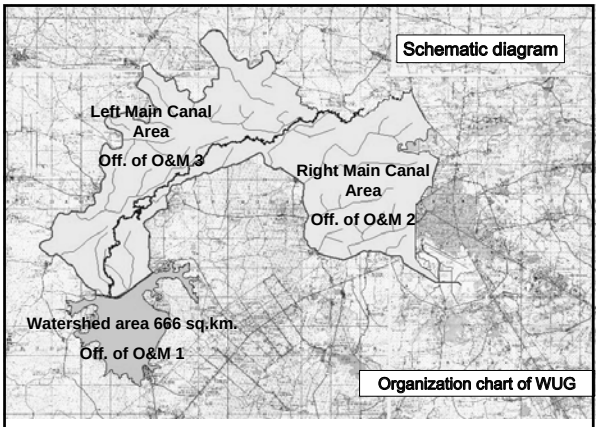
Headwork

Length 4.9 km., Width 6.00 m., Height 13.5 m.

Retention capacity 118.362 mcm.

Retention water surface area 32.00 sq.km.

- Avg. annual run-off 160.17 mcm.
- Avg. rainfall intensity 1,249.95 mm./yr.
- Evaporation 1,504.79 mm./yr.
- Avg. temperature 26.5 cc.
- Avg. humidity 71%



Huay Luang O&M Project covers irrigation area of 13,917.9 ha.

Qmax = 12.423 cms, 48 km.
Farmers 3,832 households

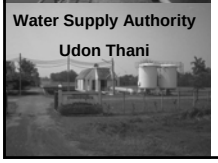
Qmax = 10.348 cms, 32.2 km.
Farmers 3,244 households

