

Participatory irrigation management: from theory to reality – Insights from the Phú'óc-Hòa irrigation project

Technical Reports

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Gestion participative de l'irrigation : de la théorie à la réalité – Regards sur le projet d'irrigation Phước-Hòa

Résumé

La GPI (Gestion Participative de l'Irrigation) a acquis un réel statut dans le développement de l'irrigation et sa mise en œuvre implique toujours un processus complexe d'interaction entre des idéologies internationales, des institutions de projets de développement qui l'insèrent dans l'agenda national de gouvernance, et le contexte local façonné par des facteurs sociaux, économiques, institutionnels et politiques. Ce Rapport Technique est issu d'un programme de recherche de trois ans qui a investigué la construction de la GPI dans deux nouveaux périmètres irrigués qui font partie du projet à objectifs multiples « Phước-Hòa ». Dans ce projet, la GPI a été mise en œuvre à travers le Programme de développement social et à la parcelle (OSDP). Le Rapport met en lumière les caractéristiques clés du processus. C'est en premier lieu le fossé entre le « temps du projet » et « le temps de l'agriculteur » qui fait de la mise en œuvre et l'adoption de la GPI un processus complexe. La participation dans la gestion de l'irrigation continue largement de suivre des étapes préconçues par l'État, discutées avec les bailleurs de fonds (AFD-BAD) et mises en œuvre par les consultants. Toutes manifestent une forte influence de la structure actuelle de gouvernance : fonctionnement « *top-down* » malgré la tentative de combiner avec une approche « *bottom-up* ». À travers ce processus, les agriculteurs et les gestionnaires locaux de l'eau (IMC et IMS), en tant que bénéficiaires, restent à leur place d'observateurs des activités et résultats du projet, adoptant une stratégie de « attendre et voir ». En outre, l'étude souligne les conditions spéciales du contexte vietnamien qui questionnent des conditions théoriques de réalisation de la GPI, notamment le principe de l'utilisateur unique qui néglige le rôle important de l'autorité locale, et la nécessité d'une organisation collective des

usagers de l'eau. Le cas empirique du projet de Phước-Hòa démontre la distance entre les principes idéaux et la réalité de la mise en œuvre de la GPI pour une meilleure gouvernance de l'eau, entre ce qui est édicté et ce qui pourrait être fait pour un cas spécifique.

Mots-clés : Bassin Đồng-Nai, Irrigation, Gestion Participative de l'Irrigation, Vietnam, bailleurs, Communs

Pays : Vietnam

Participatory irrigation management: from theory to reality – Insights from the Phước-Hòa irrigation project

Abstract

PIM (Participatory Irrigation Management) has become one of the cornerstones of irrigation development. Its implementation always involves multilayered interaction between international ideologies, development project institutions that introduce it in national governance agendas, and local context shaped by social, economic, institutional, and political factors. This technical report draws from a three-year research program investigating the building of PIM in two newly established irrigation systems that form part of the Phước-Hòa multi-purpose project. The PIM in the project was implemented through the On-farm and Social Development Program (OSDP). The paper highlights the key features of the process. First and foremost, it is the gap between "project time" and "farmer time" that makes the implementation and adoption of PIM such a complex process. By and large, participation in irrigation management continues to follow steps that are predesigned by the government, discussed with development donors (AFD/ADB), and then implemented by consultants. The approach is very much top-down with a strong influence of the current governance

structure despite the attempt to combine it with a bottom-up approach. Throughout the process, farmers and local water managers (IMC and IMS), the ultimate beneficiaries, stay put and simply observe the outcomes and activities of the project, adopting a "wait and see" strategy. In addition, the study also highlights specific conditions in the Vietnamese context that challenge several theoretical prerequisites for PIM, namely, the "users only" principle, which neglects the significant role of local authorities, as well as the necessity of a collective organization of water users. The empirical case of the Phước-Hòa project illustrates the distance between ideal principles and the reality of PIM application to improve water governance, as well as between what is decreed and what is actually feasible in a specific context.

Keywords: Đồng-Nai basin, Irrigation development, Participatory Irrigation Management, Vietnam, Funders, Commons

Countries: Vietnam

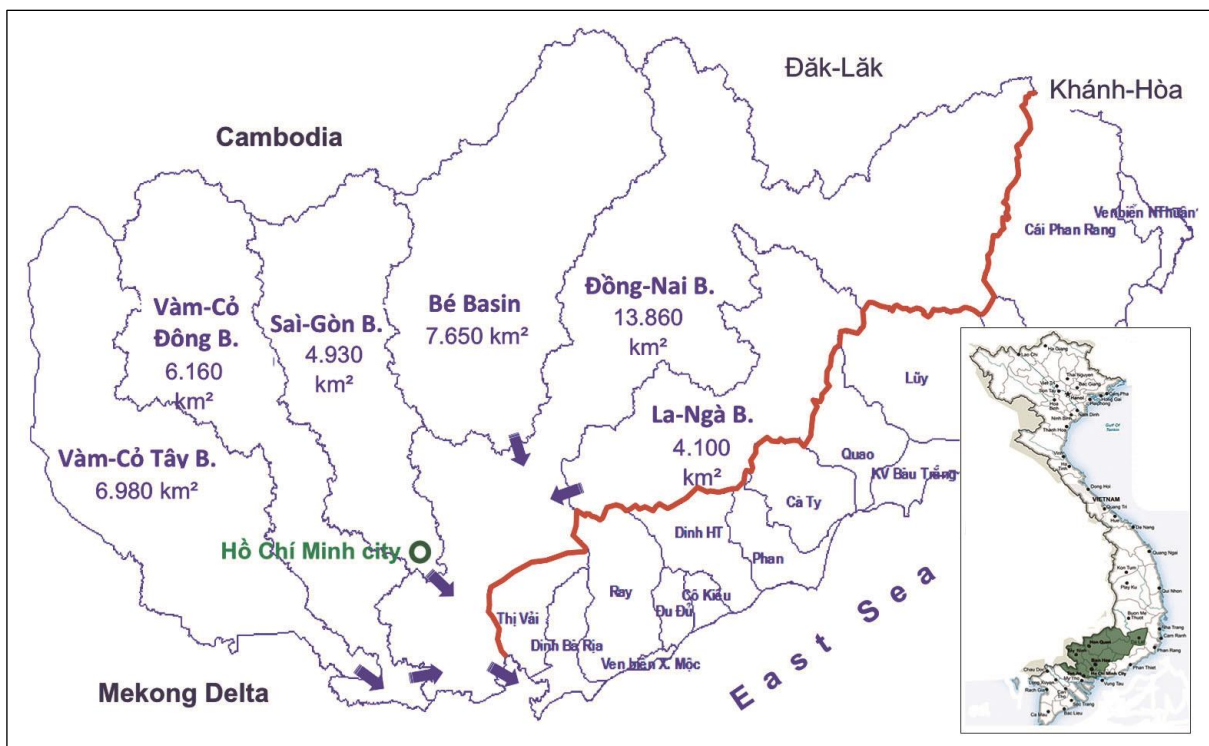
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Introduction

The Đồng-Nai-Sài-Gòn basin (see Figure 1) is one of the three largest river basins in Vietnam, with a catchment area of 36,481 km². It is also the main locus of urban concentration and industrial development in the country and the basin supports a productive economy that places complex demands on the water supply that are both huge and ever-increasing, including drinking and domestic water use, industrial water supply, hydropower production, and irrigation, as well increasingly to mitigate salinity intrusion.

Figure 1.
The Đồng-Nai-Sài-Gòn basin



Source: EFEO, 2017.

Given its key social, economic, and political position in the country, as well as its complex upstream-downstream interrelationships, there is a crucial and urgent need for improved and better-integrated water governance in the Đồng-Nai river basin. At the heart of the basin, Dầu-Tiếng reservoir, the fourth biggest in Vietnam, as well as its huge network of canals, have been central for basin-level water allocation and distribution. After lengthy development in system capacity since completion in 1985, the Dầu-Tiếng system is currently tasked with the provision of water to multiple uses of raw water supply for the domestic and industrial demands of Hồ-Chí-Minh, Bình-Dương, Bình-Phước, and Long-An provinces, as well as irrigation water (both direct and as a source supply) for approximately 135,600 ha in Tây-Ninh, Hồ-Chí-Minh, and Long-An provinces (Nguyễn Hồng Quân *et al.*, 2018). As the manager of the system, Dầu-Tiếng Company (currently the Dầu-Tiếng & Phước-Hòa complex) has worked at the interface of bureaucratic state structure and business practices to allocate water and mitigate the risks of structural damage from floods, droughts, and the more recent hazards of saltwater intrusion. The challenges of system management and the risks deriving from meteorological hazards including extreme weather events and increasing demands have profoundly tested this water

management system (Đỗ Đức Dũng *et al.*, 2014; Corderi, 2011; Nguyễn Ngọc Anh & Đỗ Đức Dũng, 2015).¹ Institutionally, the lack of effective coordination between actors with competing interests and the lack of technologies and/or mechanisms for inter-reservoir operation have made optimizing water usage in the basin become even more difficult (Linh and Tessier, 2018).

In a context of increasing water struggles and environmental challenges (especially seasonal water shortages and the progressive salinization of the Vàm-Cỏ-Đông and Sài-Gòn rivers), the Phước-Hòa project (2006–2018, approved in 2003) was implemented by the Ministry of Agriculture and Rural Development (MARD) with loans and funds from the Vietnamese government, the Asian Development Bank (ADB), and AFD. The project aims to provide additional water into the Vàm-Cỏ-Đông and Sài-Gòn rivers basin (75 m³/s) in order to supplement existing supplies for domestic, municipal, and industrial (DMI) use in Hồ-Chí-Minh City and the surrounding provinces, for the development of irrigated agriculture through irrigated perimeters, and for salinity control. The target flow volume was scaled down following the reassessment of needs and capacities, including most recently (in December 2011) from 65 m³/s to 55 m³/s. An important component of this large-scale multi-purpose project relates to Vietnam's irrigation development, that is the combination between infrastructure investment and institutional development.

In combination with Component B –“Infrastructure Design and Construction”–, Component A –“Support for Institutional and Integrated Development”– applies Participatory Irrigation Management (PIM) principles, including local participation in canal system design, PIM training, and the establishment of water user organizations. By the end of the project, 182 km of main, primary, secondary and tertiary canals (PST) were constructed in the Đức-Hòa perimeter area (in Long-An province), and about 93 km in the Tân-Biên perimeter area of Tây-Ninh province (see Annex 2). Forty-three Water User Groups (WUGs) and 16 Water User Associations (WUAs) were officially established and recognized in the Đức-Hòa and Tân-Biên perimeters, respectively.

This working paper describes and analyses the process of PIM implementation in the Phước-Hòa project. This will enable us to highlight the factors driving the current outcomes and shed light on the key potentials for PIM in the Vietnamese context. Our premise was that participation in irrigation development involves a complex process of interaction between international ideologies driving development project institutions and a national governance agenda, and local irrigation contexts that are shaped by social, economic, cultural, institutional, and political factors.

The paper builds on the results of a social, anthropological, and historical research project on local water governance in the Sài-Gòn-Đồng-Nai basin. The three-year AFD-funded research project focused on two irrigated areas: Tân-Biên and Đức-Hòa. Its purpose was to analyze the interaction between stakeholders in the Phước-Hòa project from central to local level in order to better understand local stakeholders perspectives and the nature and impact of water users' participation in project activities. The results of the research project contribute to the pool of scientific knowledge while helping donors reflect on the factors driving, and limiting, the implementation of this case of donor-funded development project in irrigation. While researching the actors and activities within the Phước-Hòa project and related to it, the researchers also joined in the discussion on PIM and its

¹ Water is among the natural resources defined by the Vietnamese legal system; its management is under the responsibility of various ministries and line agencies (see Annex 1). A non-exhaustive list of official documents related to the Phước-Hòa project and irrigation in general is presented in Annex 9.

implementation in the later stages of the project, to a certain extent also influencing its implementation.

1. PIM as an approach and trend in irrigation development and management

1.1. Participatory irrigation management and management transfer: from ideology to prerequisite in irrigation

Throughout the nineteenth and twentieth centuries, irrigation was a large industry and a driving force behind Asia's "green revolution". Due to increased competition in demand between sectors (e.g. irrigation, municipality, and industry) and the growing recognition of the importance of water in ecosystems and the environment, the question of how to make irrigation more efficient is now at the core of development agenda. Ideology in irrigation management has evolved. Three main policy approaches to irrigation are summarized by Ruff (2011). The first, upheld by Karl Wittfogel, sees the emergence and development of a "hydraulic bureaucracy" as a precondition for the creation and operation of large-scale irrigated systems, and the origin of the establishment of absolutist managerial states in Asia. The second, championed by Elinor Ostrom, describes, on the contrary, modes of self-managed governance that are based on institutions that are not so much organization as effective rules "shaped" by irrigators and accepted by them (Ostrom and Basurto, 2013). Finally, since the early 1990s, a third school has been promoting a neoliberal vision of water resources as potentially privatizable economic assets, particularly through public-private partnerships.