LMC area 7,912.16 ha.
Office of O&M Branch 3

RMC area 6,005.76 ha.
Office of O&M Branch 2


Water Supply Authority
Kud Jab District

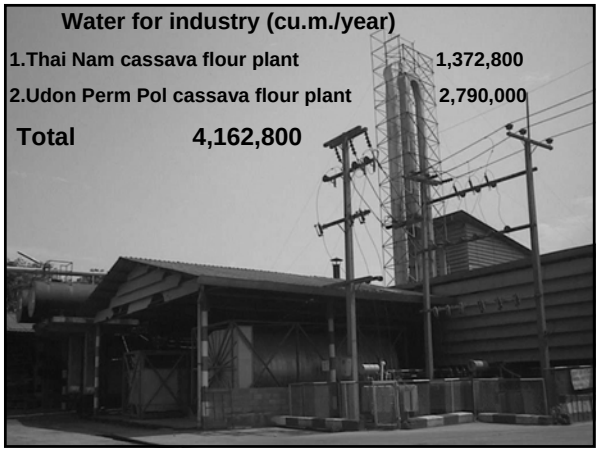

Water Supply Authority
Nong Wua Sor


Water Supply Authority
Udon Thani

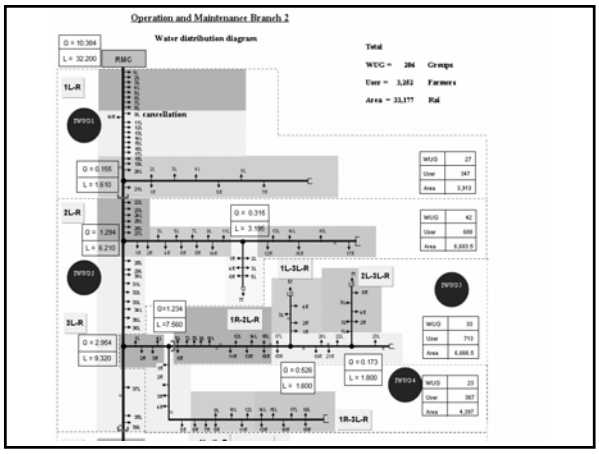
Water for domestic consumption

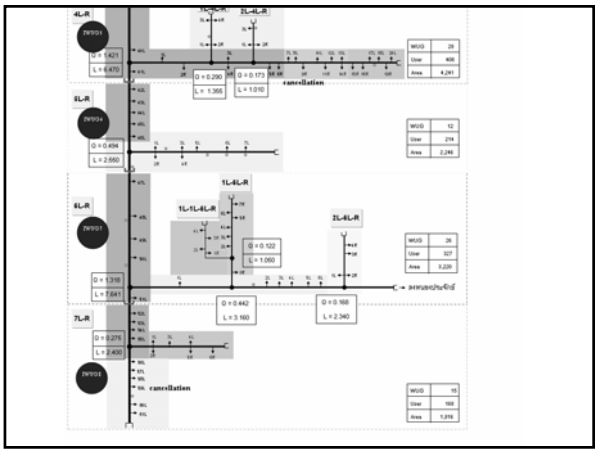
Unit : cu.m/year

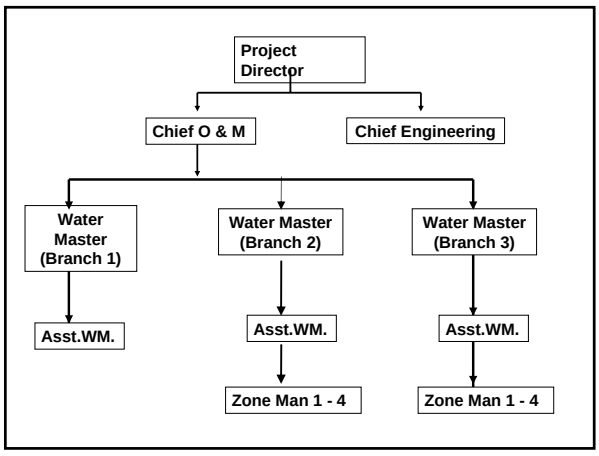
1. Udon Thani Water Supply Authority	21,000,000
2. Kud Jab Water Supply Authority	540,000
3. Nong Wua Sor Water Supply Authority	540,000
4. Kok Sa-ard Water Supply Authority	50,400
5. Ban Nam Pon Water Supply Authority	504,000
Total	22,634,400



Office of Operation & Maintenance
Branch 2 (RMC)
Located in Muang District, Udonthani



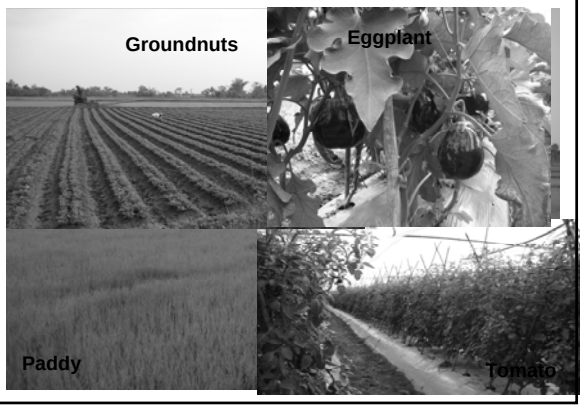


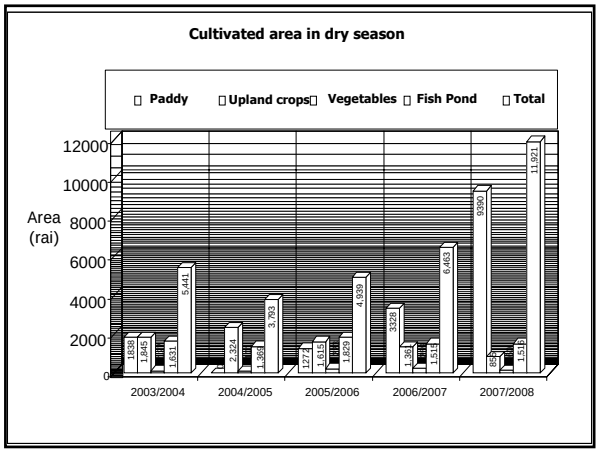


Crops grown in RMC area

Rainy season
- Paddy (only)

Dry season
- Paddy
- Groundnut
- Cassava
- Tomato
- Vegetable





Participation of WUG

1. Water Distribution

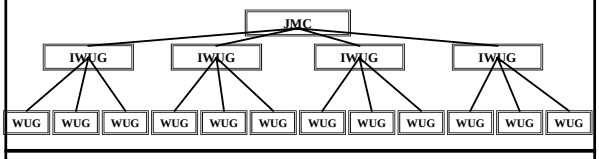
Before water distribution

- Crop cultivation requirement survey

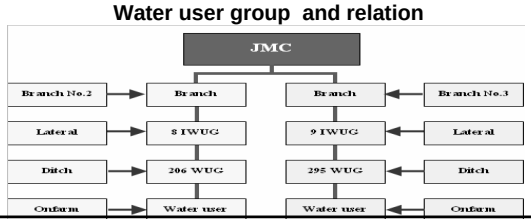
- JMC (Branch Level) & IWUG Meeting

JMC (Branch Level) Meeting

Strengthening farmer groups & development WUO



Water user group and relation



Meeting
8 IWUG and 230 WUG

During water distribution

-Monitoring the activity based on cropping pattern

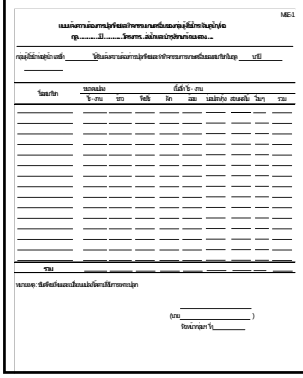
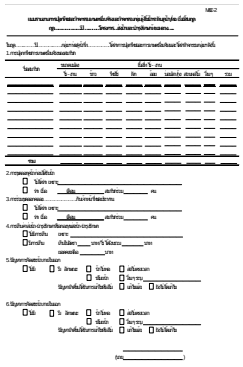


-JMC regular meeting to discuss water distribution problem



-Water discharge checking

After finishing water distribution
- Crop productivity survey

Participation of WUG
2. Maintenance


Dredging Ditch (twice a year)

Capacity building by training WUG


Available Recorded Data

- Meteorology (ET, Rainfall Intensity, etc.)
- Reservoir operation
- Cropping area/ Land use
- Cropping pattern
- Water delivery plan
- Water Users' Organization (WUG, IWUG)
- Yield/ Productivity

Thank you

for your kind attention

Vietnam National Mekong Committee

Mekong River Commission Secretariat

STUDY ON ANALYSIS OF SUSTAINABLE WATER RESOURCES USE IN LMB

CASE STUDY: MEKONG DELTA, VIETNAM

VTE, 22th April, 2009

CONTENTS

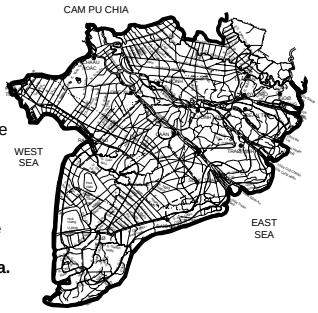
- General introduction about irrigation in Mekong delta
- Case study selection criteria
- Tan Hoa Thanh irrigation project (pilot 1)
- Thanh Hoa irrigation project (pilot 2)
- Advantages

BACKGROUND

Within past decades, the production of agriculture has increased quickly in Mekong delta.

- The delta contributed about 40% of agricultural production, and half of rice production in the country.
- Rice production is 11 million tons. Accounts for 85% of exported rice for Vietnam.

One successful reason is the improvement of water management in Mekong Delta.



IRRIGATION SYSTEMS IN MK DELTA

IRRIGATION SYSTEMS IN MK DELTA

Some Large Irrigation Projects in Mekong Delta (1990 – 2005)

NO.	NAME OF THE IRRIGATION SYSTEMS	LOCATION	SERVICE AREA (HA)	FUNCTIONS
1	Go Cong	Tien Giang	54,000	Fresh water supply, salinity control
2	Tiep Nhat	Soc Trang	53,910	Fresh water supply, salinity control
3	South Mang Thit	Vinh Long, Tra Vinh	225,682	Fresh water supply, salinity control
4	Quan Lo – Phung Hiep	Soc Trang, Bac Lieu	178,888	Fresh water supply, salinity control
5	Nhat Tao Tan Tru	Long An	13,320	Fresh water supply, salinity control
6	Ba Lai	Ben Tre	50,800	Fresh water supply, salinity control
7	Ba Rinh – Ta Liem	Soc Trang, Can Tho	30,944	Fresh water supply, salinity control
8	Huong My	Ben Tre	17,000	Fresh water supply, salinity control
9	Ba The – Tri Ton	An Giang, Kien Giang	43,700	Soil reclamation, Flood control
10	Cai San – Thot Not	Can Tho, Kien Giang	58,000	Fresh water supply, Flood control
11	Ke Sach	Soc Trang , Can Tho	32,000	Fresh water supply, salinity control

THE PROBLEMS OF IRRIGATION SYSTEMS IN MEKONG DELTA

Irrigation Structures Performance

- Low efficiency of structures such as pump stations, canals, and regulators, due to degradation and poor maintenance.
- Old technology for the regulation and monitoring system
- Lack of structure control for water management, except some irrigation project for salinity intrusion prevention

Water Resources Development

- impacted by many factors such as flooding or spring tide, acidity pollution or salinity intrusion,
- polluted by domestic and agricultural wastewater disposals such as fertilizers, pesticides and solid wastes,
- conflicts over water because farmers change from freshwater rice to brackish water shrimp cultivation of higher value

THE PROBLEMS OF IRRIGATION SYSTEMS IN MEKONG DELTA

The policy of water management

- The farmers, who are clients of an IMC, are still not organized into Water Users Associations (WUAs). There is no legal framework in place to take over, operate and maintain the newly controlled tertiary level.

Operation and Maintenance

- Lack of procedures or guidelines for the operation and maintenance of most systems,
- have not installed a monitoring system for water level, water quantity and quality in the intakes/ off-takes,
- The power of managers is not strong enough to solve the conflicts between water users.