Since the 1980s, international institutions and governments throughout the world have been emphasizing institutional reform towards Participatory Irrigation Management (PIM) and Irrigation Management Transfer (IMT). Irrigation modernization in that period refers to the idea of managing irrigation and drainage² in a way that is both efficient and financially feasible and sustainable. PIM is theoretically defined by the World Bank (1996) as "*the involvement of irrigation users in all aspects and all levels of irrigation management*" (Groenfeldt and Sun, 1997; INPIM, 2010). The notion of "involvement" is flexible, ranging from light involvement (including information sharing, consultation, joint assessment of problems, etc.) to advanced involvement (including decision-making, collaboration, and full say by the water users). The "aspects" of irrigation management refer to the initial planning and design of new irrigation projects or the improvement of existing ones, as well as the construction, supervision, and financing, decision rules, operation, maintenance, monitoring and evaluation of irrigation systems. Finally, the "levels" of irrigation management cover the tertiary, secondary, and primary system levels, as well as project and sectoral levels.

Irrigation Management Transfer (IMT) involves transferring some or all responsibilities from the public water agency to water users in order to ensure the sustainability of irrigated systems; Mexico is a prime success case in that regard (Rap, 2006). Transferring broadly implies "*reduc[ing] public expenditure whilst increasing farmer participation in the management of the irrigation systems*" (:7). This paper will mostly focus on PIM, though it is not possible to separate the analysis of PIM from discussions on IMT.

From the very beginning, the main rationale for PIM has been that of relieving governments from the financial burden of operating and maintaining irrigation systems. Van Vuren *et al.*

² The question of "drainage" is often missing in the discussion about the use of water in agriculture. However, it is often understood to be included, as drainage is an essential component of irrigation systems.

(2007) assert that it seems the main reason behind management transfer is a financial one, as it emerged during the economic crisis of the 1980s. Cost recovery and maintenance are consistently the key focus of irrigation management under the neoliberal engineering irrigation narrative (Singh *et al.*, 2014). Thus, PIM, together with IMT, had been considered a “way out” in managing financially nonviable systems (Mukherji *et al.*, 2009). However, an assessment of 108 cases of irrigation management transfer projects shows the limitations in the improvement in water delivery due to the lack of attention given to improving how irrigation systems are designed and operated (*bid.*). Such design and operation have long been guided by the technocratic domination (Molle *et al.*, 2009) and bureaucratic structure of state management. In the Vietnamese context, it is referred to as “hydrocracy,” or the bureaucracy of the hydraulic intervention regime (Benediker, 2014). Till this day, the focus on system efficiency remains a key objective of PIM policies in Vietnam.

The shift towards PIM is also informed by the belief and evidence from elsewhere during the 1980s and the 1990s that irrigation schemes are best managed by organized and empowered farmer communities (Vermillion, 1996 and 1999, as cited in Shah *et al.*, 2004). Yet, the argument has not been absolute as farmer-managed systems seems to work best at a small scale rather than as complex large-scale hydraulic perimeters (Olson, 1978). This idea is also supported by international institutions for its promise in enhancing social equity and empowerment of water users. It underlies the desire to promote a model of “participatory democracy” associated with the promotion of the state of law (good governance and transparency of public action, decentralization, and the strengthening of local institutions promoting civil society involvement). User participation is therefore essential in development contexts due to its potential to empower marginalized and disadvantaged communities. Fairness and participation have long since taken a back seat in shifting policy discourses relating to irrigation however, as costs and efficiency remain dominant (Singh *et al.*, 2014).

In facilitating the involvement of water users, water user organizations have become a key tool of PIM. The new form of water management attaches, or somewhat covers, the creation of water user associations/organizations (WUAs/WUOs). The focus on farmer participation in irrigation management, or PIM, was discussed at the same time as WUAs and Irrigation Management Transfer, and WUAs are in fact a subset of PIM (Van Vuren *et al.*, 2007). Water user organizations have been organized in one of two types: “farmer management” and “contracted management” (Hamdy *et al.*, 2004), differing in their relation to public management agencies. Water User Groups (WUGs) or Water User Associations (WUAs), despite only being a tool for PIM, often become an essential element of the irrigation intervention itself.

PIM then became an “ideal” institutional model that is prioritized in the development agenda. The implementation of PIM in irrigation development projects often constitutes an institutionalized process that is intertwined with the international development endeavor and the national/local institutional setting. Besides, PIM implementation by itself is not an easy process, not only because of how much PIM ties in with general PIM guidelines (Groenfeldt and Sun, 1997), but also because its relevance and feasibility are informed by the specific local realities. The present diversity in context driven by social, cultural, economic, and political conditions challenge any attempt to draw up a blueprint. The two main elements of PIM in newly established irrigation systems, as often implemented in projects, are the participation of water users in system design and construction, and the establishment of water user organizations. As a result, capacity building is an obligatory component in project design.

Extensive research has been carried out into the assessment of PIM implementation worldwide, showing the complex obstacles in implementing the concept. The International Water Management Institute assessed PIM/IMT interventions in Asia, pointing out that *“transferring management from bureaucratic irrigation systems to farmers’ groups has neither significantly improved productivity, operation and maintenance, nor has it produced other net benefits”* (Mukherji *et al.*, 2009:18). Recent experience in India demonstrates that PIM interventions are often restricted due to the heterogeneity of farmers, the low efficiency of the physical irrigation systems, the lack of equipment or support of the irrigation bureaucracy, inadequate or ineffective capacity building, and the lack of proper incentives (Swain and Das, 2008). Certain researchers point to the unfairness in the sharing of costs and the financial weaknesses of farmer organizations (Hamada and Samad, 2011). Others set out the prerequisites for PIM implementation. For instance, governments need to clarify objectives, create an enabling environment, provide an appropriate framework, clearly identify and enlist support of reform champions, and regularly monitor and evaluate water user associations (Peter, 1997).

1.2. PIM in Vietnam

Irrigation modernization and PIM in Vietnam illustrate both the influence of the international development agenda and the country’s own national dynamic in irrigation management, which, in turn, is strongly influenced by regional diversity. In the 1990s, Vietnam s adopted the idea of irrigation modernization using the approaches or terminologies of Participatory Irrigation Management (PIM), in combination with WUOs or WUAs, and Irrigation Management Transfers. The country has indeed adopted different ideas and models from the FAO and other global tools in investing in the “software” component of irrigation systems. Among the components of modern irrigation management, PIM is especially favored by state agencies and projects funded by international organizations such as ADB and AFD, as well as non-governmental organizations (NGOs).

In Vietnam, PIM is understood broadly as: *“Irrigation management involving farmers who participate in planning, designing, investing, and building to manage hydraulics works”*. In terms of legal recognition, PIM and WUG derive from:

- The ordinance on the operation and protection of hydraulic works;
- The “Framework for PIM Development in Vietnam” — No. 3212/BNN-TL (its draft was already discussed back in 1997 under the guidance and financial support from donors);
- Circular No.75/2004/TT-BNN on “Guidance for establishment, consolidation and development of WUOs”.

The two latter documents were issued by the Ministry of Agriculture and Rural Development (MARD) after the regional workshop on Participatory Irrigation Management as a “pathway in progress” in Vietnam in 2004.³ The same year, a directive entitled “Strategic and Development Framework for the PIM” (2004), issued by MARD, specified the meaning given to this approach:

It focuses on water users [even if it means having to exclude other actors involved in irrigation management structures]; Cooperation between irrigators is an essential element;

³ The workshop was financed by ADB, DANIDA (the Danish International Development Agency), INPIM (the International Network on Participatory Irrigation Management), and the World Bank.

Part of the works is transferred to farmers to increase their level of accountability and sense of ownership of the systems.

However, in this highly hierarchical and bureaucratic country, such decentralization in the water sector is strongly framed by the “hydrocracy” (hydraulic bureaucracy), to use Benedikter’s expression (2014). Participation must take place in organizations or agencies that are fully established and have legal status. This is the prerequisite for participation: individuals who use water from an irrigation system must all participate in these user organizations.

In 2004, the country development of PIM achieved a new milestone with the establishment of the Center for Participatory Irrigation Management (CPIM)⁴ under the Vietnam Academy for Water Resources (VAWR)—both the CPIM and the VAWR act as consultants through the OSDP in the Phước-Hòa project, with separate teams for the two irrigated areas under study.

Previous experiences in PIM implementation help inform the analysis of how PIM was implemented in the case of the Phước-Hòa project (over the 2006–2018 period). It is also essential to make a comprehensive inquiry into the PIM implementation process in Vietnam. This paper will guide readers through the project to understand the factors supporting or hindering attempts to introduce PIM in the two perimeters: Tân-Biên in Tây-Ninh province and Đức-Hòa in Long-An province. The paper builds on the results of a three-year research project on local water governance. Historical, anthropological, and sociological approaches were applied in order to analyze the interaction between stakeholders in the Phước-Hòa project as well as to understand the perspectives of various stakeholders, especially those of farmers, as well as the nature and impact of the involvement of water users in project activities. Analyses were made based on interviews, field observations, and secondary data analysis. More than 600 documents were collected and reviewed, including project documents and reports (from project managers, ICMB9, PPMBs, consultants), reports and documents from irrigation management agencies, documents concerning the cooperatives and groups in the area, rulings and reports from people’s committees at various levels regarding the groups and the Phước-Hòa Project, and many others.

First, we will give a brief outline of the development of the large-scale Phước-Hòa water resources project since 2003. During the course of the project, its objectives were gradually redefined in order to adapt to the rapid socioeconomic transformations of the basin over the last fifteen years, most notably the complex expansion of urban areas and the industrial sector and the changes in cropping patterns. Second, based on the study of the two irrigated perimeters, we investigate the implementation of PIM in the project through the participatory design of canal networks, or PST, in particular that of the tertiary canals in the first phase OSDP as well as the PIM training, establishment of water user organizations, and on-farm canal building during the second phase. We will then elaborate

on the top-down character of PIM and the ways in which water user organizations haven’t lived up to expectations, explaining why things have unfolded in the way they have, which reveals many of the characteristics of PIM implementation in the Phước-Hòa project. Lastly, we will summarize the results of empirical research on the PIM implementation process in

⁴ “AFD has participated in the funding of several hydro-agricultural infrastructure projects, in both the north and south of the country, and, as a complement to these projects, is also funding institutional reinforcement for the Center for Participatory Irrigation Management (CPIM).” (*PROJECT BRIEF – Funding for the Phuoc Hoa water resource usage project – phase II* –, AFD, undate, anonymous).

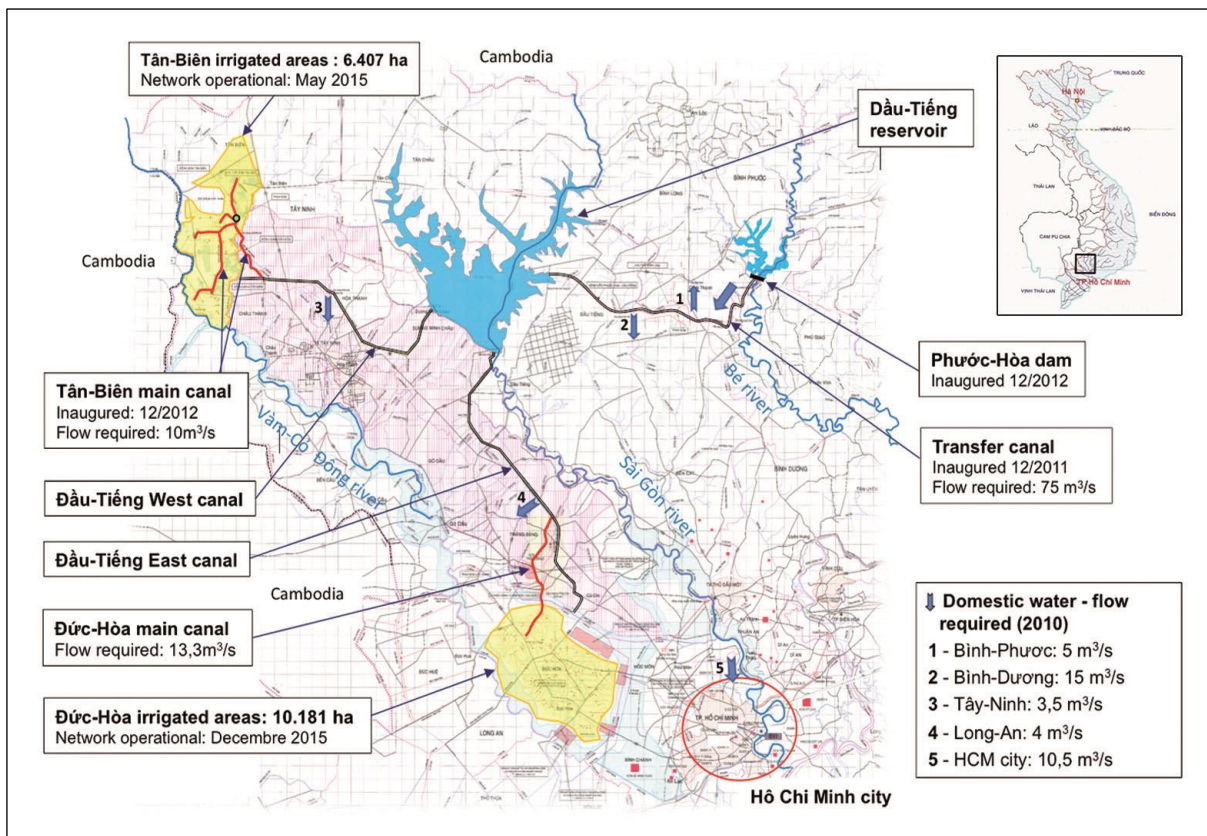
the development project and link this research to the research conducted globally on PIM, and will discuss PIM within the broad context of change in irrigation management in Vietnam.

2. The Phước-Hòa project

2.1. Objectives and evolution

The Phước-Hòa project consists of two parts: Part A – Support for Institutional and Integrated Development, and Part B – Construction of Water Resources Infrastructure. The project aims at supplying more water for multiple uses (agricultural, domestic, industrial, and control of saltwater intrusion) through a transfer canal from the newly-constructed Phước-Hòa dam (on the Bé River) to the Dầu-Tiếng reservoir, then supplying water through the reservoir's west canal system and east canal system to the two irrigation perimeters in Tây-Ninh and Long-An, respectively (see Figure 2).

Figure 2.
The Dầu-Tiếng-Phước-Hòa complex

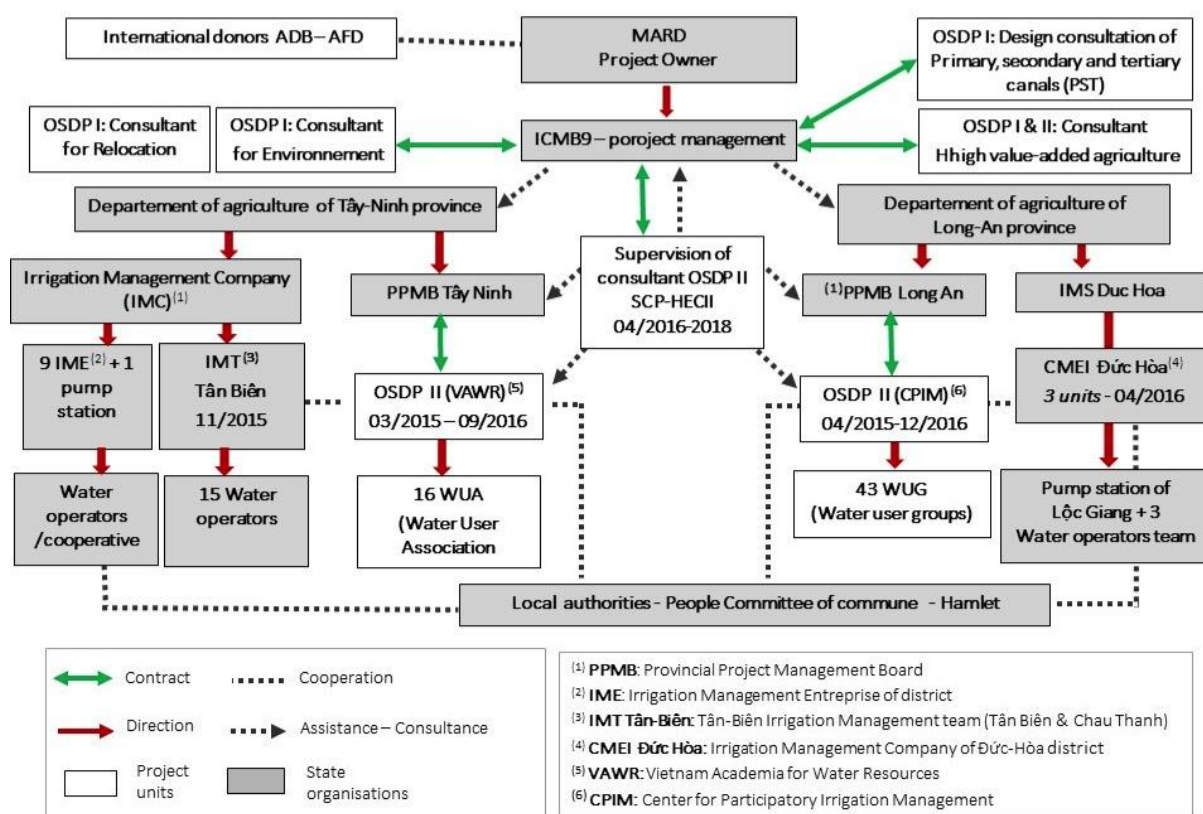


Source: EFEO, 2016.

The project management is organized at the interface between the international development endeavor and the Vietnamese administrative system (see Figure 3). The project executing agency is the Vietnamese Ministry of Agriculture and Rural Development (MARD). Project implementation falls under the purview of the Hydraulic Project Investment and Construction Management Board No.9 (ICMB9) under MARD, and the Departments of Agriculture and Rural Development (DARDs) of the four project provinces. ICMB9 provides an interface with the ADB and AFD, and is directly responsible for the management and construction of the Phước-Hòa dam, the Phước-Hòa-Dầu-Tiếng transfer canal, as well as the main canals for the irrigation systems. The DARDs and their Provincial Project

Management Boards (PPMBs) are in charge of implementing and managing the design and construction of the lower canal systems (primary, secondary and tertiary canals—PSTs), developing the irrigation areas, and implementing the on-farm and social development program (OSDP). The role of ICMB9 is to provide overall management assistance and coordination, and to provide instruction to the DARDs and PPMBs with assistance from project implementation consultants—Black & Veatch International (BVI) in the first phase, and the joint force of Société du Canal de Provence and Hydraulic Engineering Consultants Corporation II (SCP-HEC II) in the second phase (started in April 2016) (AFD Factsheet).

Figure 3.
The organizational structure of the Phước-Hòa project



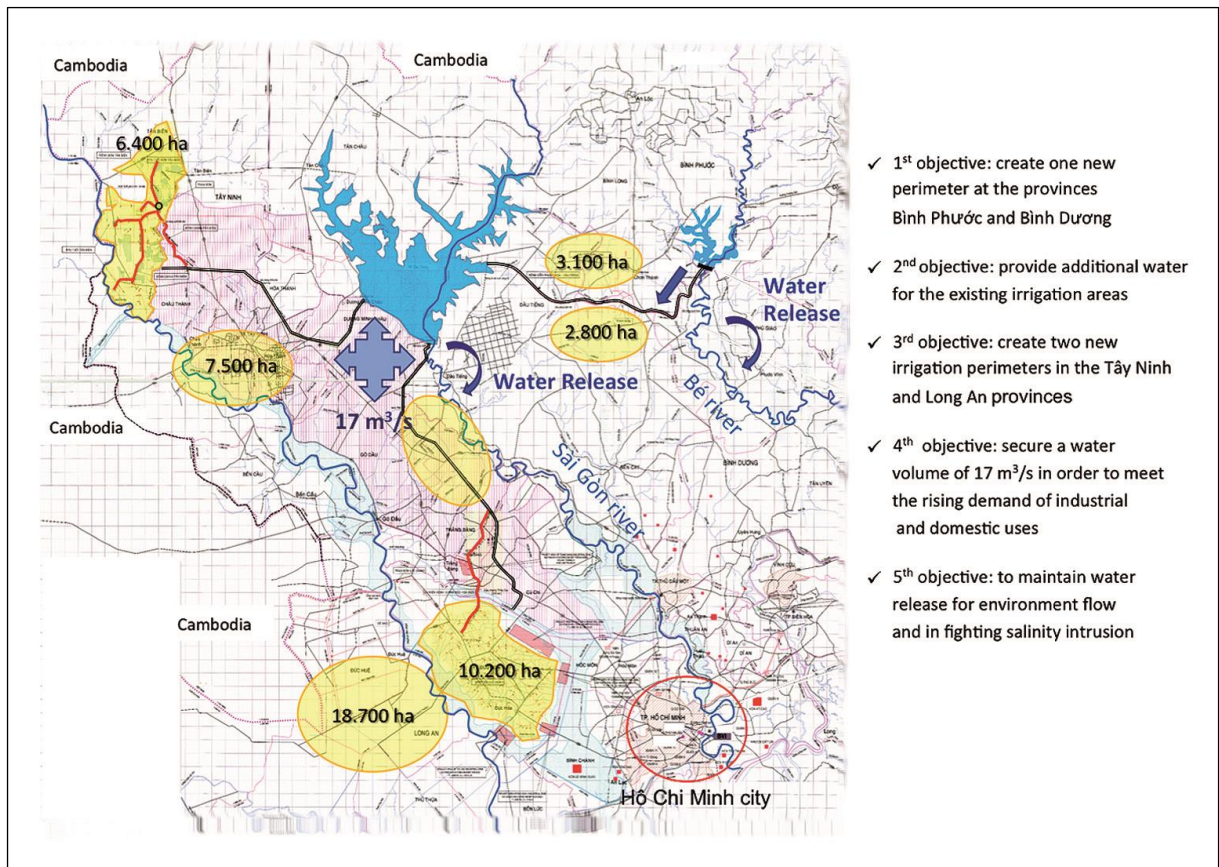
Source: EFEO, 2016.

The Phước-Hòa project is a typical development project with a centralized, hierarchical management structure concentrating the decision-making power for the main components, with the support of the international expert consultation⁵. On the receiving end is the perimeter level of the irrigation managers, Tây-Ninh Irrigation Management Company and

⁵ In the Vietnamese system, major hydraulic works crossing several provinces are under the responsibility of the central state and managed by regional entities (e.g. Dầu-Tiếng reservoir or Phước-Hòa transfer channel under the management of Dầu-Tiếng company). The provinces, notably its water hydraulic/irrigation companies, are responsible for the works built within their province.

Đức-Hòa Irrigation Management Station (later renamed the Center for Management and Exploitation of Irrigation, or CMEI). Indeed, PST design and construction are carried out by consultants contracted by provincial project management boards (PPMBs). Participatory design is also supported by OSDP consultants (in phase I), also contracted by the PPMBs. Throughout the process, IMC Tây-Ninh and IMS Đức-Hòa maintain the role of mere observers with only modest tangible involvement. The process is slightly better in Tây-Ninh than in Long-An. Thus, there exists a low level of engagement of irrigation managers (IMC and IMS) from the beginning of the project, in particular concerning the building of PST in their respective perimeters and establishing the system (both hardware and software). Because of that, the project missed the chance to make use of these agencies for their local knowledge and long-term experience during project activities (e.g. the OSDP program), thus failed to build the motivation and human capacity for the system's ensuing operations and management. Following the contract made with PPMB, the OSDP national consultants are not accountable to the on-site irrigation managers (IMC and IMS), which caused the discussion regarding the management models to be applied (e.g. WUG) to become mere information dissemination and consultation operations, rather than a joint venture between PIM practitioners and local experts.

Figure 4.
The Phước-Hòa project: five initial objectives



Source: EFEO, 2016.