Case study selection criteria

- With in the LMB area
- Typical irrigation system in the country
- Appling PIM approach in water management process
- Strength of water use association with well participation of farmers
- Accessibility
- Availability of relevant information
- Extent/inherit the result from previous study
- Can be applied and disseminating the result for other irrigation systems or within the system

Lesson learnt from previous study

- Some farmers took water more than two to three times as needed in comparison with the calculated crop water requirement – this information was recommended to farmers during the season meeting in Gocong irrigation project;
- Some usefull information for irrigation management in the the coastal zone area was evaluated:
  - Irrigation Water demand in coastal zone
  - Irrigation retern flow (20-30%)
  - Water requirement for maintenace of water quality in the protected area (approximate equal to 30% of irrigation demand)
  - ...
- Previous studied results was considered as an initial study for IIEPF for coastal zone in the Mekong delta, therefore it is recommended that a similar study could make for the other areas in the Mekong delta:
  - Acid sulphate soil areas
  - Flood prone areas.

Trend of water resources managementt in the MD

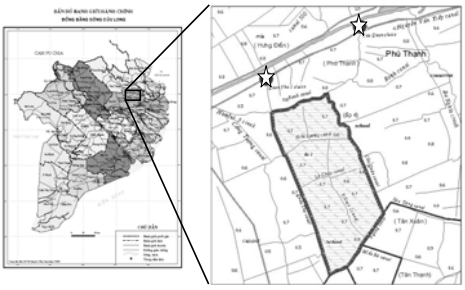
- Flood and salinity intrusion are the two major problems in the Mekong delta
- Mekong delta strategy for flood protection and salinity intrusion: beside the large irrigation projects are being develop as prevoius trends. There is also a trend for developping small scall irrigation project: for flood protection and pumping irrigation with scale of some hundred hectares. E.g in 2009 each province will get budget of 4-6 million USD for developping small pumping irrigation scheme.

Opotunity and threats

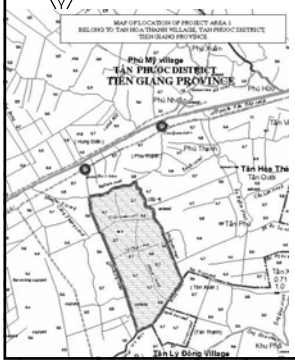
- Opotunities
  - Number of small irrigation schema will be extend
  - Water management for small irrigation scheme are required
  - PIM are needs
  - Possible to apply the study results to other
  - IMC of Tien Giang is one of the famoust IMCs in the South of VN, number of visistors to the Tiengiang's IMC each year – good oppotunities to disseminate our research result to other
- Threat
  - Water quality problem in the small scall irrigation project – need to be considered to our study.

TAN HOA THANH IRRIGATION PROJECT

(Pilot 1)

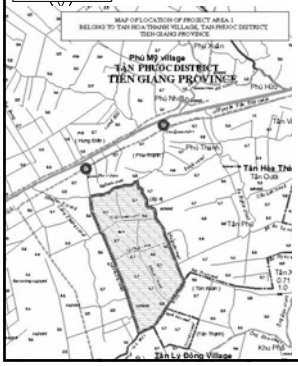


TAN HOA THANH IRRIGATION PROJECT
Location



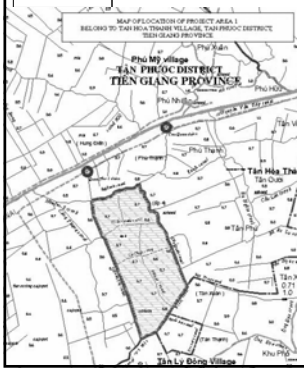
- Located in Tien Giang province;
- 100 km from Hochiminh city;
- Project area covers 3 hamlets of Tan Hoa Thanh village:
  - Hamlet 1
  - Hamlet 2, and
  - Hamlet 3

TAN HOA THANH IRRIGATION PROJECT
Background



- Project type:
  - Tidal irrigation and semi-tidal irrigation and pumping irrigation
- Project objectives:
  - Irrigation and drainage for project area;
  - Flood control
  - Acid water quality control

TAN HOA THANH IRRIGATION PROJECT
Present condition



- Total area: 250 ha of paddy rice
- Cropping pattern
  - Two rice crops
  - Three rice crops
  - Two rice crops and dry crop

(represents all cropping patterns in the Mekong delta)

Benefit for 325 families of 3 hamlets of Tan Hoa Thanh village

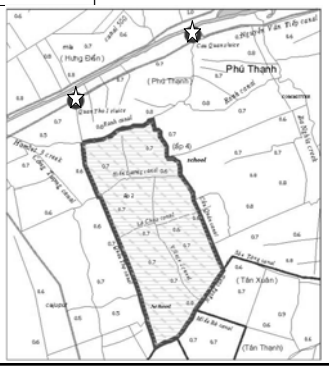
Crops

Winter – Spring rice (from January to March)

Early Summer – Autumn rice (from March to June)

Summer – Autumn rice(from May to August)

INFRASTRUCTURES OF TAN HOA THANH PROJECT
Present condition

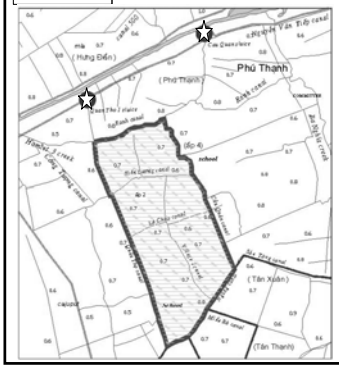


Main canal network :

-7 canals in the project area:
- Quan Tho canal,
- Cau Quan canal,
- Ranh canal,
- Hien Luong canal,
- hamlet 2 canal,
- Lo Chua canal, and
- Ngang canal.

- Total length: 11.4km

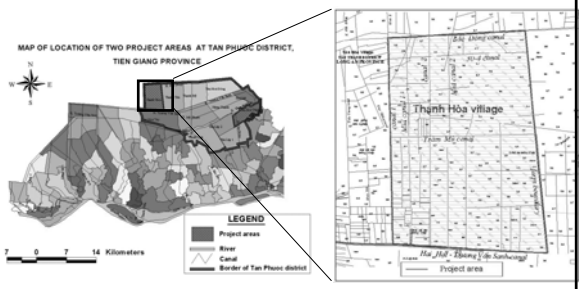
INFRASTRUCTURES OF GO CONG PROJECT
Present condition



Sluices :

There are total two sluices in the project area i.e Quan Tho 1 sluice and Cau Quan sluice

THANH HOA IRRIGATION PROJECT (Pilot 2)



LOCATION

- Located at Thanh Hoa village, Tan Phuoc District, Tien Giang Province, includes 3 hamlets;
- Approx. 120 km from Hochiminh city;
- 30 km from My Tho town;

PROJECT BACKGROUND

- Project type:
  - Tidal gravity irrigation in combination with pumping irrigation
- Project objectives:
  - Monitoring for Salinity intrusion, acid number and flood
  - Irrigation for paddy rice
  - Flood control
  - Acid water quality control

PRESENT CONDITION

- Total project area:
  - 450 ha of rice paddy
- Benefit for 583 families of 3 hamlets of Thanh Hoa village of Tan Phuoc district, Tien Giang province.
- Crops:

  Winter – Spring rice (from January to March)

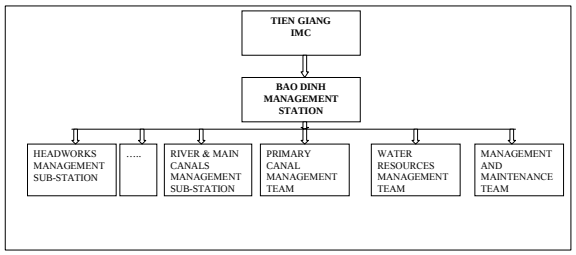
  Early Summer – Autumn rice (from March to June)

  Summer – Autumn rice(from May to August)

WATER MANAGEMENT ACTIVITIES
Organization chart

- Organization chart is similar to Tan Hoa Thanh;
- Bao Dinh enterprise is responsible for management and maintenance of head works and principle works. All remanings is managed by local government.
- At the present, there is no establishment of WUAs in this area.

WATER MANAGEMENT ACTIVITIES
Organization chart



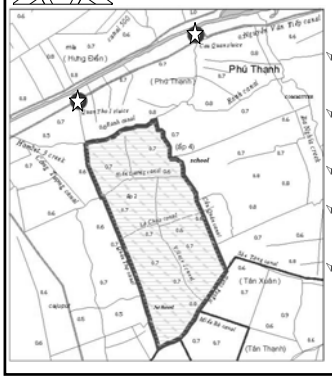
Water management activities

- Project authorities
  - Responsible for the head works (sluices) and the main and secondary canals;
  - Planning for water supply;
  - Monitor gate operation and water quality;
  - Informing farmers the operation schedule on time.
- Water users
  - Maintenance and management of tertiary canals;
- Agreement between IMC and WUs by contract, total irrigation area by each farmer each year;
- Priority for water distribution: limited by condition of acid water, flood and salinity intrusion

Present facilities for operation

- Local radio system
- Telephone lines
- Cable network for data and information sharing
- GIS and Database
- Automatic data collection: WL, WQ, rainfall

EXISTING MONITORING SYSTEM



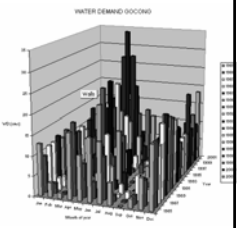
- **Meteorology stations: My Tho (W, Ep, RS, Rainfall) and local stations (Rainfall).**
- **Water level stations: My Thuan (WL, Q), Quan Tho 1 and Cau Quan (WL).**
- **Water Quality stations: Quan Tho 1 and Cau Quan (pH).**
- **Water sensor from prevoius project in Longhai can be reused for other plot study**
- **Most of these data can be accessed via internet, except national stations**