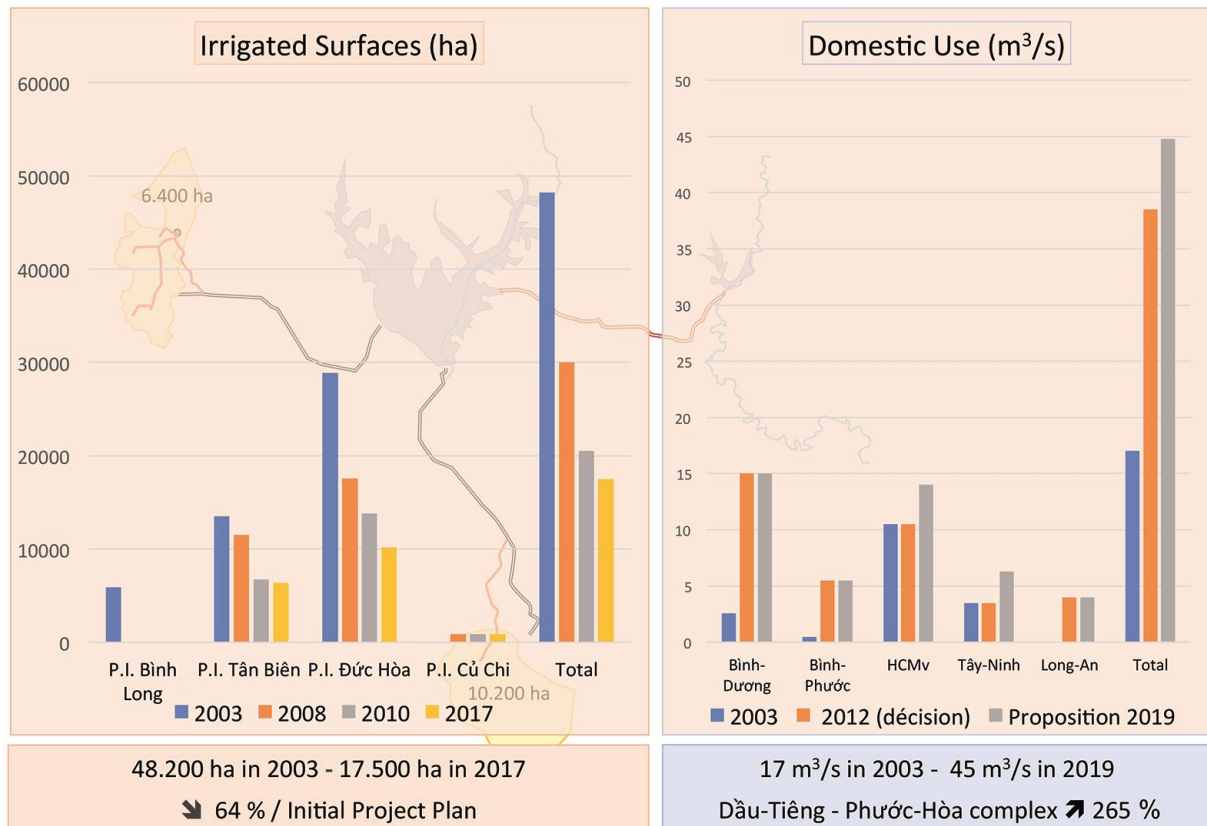
Due to the region's strong socioeconomic dynamics, project targets were subject to change immediately after inception. When the project was approved in 2003, five objectives were set regarding the provision of additional water in the Vàm-Cỏ-Đông and Sài-Gòn rivers basin for the development of irrigated agriculture and to supplement existing supplies for salinity control, as well as domestic, municipal, and industrial (DMI) use in Hồ-Chí-Minh City (HCMC) and the surrounding provinces (see Figure 4). The designed irrigated areas of the Phước-Hòa project were scaled down from more than 48,130 ha in 2003 to 29,980 ha in 2008 in two perimeters (Đức-Hòa in Long-An province and Tân-Biên in Tây-Ninh province, following MARD Decision No. 2851). In 2010, with MARD Decision No. 3415, the ambitions were again revised downwards to 20,545 ha (including 6,725 ha in Tân-Biên and Đức-Hòa Thái-Mỹ in Củ-Chi district of Hồ-Chí-Minh City). A final adjustment took place following MARD Decision No. 3184 in December 2012, which set the project irrigation area at a total of 17,749 ha (including three perimeters: 6,408 ha in Tân-Biên, 10,180 ha in Đức-Hòa, and 1,161 ha in Thái-Mỹ) (see Figure 5). Almost two thirds of the initially planned irrigated areas were therefore cut from the project. Adjustments were made due to the expansion of the industrial area in Long-An and Bình-Dương during the 2000s (leading to the cancellation of the Bình-Long perimeter), urbanization, and the strong shift of cropping patterns towards rubber in Tây-Ninh the late 2000s. At the same time, the volume of water reserved for domestic, municipal, and industrial (DMI) uses increased. However, this evolution can only be quantified for the Dầu-Tiêng - Phước-Hòa complex considered as a whole, and not only at the level of the Phước-Hòa project. In fact, only the volumes of water intended for the DMI supply of the provinces of Bình-Dương and Bình-

Phước are taken directly from the transfer canal: for these two provinces, the projections went from 3 m³/s in 2003 on a global flow of 75 m³/s (4%) to 20 m³/s in 2019 on a global flow reduced to 55 m³/s (37%), i.e. a multiplication by 9 of the volumes allocated compared to those initially planned. The remaining 35 m³/s then flows into the Dầu-Tiếng reservoir. It is then impossible to determine the share of these 35 m³/s intended for DMI uses, if only because the volumes of water consumed by irrigated agriculture vary considerably between the dry and rainy seasons and within each of them according to fluctuations in rainfall. It should be pointed out here that figures put forward are projections (ratified in 2012 by decision 597/QĐ-BNN-TCTL 2012 and under consideration for those of 2019) which greatly exceed current actual consumption due, among other things, to a cruel lack of water treatment infrastructure and the systematic overestimation of industrial needs.⁶ Having said that, the constant increase in water volumes intended to meet DMI needs is a structural trend that has been growing over last twenty years. In this context, the severe drought of spring 2016 and the scale and duration of saline ingress during spring 2020, which required large releases of water to be contained, generated tensions between the different water uses. And logically, during this kind of climatic accidents, DMI demands take priority over those of irrigated agriculture.

The adjustment is also due in part to the redefinition of infrastructure capacity during the designing, consultation with local stakeholders, and construction stages. As of now, data regarding irrigated areas are still only estimated, and the real potential of each perimeter is yet to be measured.

⁶ Thus, if the projections allow a water volume of 4.9 m/s for the Bourbon sugar company and Tay Ninh sugar company, the volume used in 2019 was only 0.6 m/s.

Figure 5.
The Phước-Hòa project: a shifting design for agricultural, domestic and industrial water supply



Source: EFEO, 2018.

Concurrently to these changes in the project's objectives, the initial overall project cost, which was estimated at USD 198 million in 2003, increased by 131 million USD in 2010, ballooning to a total budget of USD 330 million at the request of the project implementers, the extra funding being provided partly by the Vietnamese government and partly by international donors. This subject was clarified during an interview with the former director of AFD in Vietnam, conducted on April 13, 2017:

"This project initially aimed to secure water supplies for the population of Hồ-Chí-Minh City and to increase the volume of agricultural water available by creating new irrigated areas. However, the urban growth of Hồ-Chí-Minh City and delays in implementation paradoxically led to increased costs despite a decrease in irrigated areas."

This process shows the complexity of carrying out a project with targets that are constantly influenced by socioeconomic changes, entailing a high level of adaptability and room for change in the project. The Phước-Hòa project proved that its institutional setting was able to respond to change and to the input of local project managers and create an actionable road map. The adjustment process often took a lot of time however, within a limited project time frame, thus impacting the improvements in efficiency that had been targeted by the project.

2.2. The two perimeters: Tân-Biên and Đức-Hòa

The Tân-Biên perimeter covers five communes in the Châu-Thành and Tân-Biên districts, which are located to the northwest of the city of Tây-Ninh, on the border with Cambodia. From a historical perspective, colonial investments in water infrastructure in this region were limited to transportation during the French period, and then towards security agenda during the “American war,” with some remarkable local projects including significant investment in dug wells for water abstraction (Le and Tham, 2018). The province has been undergoing active dynamics under the reunified government of Vietnam: since the 1970s, the agricultural area expanded, mostly for rice and peanut cultivation, alongside a large-scale resettlement program to rural areas with the so-called “new economic zones” (*vùng kinh tế mới*) program. Because of the recent arrival of migrants of various origins, the area does not possess a strong tradition of mutual help (e.g. social assistance, work exchange, or any other non-market forms of exchange). Besides, the region has witnessed different patterns of agricultural landscape use, with the sugarcane boom of the 1990s supported by AFD⁷ and the Bourbon sugar factory, to that of cassava plantation⁸ in the last ten years, following the increase in the tapioca market and processing facilities, and then the recent boom of rubber plantation since the late 2000.

The Đức-Hòa perimeter of Long-An province, bordering Hồ-Chí-Minh city, was also relatively untouched during the French colonial period (compared to other parts of the Mekong Delta region) as well as the “American war.” Hydraulic investment in the area indeed remained modest with some canals drawing water from the Vàm-Cỏ river for rice cultivation, despite some initiatives on behalf of the French and then the American to invest in agriculture in order to secure rural growth and promote security control. In the area of the twelve communes belonging to the Phước-Hòa irrigation perimeter, access to agricultural water before the implementation of the Phước-Hòa project occurred mainly through individual pumping from groundwater with tube wells, and only some use of pumping facilities to access the water from the river and existing drainage canals. Thus, as in Tân-Biên, the creation of a collective form of water resource management in this perimeter could not be based on pre-existing practice. Outside the Phước-Hòa’s designated area in Đức-Hòa, 3,000 ha in five communes were selected to be irrigated by the Lộc-Giang pumping system⁹ and three smaller pump systems connected to earthen canals (only the two main canals of Lộc-Giang are lined with concrete). Phước-Hòa’s command area in Đức-Hòa displays a diverse cropping pattern of rice, vegetables, peanuts, and cattle rearing. It is also one of the areas experiencing high level of urban and

⁷ The development of sugar cane cultivation in Tây-Ninh province was partly financed by an 1998 AFD loan of €23.78 million targeting the creation of 12,000 ha of new plantations, the establishment of medium-term credits for individual farmers, combined with sugar factories through delivery contracts. The project also financed the construction of a hydraulic network for the irrigation of 13,000 ha and the construction/rehabilitation of 87 km of roads of provincial interest to facilitate the daily transport of 11,550 tons of sugarcane between the cutting areas and the factories. (Source : *Les cahiers de la coopération française au Vietnam – Agriculture et développement rural* (2003), Ambassade de France en République Socialiste du Vietnam, p. 17).

⁸ The main season runs from October to June or July for lowland areas (*mỹ ruộng*), combined with a rice crop during the rainy season, or from October to October in highland areas (*mỹ rẫy*).

⁹ The system was established with government budget in 1990 with two pump stations. The stations get water from the Vàm-Cỏ river and supply water to two main canals. The water is then conveyed through a system of nine primary canals and smaller canals, supplying irrigation water in five communes of Đức-Hòa district (with no overlapping with the Phước-Hòa perimeter). The designated command area covered 3,000 ha. The system had reached circa 1,500 ha after the two main canals were lined with concrete in 2001. Further upgrading of the scheme continued in 2016. Besides, Đức-Hòa also has several smaller pumping systems such as Thôi-Môi, Bình-Hữu, and Ba-Sa-Tây, which is under CMEI management.

industrial expansion due to its geographical location close to Hồ-Chí-Minh City. Ultimately, the growth in land demand for industrial and residential purposes¹⁰ raises questions about the future of the perimeter.

Although agrarian landscapes differ greatly between the two sites targeted by the Phước-Hòa project, they share one thing in common: they are undergoing continuous transformation and are shaped by the natural and physical conditions of climate, land, and water, as well as the irrigation infrastructure, the level of urban and industrial expansion, state policies, and, last but not least, market forces and the interference of private companies. All these factors impact the landscape simultaneously and any challenge might prepare the ground for an alternative. For instance, the delay in the planting of cassava due to the extended rainy season in 2016 caused many farmers in Tây-Ninh to switch to (or back to) sugarcane, with financial and technical support from the sugar company (Thanh Thành Công, previously named the Bourbon factory). Besides, other farmers in the Tân-Biên perimeter opted for rice cultivation during the dry winter/spring, drawn by the potential of the newly constructed canal system. In Đức-Hoà, current state policies promoting vegetable cultivation and cattle rearing are reflected on the ground by intensive state support and strong market forces. At the same time, the area adjacent to Đức-Hoà's residential and urban expansion is witnessing significant changes in farmers' perspectives and behavior. The shift of labor to the urban sector and fallow land are becoming increasingly common in the district. As a result, the intertwined influence of all the different factors makes the farming system and activities become increasingly complex and unpredictable. It is therefore difficult to point out a highly suitable model for all in terms of water governance and the management of the agricultural landscape.

It is important to mention that prior to the creation of these two irrigated areas under the Phước-Hòa project, there was no practice of collective management of common property (forests, public land, and so on) in general, and of water resources in particular. The appropriation of agricultural water was mainly carried out by individual pumping of the water table (between 25 and 35 meters). As a result, setting up the collective organization of water management made more complicated by the lack of a pre-existing foundation for collective forms of resource management. This key reality was not sufficiently considered during the application of PIM in the two irrigated areas.

¹⁰ In concrete terms, in the north of Đức-Hòa district, Vingroup corporation acquired 1,100 ha of land in Tân-Mỹ commune to develop a residential and leisure area equipped with a hospital and several schools. Local authorities claim that this development will not affect the 890 ha of land included in the perimeter. In addition, a 120 ha golf course and a 48 ha zoo were set up. These large-scale development projects have generated growing demand for agricultural land. Land speculators, mainly hailing from Hồ-Chí-Minh City, are intent on changing the land use of the farmland: today the price of one hectare of paddy field can reach up to VND 6 billion (about 230,000 €), a five-fold increase compared to prices only five years earlier.