AVAILABLE EQUIPMENT

- Data loggers for measurement of groundwater or water level;
- Automatic weather station in Gocong;
- Automatic monitoring station for water level and water quality (pH) on Tram Mu canal;
- Equipment for measurement of infiltration from field, canals
- Laboratory for soil and water analysis

AVAILABLE DATA

- Hydrological and meteorological data at My Thuan, My Tho and Vam Kinh (since 1985);
- Water level and water quality data at sluices since 1990;
- Cropping area and cropping pattern from 1985;
- Crop water requirement model for Gocong irrigation project from 1985;
- Hydraulic and water quality model for the whole Mekong delta;



ADVANTAGES

Criteria	Tan Hoa Thanh Project	Thanh Hoa Project
Location	Closer (100 km)	Far (120 km)
Size	Small (250 ha)	Larger (450 ha)
Closed boundary	Good, closed	Partial closed.
Management condition	Equal	Equal
Maintenance condition	Equal	Equal
Available data	More adance	-
Available facilities	More advance	-
Possible to extend our study	large	large

THANK YOU

FOR YOUR KIND ATTENTION

Annex 5: TORs of Implementing Activities

MEKONG RIVER COMMISSION

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Telephone: (856-21) 263 263 Facsimile: (856-21) 263 264
Email: mrcs@mrcmekong.org

TERMS OF REFERENCE

1. Project Title:
Sustainable and Efficient Water Use in Irrigated Agriculture in Lower Mekong Basin Project (SEWU)

2. Title of Consultancy:
Data collection on irrigated agriculture in the LBM, and field observation and introduction of Water Use Efficiency (WUE) improvement plan at pilot site

3. Duty station:

Member countries (Cambodia, Lao PDR, Thailand and Viet Nam)

4. Duration:

2.5 working months for data collection (June to mid of August 2009), and

1 year for field observation and water management improvement plan, covering dry and wet seasons cultivation (around October 2009 to September 2010, depending on the periods of cultivation season)

5. Purpose and Objective:
The Mekong River Commission (MRC) is implementing the project "Sustainable and Efficient Water Use in Irrigated Agriculture in Lower Mekong Basin Project (SEWU)" in order to contribute to overall goal of securing food supply and alleviating poverty through sustainable water use in irrigated agricultural sector in the Lower Mekong Basin.

In order to achieve overall objective, project set immediate objectives as follows:

- To focus on water use efficiency (WUE) and drought management in irrigated agriculture with particular emphasis on water management practices;

- To review past and current policy measures/projects in the region;
- To conduct empirical works at pilot sites;
- To analyze the effectiveness of WUE improvement and impacts on food production and farmers income;
- To recommend future directions in irrigation sector and provide the framework for dialogue.

In this regard, the MRC Secretariat (MRCS) is entrusting two activities to Line Agencies through National Mekong Committee of each member country: (1) data collection on irrigated agriculture in the LMB, and (2) field observation and introduction of WUE improvement plan at pilot site.

The first activity aims to collect information related to backgrounds, trends, issues, and opportunities of irrigated agriculture sector and its strategies and policies in the LMB areas in order to support AIFP to produce "a report on irrigated agriculture of the LMB". This collected information will not be overlapped with data collection for "Irrigation Strategy Review" of BDP, but it will be additional supplemental information with further in-depth information regarding to Operation and Maintenance (O&M) of irrigation, issues and policies needs on water use, and draught management in irrigated agriculture sector in the LMB.

The second activity intends to conduct field observation on identifying actual irrigation water management performance at irrigation scheme pilot site and then to introduce WUE improvement plan in order to seek the best applicable approach for water irrigation water management at the irrigation scheme by applying "Guidance on Efficient Water Use" under IIEPF project and by other lessons learnt. The overall goal is to reach the optimal irrigation water use which impacts on food production and farmers' income in the member countries of the LMB. Through the involvement of NMCs and Line agencies on the processes of this activity implementation, their capacities will be built.

6. Outputs:
Two major outputs below are expected through implementation of this working agreement.

(1) A full set of data collection on irrigated agriculture in the LMB; and

(2) A country report on field observation and WUE improvement plan of the pilot site.

7. Responsibilities and Task:

The responsibilities of the implementation teams includes but is not necessary be limited to the following tasks:

Activity 1: Data Collection

(1) Collecting information listed below; and
(2) Complying all collected information into a set of information with short brief summary of information arrangement.

Data collection shall be included but not limited to the following items.

i. National strategies for irrigation development, improving O&M, strengthening WUGs, and improving drought management;
ii. National policies (laws, programs, budget systems, regulations, etc) for irrigation development, improving O&M, strengthening WUGs, drought management;
iii. Project documents for selected individual projects which include the components of improving O&M, establishing/strengthening WUGs, improving drought management (latest report within Master Plan, feasibility study, detailed design, implementation report, evaluation/assessment reports, etc);
iv. National statistical data and/or data of specified projects related to land use in irrigated areas (ratio of design-command area and actual irrigated areas, harvested areas, abandon/damage crop areas, etc), and national statistic data related to WUGs, PIM/IMT, etc (number, figures, areas, etc),
v. Papers, guidelines, evaluation reports, etc related to irrigation performance assessment with indicating the degrees of scheme performances and functions;
vi. Others information (cost recovery, Irrigation Service Fee rate, government's subsidies in irrigation investment and rehabilitation, etc) related to irrigation O&M, PIM, WUGs, and performances.

Activity 2: Field Observation and Improvement Plan

(1) Selecting appropriate pilot site according to the criteria below;
    - Locating at the LMB area

- Typical irrigation system in the country
- Applying PIM approach in water management process
- Strength of Water User Association with well participation of farmers
- Accessibility
- Availability of relevant information

(2) Preparing general information of pilot irrigation scheme (pre field survey);
- Schematic plan and scale-command area map;
- List of available data;
- Water source, canal alignment, key facilities, water distribution system, beneficial area (wet, dry), member of farmers/villages, planted crops, etc;
- Outline of stakeholders for irrigation development and O&M, and agriculture development (Central/local government, WUGs, individual farmers, farmers cooperatives, villages/communities, etc).

(3) Field survey planning;
- Setting flow measurement points(inflow/outflow) and measurement method;
- Proposing methods to estimate planted/harvested area and production/yield, to collect meteorological date, to investigate institutional and socio-economic aspects.

(4) Conducting field survey;
- Technical aspects
  1. making H-Q curve, measuring flow volume at selected points ;
  2. collecting meteorological data;
  3. investigating drought management measures/practices;
  4. surveying planted/harvested area, production, yield;
- Institutional aspects
  1. identifying and investigating roles and functions of each stakeholders in irrigation development/management (Central/local government, WUGs, individual farmers, farmers cooperatives, villages/communities, etc);
  2. investigating decision making procedure for seasonal irrigation plan and irrigation scheduling;
  3. investigating operational rules and actual practices for water distribution/facility operation;

4. estimating the O&M costs and investigating its sharing system;
5. investigating the performance of WUGs (water fee collection, organizational structure, budget, technical knowledge, etc).

- Socio-economic aspects
  1. investigating farmers' economy (land managed, income & expenditure for farming, etc);
  2. investigating the structure, social and economical roles and functions of communities/villages, farmers cooperatives and other local institutions/NGOs;
  3. investigating farmers' access to input (seed, fertilizer, etc), farming technology, credit service, post-harvest service, marketing, etc.

(5) WUE improvement plan;

- Examining irrigation performance
  1. estimating demanded, supplied and consumed water volume;
  2. examining irrigation efficiency, water productivity;
  3. assessing irrigation planning/operation procedure and institutional structure;
  4. assessing cost recovery of O&M;
  5. assessing socio-economic conditions for irrigation development/O&M, future agricultural development.
- proposing WUE improvement plan
  1. irrigation planning and scheduling procedure improvement;
  2. water distribution operation improvement;
  3. institutional improvement of WUGs and other stakeholders;
  4. options for physical improvement;
  5. options for new cropping system and support service to farmers.

(6) Complying above field survey results and WUE improvement plan into country report;
(7) Facilitating technical backstopping activities by the MRCS/AIFP made on demand by implementing agency; and
(8) Taking part in regional workshops organized by MRCS within the framework of this project.

8. Itinerary:

Activity 1:

Listing up the information/data to be collected : 1-15 June 2009
Conducting data collection : 15 June-15 August 2009

Submission of draft version of data collection : 15 August 2009
Submission of final version of data collection : 25 August 2009

Activity 2:
Preparing general pilot site information : 15-30 Aug. 2009
Planning for field survey : 1-30 Sep. 2009
Conducting field survey in dry season : Oct. 2009- Apr. 2010
Submitting interim country report : May. 2010
Conducting field survey in wet season : May- Oct.2010
Making WUE improvement plan : Sep.-Nov.2010
Submitting final country final report : Dec. 2010

9. Main Deliverables
The implementing agency will submit to the MRCS through relevant NMC with
(1) Set of information and data on irrigated agriculture with attachment of all relevant collected information including GIS, maps, and other necessary hard copies; and
(2) Country report on field observation and introduction of WUE improvement plan attachment of necessary information.

Outline/ formats of the country reports will be provided by MRCS.

10. Arrangements
The implementation team will be identified by the National AIFP units. Service contracts will be signed with the MRC. The team of the implementing agency that will implement activity 1 and 2 should be the same persons and, at least, should be composed of minimum 3 and maximum 4 members.