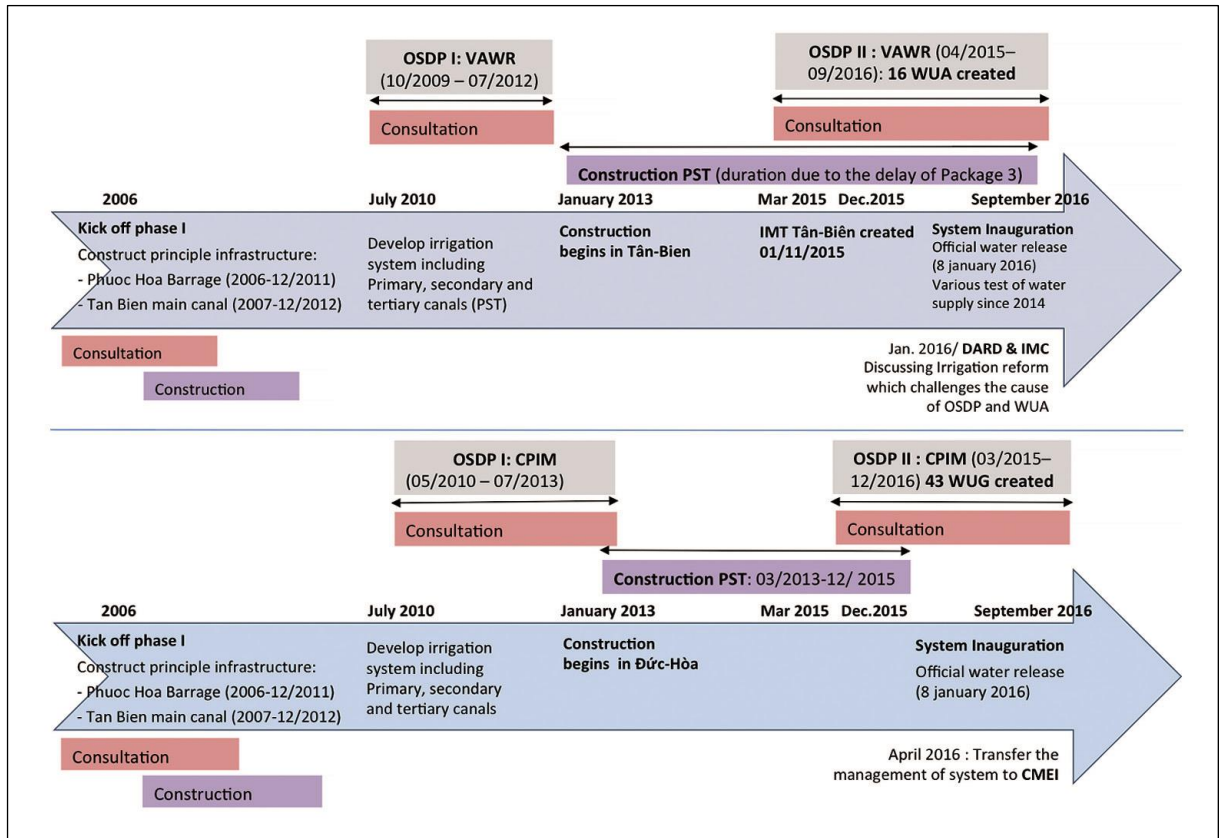
3. OSDP and PIM implementation: from design to practice

Based on this research, in general, the application of PIM in the Phước-Hòa project is characterized by (i) the targets to enhance irrigation efficiency, transfer part of infrastructure management to farmers, and improve the accountability of water users; (ii) a focus on water users; and (iii) the use of water user organizations. It was presumed or hoped that simply summing up these activities would result in the project's objective in terms of infrastructure effectiveness being met and a good foundation for PIM development in the area to be established.

Component A of the Phước-Hòa project was carried out with the institutional program called On-farm and Social Development Program (OSDP), in which PIM was the main implementation approach. This program reflected efforts in implementing the two core tenets of PIM: cost recovery and social empowerment, these two ideas being differently perceived by various actors, however. The OSDP was designed as a form of tendering for consultancy services in which the consulting bodies were to provide a service following contracts with identical assignments. The OSDP contracts were signed between the Vietnam Academy of Water Resources (VAWR) as the consulting body and the provincial project management board of Tây-Ninh province (PPMB Tây-Ninh) in the Tân-Biên perimeter, and between the Center for Participatory Irrigation Management (CPIM) and the provincial project management board of Long-An province (PPMB Long-An) in the Đức-Hoà perimeters (see Figure 6). The economics-based contracts quantitatively regulated the activities to be conducted within a given time frame.

The OSDP program consists of two main activities: (i) a social support program aimed at supporting the households impacted negatively by the project; (ii) an on-farm development program. The on-farm development program aims to support beneficiaries of the project through participatory Primary-Secondary-Tertiary (PST) design (in phase I), the establishment of a sustainable management model for on-farm systems, and an agricultural support program (in phase II) (see Figure 6). The designated beneficiaries are farmers receiving irrigation water in their fields, thus supposedly benefiting from the project.

Figure 6.
The Phước-Hòa project time line in the Tân-Biên perimeter (top)
and the Đức-Hòa perimeter (bottom)



Source: EFEO, 2016.

Insights from the OSDP phase I were gained through interviews with relevant stakeholders, while our analysis is mainly based on the phase II of the program, with in-depth analysis based on empirical research activities (i.e. interviews and observation). In order to avoid redundancy, our analysis of OSDP phase II starts with the Tân-Biên perimeter and any characteristics and issues specific to the Đức-Hòa perimeter will be examined subsequently.

3.1. OSDP Phase I: land acquisition support and participatory network design

The first phase of the OSDP program had two main objectives. The first was to facilitate the compensation process for families having lost land and/or part of their agricultural income due to the construction of water infrastructure, i.e. canals and hydraulic structures. Irrigation systems, such as those built in the Phước-Hòa project, consist of a main structure of dams and a system of canals (main; primary, secondary and tertiary—PST) conveying water from upstream to downstream, and then to drainage. The lowest order of canals in the system are quaternary or on-farm canals, connecting to the PST system and bringing water to the fields. In the Phước-Hòa project, and as regulated in Vietnam, the project will invest on the main and PST systems, while on-farm systems must be established by water users.

During the land acquisition and compensation process, OSDP consultants did not encounter much difficulty (this was confirmed by both consultant teams involved), thanks to the satisfaction of local inhabitants regarding the amount of compensation offered, which was equal or higher than market prices at the time. Even in the event of disagreements, all were settled easily through negotiation. The compensation for households also came with a social support program including small loans, scholarships, health insurance, and vocational training.

The second objective was to consult farmers about the design of the networks, especially that of tertiary canals. The design of the canal network developed by the engineers was brought to consultation meetings held at each hamlet. A “community monitoring group” (*Tổ giám sát cộng đồng*) was created for this purpose in each hamlet. Many members of the groups later became members of the “founding group” (*Nhóm sáng lập*) of water user groups established by Đức-Hòa’s OSDP consultant team. Some changes regarding the direction of canals were discussed.

Nevertheless, when the canals were actually constructed, a significant number of design errors and technical malfunctions were reported in both perimeters (including the failure to take into account pre-existing drainage networks that resulted in the flooding of some fields).¹¹ A 2018 field survey conducted by CPIM thus proposed 191 new outlets or outlet changes in the Đức-Hòa perimeter (amounting to 34% of the total 567 outlets built by the project). The changes were requested by local authorities, WUG, and the water users (CPIM final report for on-farm system design package, 12.2018:13).

A “top-down” design seems technically unavoidable to ensure complete control over major structures (main, primary, and, to a certain extent, secondary canals), and also due to the assumption of the lack of local technical capacity to handle big and complex designs among water users. In terms of tertiary canal design, the farmers were given the opportunity to comment on the direction and layout of the canals, as well as the location of the outlets for future quaternary canals. Field observations and reports by the farmers and local cadres provided feedback about problems with any outlets, e.g. outlets below the fields they were supposed to feed into, outlets leading up to obstructions or housing units rather than fields. These problems were then slowly forwarded to the governmental system

¹¹ The mid-term report of the SCP-HECII consultants also points to the existence of a significant number of design errors and technical malfunctions. (Đức-Hòa: p. 8–9; Tân-Biên: p. 9–10).

for checking and to find solutions. We therefore necessarily asked ourselves the following question: how was the participatory design of the PST network conducted?

First, interviews and *in situ* observations show that local authorities and farmers had great difficulty in understanding the technical designs and plans presented to them. Obviously, it is very difficult for non-specialists to participate and comment on technical notes regarding the spatial layout of the canals (i.e. location, depth, length, and width) on the basis of which they were expected to suggest adjustments according to the exact context in the fields. A cadre in Đức-Hòa-Thượng commune's People's Committee reported, regarding the outlets' location (in the Đức-Hòa perimeter) that:

"We, the local authorities, know nothing about the technical issues and since the technicians took steps to draw the map with all kinds of devices [complicated techniques which supposedly make good design], we had nothing to complain about."

Regarding this matter, Nguyễn Xuân Tiệp, one of Vietnam's leading experts in PIM implementation since the late 1990s, points out a lack of explanations as well as awareness and capacity building:

"There is a need for a 'bottom-up' approach, but it alone is not adequate. You also need a 'top-down' approach, because in order to make farmers really participate in the design, they need to understand what they are going to comment on. It is therefore necessary to train them on beforehand so that they can contribute constructive ideas." (March 2017 interview).

Secondly, for the members of the "community monitoring groups" who are either former hamlet cadres, mass organization cadres (e.g. from farmer unions or veterans councils), and model (good) farmers (active local cadres are not initially allowed to participate, but are invited later), decisions were already made before the meetings in their area, as a farmer explained in Hòa-Khánh-Đông commune (Đức-Hòa perimeter):

"The plans already existed, prepared by engineers, and we were only involved in marking out the canal layout in the field. I took part in the group as a representative of nine families and other farmers, forming a supervisory committee. Supervising, discussing, that's a way of putting it. There were actually a lot of things you couldn't discuss because the plans were already agreed on with no possibility to change them." (February 2017 interview).

In both perimeters, during the construction phase, farmers and hamlet cadres asked the construction workers to move some outlets because their location wasn't suitable. However, no change was made because the workers were required to comply with the initial design and was impossible to make changes during the construction phase.¹² Ironically, for many farmers (Tân-Biên field trip in June 2016), it was impossible to judge the suitability of the canals until they were actually fully constructed. It is important to recall an important point that certainly helps to explain this situation: the CPIM and VAWR teams were not

¹² The mid-term report of the SCP-HECII consultants highlights this standardization of design in both perimeters. Thus, regarding the Tân Biên perimeter: "To simplify the design, the distance between outlets is uniform, usually around 500 meters. Such a design does not take into account the topography and the boundaries of the farms, and as a result the location of certain outlets is completely inappropriate. In many cases, a certain number of outlets are simply useless (for example along the primary canal N17), while others are missing (for example along the primary canal N2). Many farmers complained and asked for different locations for the outlets." (Tân-Biên report: p.11). In this context, it is surprising to read the following further in the report: "Although the process has not conformed exactly to the TOR, there is knowledge of the project in the hamlets we visited and the farmers interviewed had participated in the design process."

present during most of the construction phase of the PST and were therefore unable to act as mediators between the farmers, designers, and construction agencies.

This calls for an understanding of the key factor contributing to the inefficiency in communication between the technical consultants in charge of designing PST networks, OSDP consultants, local authorities, and farmers. Indeed, the OSDP program was interrupted during much of the construction phase (33 months in Tân-Biên and 21 months in Đức-Hoà) (see Figure 6) due to delays in the administrative and financial processes of the project. Thus, the construction phase of the project faced the lack of a body which should have played an intermediate role between the technical teams (design and construction) and local actors (authorities and farmers). Because of that, the feedback channel during the construction phase, as reported by local authority and farmers, reverted to the existing hierarchical structure of the state: farmers to chief of hamlet, then to the commune's People's Committee, to the district's People's Committee, and finally to the PPMB of the project. In terms of downstream communication, the absence of an intermediary led to a structural lack of information regarding construction schedules, infrastructure description, and technical rationales (geomorphological/hydraulic, financial constraints, and so on). In this context, the local authorities found themselves in the tricky position of having to communicate with farmers when they were only able to disclose the information guidelines received, which were frequently not sufficient to respond to their inquiries.

In the end, the consultation phase for PST design did not achieve the expected outcome, leading to sectional malfunctions in the irrigated areas. For both local (commune, hamlet) cadres and farmers, the project works through a predesigned model and training which is far from being enough for building capacity for a new irrigation management method (regime). Despite the importance of this phase as the start of a concrete involvement of future users (Ruff, 2017:583), the population and local authorities remained passive. Simply presenting the infrastructure development plans and network layouts does not in itself produce a participatory approach; rather, it reproduces much of the top-down structure of information dissemination.

3.2. OSDP II in Tân-Biên perimeter: the standardized water user associations and the rush to implement PIM

3.2.1. The creation of sixteen Water User Associations

The second phase of the OSDP program is guided by the PIM and WUG guidelines (2004, 2010) prepared by BVI, the project consultants during phase I, and were based on basic knowledge of the project area.

“Effective Participatory Irrigation Management (PIM) is required to ensure that the entire irrigation system from headworks to on-farm structures is managed efficiently, taking into account the requirements of the local irrigators and other system users. This will require the establishment of an effective organization to manage the main system as well as a separate but closely integrated management organizations for the lower level canals.” (WUG guideline).

For the project designers, given the size and complexity of the two irrigated areas, it was necessary to rationalize and institutionalize water governance modalities through the implementation of a standard model structured around and by user groups. This was far from straightforward. Indeed, after the two years of absence (between the two OSDP phases), the same team of OSDP consultants (VAWR) found themselves asking doubtful farmers to yet again take part in an approach of dubious effectiveness in view of the failure of the participatory design phase of the networks and the successive postponements of water supply in the perimeter. The aim was to create participatory water management institutions, but there was either no water or an unreliable supply.

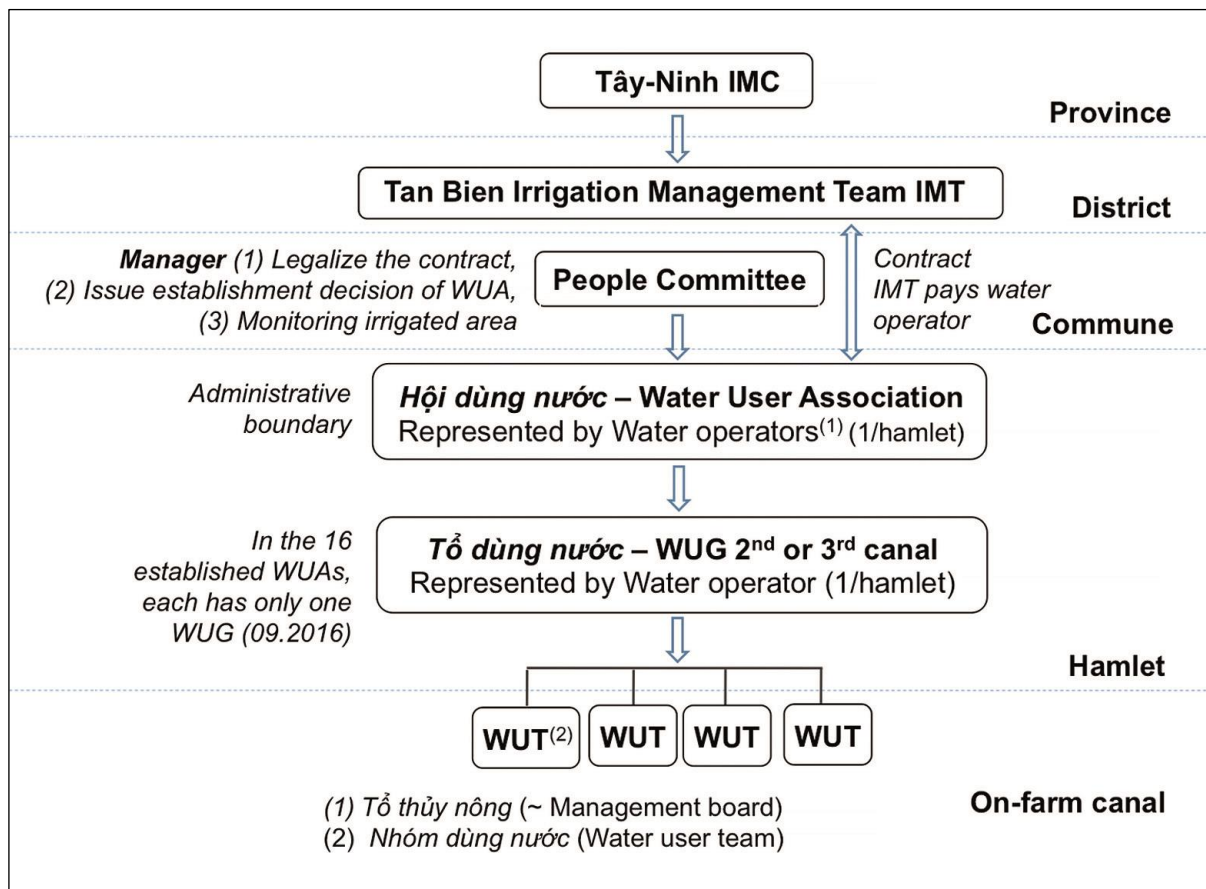
In this atmosphere of mistrust, the consultants found themselves confined by the specifications set by the Term of Reference (TOR). The directive compartmentalized, and its technocratic nature pushed them to carry out their tasks which are mainly based on quantifying the interventions. To this end, they relied on “Guidelines on establishment of water user groups,” which sets out a series of guidelines, some of which take the form of directives:

“WUG is established with relevant scope and organizational structure in line with features of facilities, level of management capacity, traditions, practices and demands of farmers. ... The WUG shall have a management board consisting of a Chairman and Deputies. The Chairman is elected by the WUG’s congress on the principle ‘one family, one vote’ and is legally recognized by the responsible authorities. The number of Deputies will be determined in the congress. The Deputies will be introduced by the Chairman and voted by the congress.” (PIM guidelines, 2004) .

Initially, in accordance with the recommendations of the BVI consultants, the principle that each WUG should bring together all farmers having one or more plots of land belonging to the same Tertiary Unit (TU) was introduced, the TU being a territorial unit based on operational hydraulic coherence. Thus, the irrigated perimeter was divided into 86 TUs distributed over the 9 hamlets of Châu-Thành district (40 TUs) and the 10 hamlets of Tân-Biên district (46 TUs).

In 2015, the configuration of WUGs changed: they became designed at the tertiary canal level while respecting the administrative boundary, i.e. hamlets. The organization and management mode is therefore no longer directly based on the hydraulic territorial division into TUs, although this concept still appeared in the VAWR reports until June 2016, when it was replaced by that of Water User Associations (WUAs). Responding to the reasons for replacing the concept of TUs by that of WUAs, the consultant team explained that the idea underlying WUAs/WUGs/WUTs (see Figure 7) was not to eliminate the concept of TUs, but rather to reduce the number of units to 16 WUAs, each with an average of 5 TUs, in order to facilitate water management by limiting the number of meetings between users.

Figure 7.
The WUA model for the Tân-Biên irrigated area, according to VAWR-OSDP (2016)



Source: EFEO, 2018.

During their missions, the consultants conducted a significant number of discussions, interviews, and training workshops in the perimeter. From June to September 2016, with guidance from the consultants, 16 assemblies were organized and 16 WUAs were established; their leaders were recognized officially by commune authorities via an official decision (see Annex 4 for more details on the exact activities carried out). Following the OSDP model, each hamlet was to have its own WUA, each WUA consisting of several WUGs, and each WUG managing between 100–150 ha of land, irrigated by one or several secondary and/or tertiary canals (/sections). For this purpose, each WUG has one or two water operators who are in charge of operating the gates, checking and reporting on the irrigated area, maintaining the canals, and playing an intermediary role between farmers and the company agency—in this case, the Irrigation management team of Tân-Biên (IMT) under the Tây-Ninh Irrigation management company (IMC). All water operators together form one Water Operator Group (*tổ thủy nông*). Under each WUG is a Water User Team (WUT), consisting of 2 to 7 farmers, who together share the water inflow and build and maintain one on-farm canal that brings water to their fields.

Despite the changes in the water management model—which is no longer based on TUs but on administrative divisions—the project assessment made for the Tân-Biên OSDP package was considered satisfactory according to TOR in terms of the number of collective water management organizations created as they covered the whole territory of the

irrigated perimeter. Such an evaluation is based on a quantity check, while assessing the quality of interventions was not easily conducted. However, whether the sum of completed activities will result in project objectives being achieved successfully (e.g. PIM for the proper operation and maintenance of the system and the enhancement of agricultural production and household livelihoods), relies not only on whether a participatory approach is implemented appropriately, but also on the expert capacity of consultants, local factors including human incentives, and other physical, social, and political conditions.

The next step is therefore to examine how these organizations were set up.

3.2.2. Assembly and election: a bureaucratic exercise

It is necessary to clarify that a WUA is supposed to be, in the long run, a federation of several WUGs. In practice, this intention of leveling up the organizational structure remains virtually impossible. Except for one case where there were two WUGs in one WUA, each association consists of only one group, the same person being simultaneously head of the WUG and representative of the WUA.

The assemblies were organized by the lead of the OSDP team with a standardized structure (see Figure 8). Assemblies, or *Đại-hội* in Vietnamese, are an integral part of Vietnam's party-state system.¹³ The People's Council's assemblies from central to local levels¹⁴ to those of mass organizations (farmer, youth, women union, and so on), all follow the same party template for assemblies, first reporting on activities and achievements in the past term and then presenting the strategies and targets of the following one. In the case of the WUA in the Tân-Biên perimeter, the consultants decided on the various stages of the assembly, including the (1) introduction of the delegates, (2) introduction of the Phước-Hòa project, (3) election of the WUA's representative (or an overt show-of-hands vote to approve the only nominee), (4) reception by the elected representative of the official decision from the commune leader, and (5) reading of the rules and charters of the WUA by the representative. The assemblies were relatively informal with less bureaucratic procedures, shorter presentations, and a less formal atmosphere than usual. Bureaucratic government language was used to explain the election process (election, nomination, direction, and inspection). Ultimately, despite the effort to create a structure that is autonomous from the state system, the establishment of the WUA in the Tân-Biên irrigated area of the Phước-Hòa project simply reproduced the state structure of management in Vietnam with both its advantages and limitations.

¹³ Ideologically, authority to run the nation-state in Vietnam goes beyond governmental institutions. As a popular slogan promoted in Vietnam asserts: "The Party leads, the People control, and the State manages." As stated, the nation is managed by the state under the Communist Party, with the support of People's Army, the Fatherland Front, and mass organizations (e.g. for women, peasants, workers, youth).

¹⁴ Vietnam's administration system has a top-down, 4-tier organizational structure: the central or national level, provincial level, district level, commune level, and hamlet level. The central level includes the National Assembly, ministries (including the Prime minister's office and various departments), and the Supreme Court. These agencies fulfil the legislative, executive, and judicial functions of the national government, respectively. At the province and district levels, the People's Council, People's Committee, and People's Court perform the legislative, executive and judicial functions, respectively. Within the ministries there are three types of agencies: state management, non-business (generally translated as institutes), and business agencies. The latter two are governed primarily by the state management agencies.

The presidents of the WUAs were not elected but rather appointed by the People's Committee of the commune. Most of them are either hamlet leaders or deputies or secretaries of the hamlet Party unit. The election of the WUA representative during the assembly remains symbolic since there was only one candidate nominated by the commune's People's Committee, who was later elected.

The WUAs were established due to the external influence of project consultants working according to the TOR and the whole process was still very new to farmers. It provided neither incentives nor adequate information to both the (single) candidate nor the voters. In this situation, project experts relied on local authority to choose and mobilize potential candidates to assume the position of community leader in the WUA. In most cases, the local commune or hamlet cadres became the water operator candidates, which reflects part of the state tradition of creating social leaders, representatives who are accountable both to the people and to the state system. This implies a special case of the Vietnamese system toward WUA and PIM where local government structure plays an important role. After decades of being familiar with the state influence in every corner of their society, communities such as those in Tân-Biên tend to merge state cadres and social leaders, which then provides those state leaders with the power to organize any collective activities. Thus, the productivity of the leaders of WUAs to create PIM does not rely on whether that person is affiliated with or autonomous from the government, but more about their capacity and prestige.

Besides, to comply with the protocols set out in the PIM and WUG guidelines, the charters and internal rules of the associations were submitted to the members present for ratification (summary provided in Annex 5). In the Phước-Hòa project, with the idea of combining top-down and bottom-up approaches, the charters and rules were drafted by the OSDP consultants with contribution from and discussions with the provincial and district managers (PPMB and official cadres from the district office of DARD). The documents, together with the model of PIM and WUA, were then presented to the farmers for discussion and endorsement. However, given the nature of formal events as assemblies organized by those with authority (the commune's People's Committees and the hamlet's People Boards under the guidance of OSDP consultants), the implementation ended up as much of a top-down process, whereas the bottom-up approach had little space to be adopted. All farmers, including the association's leaders, only knew about the documents at the day of assembly. All WUAs are supposed to be governed by the same texts. To formalize this, these documents were co-signed by the president/representative of the association and the president of the commune's People's Committee, who also signed on this occasion a decision for official recognition of the new structure. There were indeed some small changes discussed at the assembly (e.g. the amount for a fine applied for violation in water distribution). However, the charters and rules were passed without much attention, which creates doubt on the binding power and value of them to the water users.

To encourage farmers to take part in these meetings, as with other training during the project, each farmer present received a travel allowance of VND 50,000 (about €2). The systematic grant illustrates the initial apathy towards these structures. It is common practice to encourage the participation of water users in this way, before any self-incentive can yet be formed. It is necessary for project to accept long term interventions, waiting for incentives to build up and then maintain the momentum, or alternatively, provide incentives through small amounts of money, in order to have the activities completed within the project time frame. Experience in such projects shows that the latter method can only add

value when the interest of participants is already present. In other words, only when the key conditions for incentive building are present, such as reliable water supply and farmers' trust in the project. While the first condition is related to infrastructure and operation performance, the latter, trust, is built through the process of interaction between project's personnel and local actors, including water users. In projects like Phước-Hòa, where the idea of irrigation is introduced to the area, activities carried out as planned and transparency in information should have contributed strongly in the trust building process.

Figure 8.
Water usage rules of WUA and the assembly of WUA in Thạnh-Tây hamlet, Thạnh-Tây, commune, Tân-Biên perimeter (July 2016)



Source: EFEO, 2016.

In short, this is not to disparage the effort of the consultants in applying the participatory process during OSDP in Tân-Biên; one of the successes of OSDP consultants was in laying the foundations of the perception of PIM, especially regarding how farmers were to work together in operating and maintaining the system. Despite that, the operation's modalities for WUA at the time of establishment were decided mainly by the experts, and the WUA's representatives were mobilized by the local cadres. There was a deviation between, on the one hand, the OSDP consultants' understanding of the local situation and farmers' perspectives, and, on the other, the rush in formulating a model for irrigation management at local level by the end of the OSDP II contract. This resulted from the difference between "project time" and "farmer time." Farmers were not ready to discuss any form of management as long as water wasn't available everywhere and all the time, while the project timeline required the OSDP consultants to establish the WUA through formal assemblies.

Finally, also in relation to Đức-Hòa, due to organizational and financial problems (in particular those of the Ministry of Planning and Investment), the joint force of Société du Canal de Provence (SCP) and Hydraulic Engineering Consultants Corporation II (HEC II) were not operational until April 2016, at the end of the second phase of the OSDP. Their assistance was therefore not in a capacity to adequately guide, supervise, and control the work of the VAWR and CPIM teams, which was its primary mission.

3.2.3. The local operating model in Tân-Biên

At the same time, Tây-Ninh Irrigation Management Company (IMC Tây-Ninh) developed its own model, many parts of which overlapped with the WUA's boundaries as established by the project, yet with a different idea regarding its organization. To this end, a structure specifically dedicated to the management of the Tân-Biên perimeter was created: the Tân-Biên Irrigation Management Team (IMT), which aims to unify and coordinate the management methods developed in the two districts of Tân-Biên and Châu-Thành within the irrigation perimeter.

The existing management structure for irrigation in Tây-Ninh since the 1990s includes a hierarchy with the Irrigation Management Company (IMC) at provincial level and the Irrigation Management Enterprise (IME) at district level, which the newly established Tân-Biên IMT holds an equal position to. Each IME with several hydraulic workers take responsibility for operating and maintaining the irrigation related structures in the district (e.g. opening gates, renovating or concrete-lining the canals, weeding, and so on). To be able to reach the households, the IMC Tây-Ninh has been working with the *Tổ-Thủy-Nông* model of water operators (see Figure 9).

“Tổ” means group or organization in Vietnamese; however, it points to individuals working in irrigation operation and maintenance of an area of tertiary and on-farm canals. The *Tổ-Thủy-Nông* (a single person) represents the farmers in the designated area in signing the contract with the IME and is responsible for the management and exploitation of the infrastructure in providing water for agriculture production, fee collection (before 2008), and system protection and dredging (IMC manager, interview on July 5, 2016). For these services, each water operator receives 8% of the amount of the subsidy allocated by MARD to the IMC, and his—all water operators so far have been males—remuneration is calculated in proportion to the area for which he or she is responsible. They are designated as water operators¹⁵, just like of the WUGs under WUA established by the OSDP program.

The IMC considers the water operators as their “extended hands”, and it does not reflect a local organization such as WUG (March 2017 interview). According to IMC, although the model does not align to the state guidance to water user group (e.g. Circular No.75/2004/TT-BNN), experience over the past thirty years testifies to the efficiency and suitability of the model to Tây-Ninh's context. By and large, we may refer to this model as IMC contracting. Explaining the reason for choosing the contract model of *Tổ-thủy-nông*, IMC representative stated that:

“Until now, after having seen different models in different places, in the specific case of Tây-Ninh, this model [contracted irrigator], although it is not modern, does now follow the state regulation, and up to now is still the most suitable and most effective approach due to several reasons: (1) cooperatives need more financial capacity from its members to extend activities to more than just irrigation services as without additional activities, there is no more income to run the organization, and even the two pilot areas on N20 and TN17

¹⁵ Each water operator in the IMC model is appointed and mobilized by the commune authority (a common practice in Vietnamese bureaucratic structures) and works under the technical guidance of the IME's workers. Water operators are often responsible for an area of about 150–200 ha.

with 9 and 12 cooperatives, respectively, created by VWRAP project¹⁶, after the first support, did not thrive; (2) the irrigation/irrigator group is like contract to individual, working according to a set allowance, which is very suitable given the predominance of private farming in Tây-Ninh.” (Interview on July 5, 2016).

In clarifying why, neither cooperatives, nor any official form of water organization is in charge:

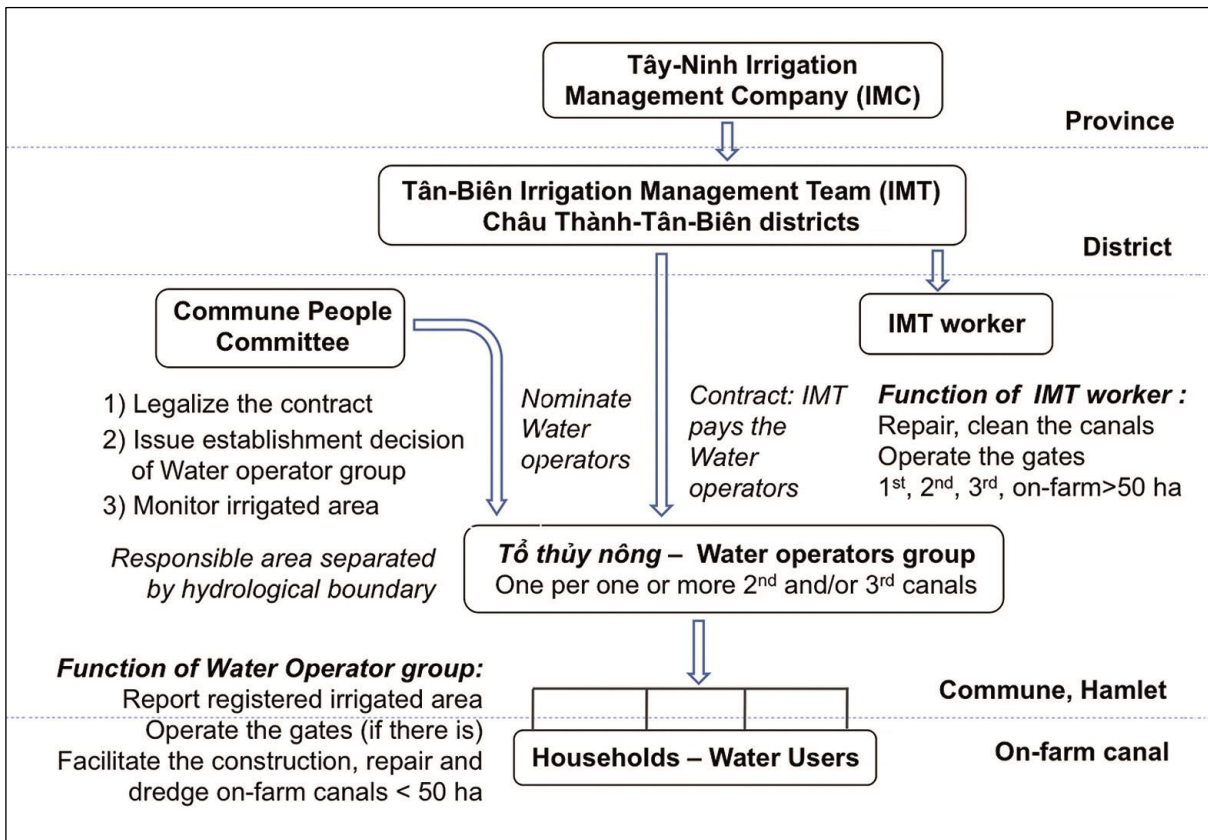
“It is because personal requirements are not met [the level of skill of the leaders], thus cooperatives cannot be formed; in addition, their financial condition is not good enough to contribute to the cooperative; there is a low capacity to mobilize the cooperative members as many of them are poor while richer farmers would rather do business on their own rather than put money into cooperatives.” (Interview on July 5, 2016).

The model proved suitable to the individualistic farming dominant in the area. The choice for IMC contracting model is the result of a learning process in which it is significantly influenced by the failure of previous attempt to implement PIM with WUAs/WUGs and cooperatives in the area. The government model of irrigation service cooperatives (programmed before 2006 and continued after 2010 with the new rural program) or WUGs/cooperatives established within the donor-funded VWRAP project did not find strong ground after the end of these projects (fieldwork in Châu-Thành district, Tây-Ninh, August 2016).

The model provides that the IMC dominates the water operator selection process, in cooperation with local authorities (this will be discussed and confronted with the new approach later on). It works because it closely matches the management ability of the IMC and the financial constraints involved (e.g. farmers are not motivated to contribute more, and the system is sufficiently small and less bureaucratic). In addition, the conditions for real democratic and autonomous organizations such as WUAs/WUGs face neglect from both farmers and local authorities. Most farmers still do not see the point or aren't capable of contributing (both in cash and in kind) to the system given that that the state promoting care for the Vietnamese people, while local authorities do not go beyond their bureaucratic checklists when organizing WUGs.

¹⁶ The “Vietnam Water Resources Assistance Project” (VWAR: 2004–2012) was funded by the World Bank to modernize and increase the productivity of Vietnamese agriculture, improve the management of water resources, and reduce dam safety risks. The Tây-Ninh area was within the scope of capacity building in the PIM application for the project.

Figure 9.
The IMC–IMT irrigation management model

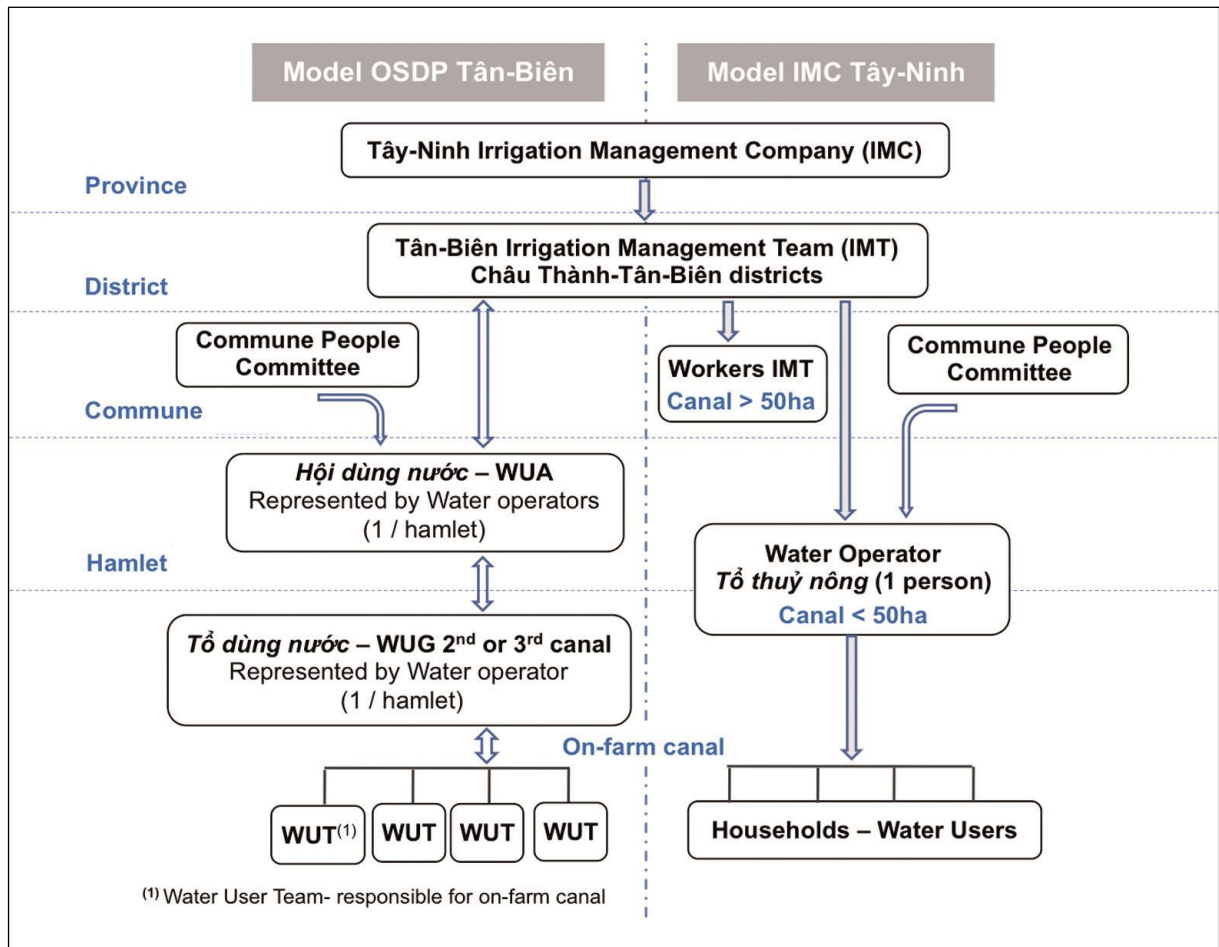


Source: EFEO, 2018.

In this model, the Tân-Biên IMT worked with the commune cadres to choose water operators for 15 areas separated by hydrological boundaries. This process took place at the same time as the OSDP activities, and the water operators that worked with Tân-Biên IMT were the same water operators who were “elected” (appointed) in the WUA assemblies. However, there are differences in the way water operators are appointed: they become water operators of a given number of canals instead of the water operators of a given hamlet, marking the key difference between the hydrological boundary-based IMC model and the hamlet-based OSDP model. We also recorded some mismatches in the areas of responsibility of each water operator in the two models.

Such overlapping of the two structures reflects a process of co-evolution or mutual learning between the irrigation management company’s staff and the project’s PIM experts of the OSDP program. Yet, contradictions in boundary divisions such as between administrative borders for project WUAs and mostly hydraulic boundaries for the IMC contracting water operator, and the three-level versus one-level structure (see Figure 10) creates more confusion than assistance for the local irrigation managers, as well as for the IMT Tân-Biên, the commune and hamlet cadres, and for water operators themselves.

Figure 10.
Comparison between the WUA model proposed by the project
and the operating model of IMC Tây-Ninh



Source: EFEO, 2018.

Despite the confusion regarding the model to be applied, as one commune cadre put it, the commune authorities supported the implementation of the WUA/WUG/WUT model with following assemblies in the area:

“WUA – too new, not yet understood; ... we shall need to elect the head. But “tổ dùng nước” [OSDP model] is also “tổ thủy nông”?! [IMC model]. But then if we have more people, how we can pay them? The rules are complicated. It is hard if we establish but not able to maintain.” (Interview with a commune cadre on June 8, 2016).

Supporting the project falls under the responsibility of the commune authority, a task assigned to them by the provincial and district managers. In another aspect, while things are still uncertain, national consultants got their expert power from the guiding of the process. All hesitated to discuss the model, to state whether it was good or bad, because the evaluation could not be conducted given the uncertainties. Thus, all stakeholders involved, and first and foremost the farmers, adopted at “wait and see” approach. This is a common reality in terms of social change: a new practice, rule or norm will be considered, tested, then approved, rejected or adjusted (see Ostrom 1992 and Cleaver 2012 for further

discussion on institutional processes). The participatory approach will fulfill its role only if this process is allowed to happen. The consultants were aware of this (interview on July 5, 2016), however, due to the pressures of the project timeline and the explicit requirements stated in the TOR, a series of WUAs were established together following the exact same model rather than one at a time, allowing for step by step adjustments. Thus, at the end of the project, although the IMC was recognized as the most efficient model, the final report does not reflect this reality and continues to consider the WUAs/WUGs/WUTs model as the ultimate aim, even though the WUA and WUG units are now slated to be merged within the Tân-Biên IMT.

In sum, while WUA may provide a foundation for the management structure for future expansion of the irrigated area, it displays a complex structure that currently remains on paper. Tân-Biên's case illustrates that the formal institutionalized and standardized organization of WUAs are not applicable due to the diversity of conditions between areas and between zones in a given area. In some cases, water distribution could be done easily by informal agreements and everyday dialogue between water users, with no organization or standardized rule and charter needed.

At the end of the Phước-Hòa project, the only working part of the WUA model of the OSDP is the water operator, which already existed in the management model developed by the IMC in the early 1990s. At this stage when system operation and maintenance are being settled down, commune cadres play the even more crucial role of appointing and mobilizing individuals to take on the role of water operators, supporting the registration of irrigated land, solving conflicts, and playing an intermediary role between the Tân-Biên IMT and water operators and farmers.

The gradual abandonment of the collective water management model advocated by the project had its epilogue at the end of 2018. The Tân-Biên IMT, which was officially created on November 1st, 2015 to establish a coherent and efficient water management throughout the perimeter¹⁷, was dissolved on December 27, 2018, officially due to budgetary constraints. The management of the perimeter has been entrusted to the Irrigation Management Enterprises of each district in Tân-Biên and Châu-Thành: it therefore follows a political and administrative division and no longer the hydraulic unit that the perimeter was supposed to represent as a coherent whole. This reorganization raises questions about the capacity of the two District Irrigation Management Enterprises to collaborate together and the means that could be mobilized to solve any conflict, particularly regarding the sharing of upstream-downstream water.

¹⁷ Article No. 1 of Decision No. 421/QĐ-TLTN-TCHC issued on 22/10/2015 by the People's Committee of Tây-Ninh Province: "The decision was taken to create the Tân-Biên IMT attached to the Tây-Ninh IMC in order to manage the entire canal network of the Tân-Biên perimeter of the Phước-Hòa project." The article then specifies the sections that will no longer be managed by the Châu-Thành EMI and Tân-Biên EMI, respectively.

3.3. OSDP Phase II in Đức-Hòa perimeter: too early for PIM and WUGs

In 2016, under the authority of CPIM, 43 assemblies were organized and 43 WUGs were established. The assemblies were organized following the principle of delegation, and several water users were thus invited to attend the event. Local cadres were the ones deciding who to invite based on a list of potential users. Commune cadres also appointed the one and only candidate to be elected as head of the WUGs. More often than not, the head of WUG (head of management board of the WUG) in Đức-Hòa were local cadres, either at hamlet or commune level. The assemblies of WUGs in Đức-Hòa followed a bureaucratic checklist with the introduction of the assembly, the introduction of the delegates, the election of the WUG management board and the head of management board, the reading of the bylaws of the WUG, and the decision of the commune's People's Committee recognizing the WUG and its manager.

The establishment of WUGs through the OSDP program in the Đức-Hòa perimeter intervened ahead of water availability. At the time of the assemblies, water was available in only small portion of the whole perimeter (in the upstream communes), given the lack of on-farm canal and later arrival of water in the system compared to in Tân-Biên perimeter (2016 versus 2014). Thus, the area was yet to be familiar with the "new" water channeled through the concrete above-the-ground canals. In addition, the management agency for water in Đức-Hòa district, the Đức-Hòa Center for the Exploitation and Management of Irrigation (CMEI, formerly the Đức-Hòa Irrigation Management Station) is still undergoing restructuring and has yet to plan or to concretely interact with the system, or even to start working with OSDP consultants on establishing any form of water user organization. Thus, while the CMEI was late in starting to draft a plan for water operation and management, OSDP consultants (CPIM), guided by the contract signed with Long-An PPMB, had established WUGs via formal assemblies.

The WUG boundaries are somewhat aligned with those of the Tertiary Units, following project guidelines. However, its heavy management structure and the big size of some WUGs calls the feasibility of these organizations into question. 43 WUGs were established in the perimeter, of which 4 WUGs are inter-commune and some are inter-hamlet; the rest are within hamlet administrative boundaries. The area managed by each WUG officially ranges from 80–530 ha, consisting of 150 to 900 households each (source: WUG list provided by CPIM consultants). The management structure of WUG is rather heavier than that of the WUA in Tân-Biên, having 7–20 people in the management board with various positions assigned such as head, deputy head, accountant, treasurer, and water operators. Mostly, the head and deputy head of WUG are either hamlet chiefs or deputy chiefs, and most members of the management board are local cadres and prominent farmers (well-off farmers with good farming skills). The complex structure with formal procedure of WUG assembly in Đức-Hòa follows the Vietnamese state management structure in facilitating the development of cooperative. It thus reproduces the bureaucratic system currently in place (see Figure 11).

The model is inactive so far. Some WUG leaders have confirmed that the WUGs haven't had any activity since they were established (interviews on September 21, 2016 and in March 2017), and many farmers are not even aware of the organization (SISS, 2018). One WUG leader explains the predicament:

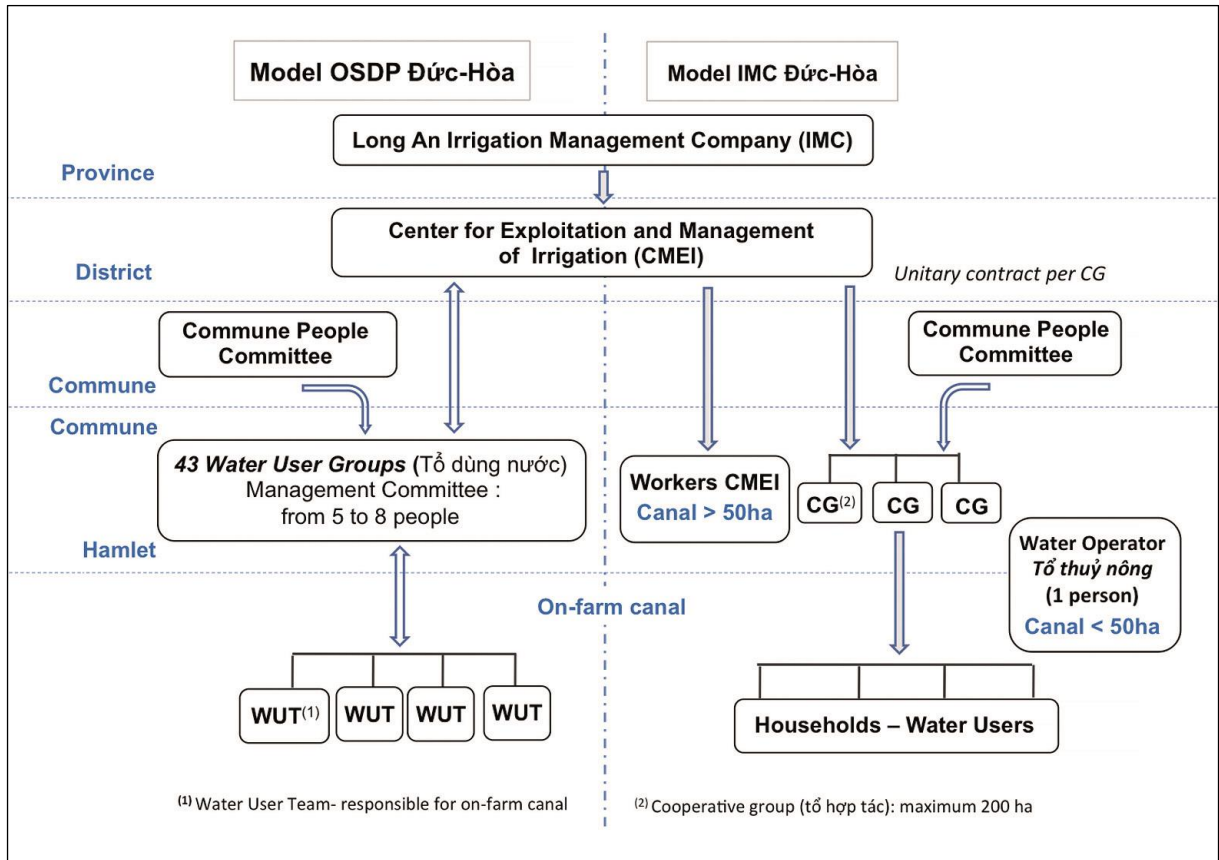
“WUG will only be active if water is available, but only when people can be organized (probably by WUG), will on-farm canals be built, only then water is available.” (interview on September 21, 2016, summarized by the authors).

This issue was considered by the CPIM and discussions among project personnel on which action should be carried out first, and whether they should wait for the system to be ready (i.e. when water supply is available in more areas