The team members should comprise of
(1) Manager (from central government irrigation office)
(2) Engineer (from central government irrigation office)
(3) One or two project staff (from pilot sites)

11. Working Principles / Reporting line:
The team will report to the National AIFP Coordinators and Heads of National AIFP units. Close interactions and consultation of AIFP team will be required.

12. Qualifications / Requirement:
The team of implementing agency needs to be familiar with national irrigated agricultural policies, plans and projects and able to cover a wide range of experience

and skills in irrigated agriculture and planning, including soils, water diversions, drainage, irrigation engineering, on-farm irrigation, agronomy, participatory irrigation management, GIS, mapping, and economics.

Team members should be willing to work in the field for long hours, and must be willing to learn new concepts and tools.

Head of the Implementing Agency's team should hold master degree or equivalent with minimum 7 years of experience in irrigation planning, water resources development or other relevant fields.

Other team members should have educational and practical background of at least one of the following:

- water resources development and management,
- irrigation project appraisal and survey,
- irrigation or water resources development project planning,
- hydrological observation and analysis.

The team as a whole should cover all the above mentioned expertise.

13. <u>Condition of Payment</u>

Payment is made in three parts.

(1) 40% of the contract value, after signing of the Agreement
(2) 30% of the contract value, upon submission and acceptance of the draft final report
(3) 30% of the contract value, upon submission and acceptance of the final report

14. Signature Block:

2

MEKONG RIVER COMMISSION

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Ban Sithane Neua, Sikhottabong District, Vientiane 01000, Lao PDR
Telephone: (856-21) 263 263 Facsimile: (856-21) 263 264
Email: mrcs@mrcmekong.org

TERMS OF REFERENCE

1. Project Title:
Improvement of Irrigation Efficiency on Paddy Fields in the Lower Mekong Basin project (IIEPF)

2. Title of Consultancy:
Dissemination of Guidance on Efficient Irrigation Water Use

3. Duty station:

Member countries (Cambodia, Lao PDR, Thailand and Viet Nam)

4. Duration:

2 working months (May-July, 2009)

5. Purpose and Objective:
The Improvement of Irrigation Efficiency on Paddy Fields in the Lower Mekong Basin project (IIEPF) was implemented in 2005-2008. The overall objective of the project was to improve irrigation efficiency at basin wide scale. The intensive field observation was conduced at four pilot sties, one in each member country, to examine irrigation efficiency and also to support information for establishment of guidance on efficient irrigation water use, which is the main output of this project.

The guidance covers technical, institutional, and managerial aspects of irrigation facility operation and also includes a case study on pilot sites. The target use of the guidance is mainly for irrigation project staffs, ministry officials and engineers who are engaged in operation and maintenance of irrigation water management.

Through consultation meeting with member countries in November 2008 to improve and to finalize the guidance, one of suggestion made by member countries was to disseminate the guidance into local use with translation into local languages. In this regard, the MRC Secretariat (MRCS) is entrusting "dissemination work" to National Mekong Committee (and/or Line Agencies) of each member country to make dissemination material in local language based on the guidance.

6. Outputs:

- Dissemination material in local language under their responsibilities by using the content of the guidance (including printing of 50 copies with CD attached)

7. Responsibilities and Task:

Under responsibilities of NMCs and /or line agencies, the tasks of this assignment include but is not necessary be limited to the following items:

(3) Producing dissemination material in local language based on guidance with 77 pages of main report and 14 pages of case study;
(4) Printing 50 sets for each team (color printing of necessary graphs are preferable)

8. Itinerary:

May-July 2009	: Producing material (including editing & formatting)
30 July 2009	: Submitting a draft version to MRCS, AIFP
15 August 2009	: Submitting final version with 2 copies to MRCS, AIFP and disseminating 48 copies to NMCs and Line Agencies

9. Working Principles / Reporting line:

The team will report to the National AIFP Coordinators and Heads of National AIFP units. Close interactions and consultation of AIFP team maybe required.

10. Qualifications / Requirement:

- NMCs and/or Line agencies from Irrigation officials at central offices (e.g. MOWRAM of Cambodia, DOI in Lao PDR, related line agencies in Vietnam, and RID in Thailand);
- Excellent English language skill and familiar with technical words of irrigation and water management;
- Excellent local language skill and familiar with technical words of irrigation and water management;

- Background of irrigation, hydrology, or water resources development and management;
- Ability of editing and formatting and to delivery high quality work within strict deadline; and
- Extensive experience and skill in translation work and preparing high quality reports and improving the work of others.

11. Condition of payment:

Payment is made in two parts.

(4) 40% of the contract value, after signing of the Agreement

(5) 60% of the contract value, upon submission and acceptance of the final translation report

12. Signature Block: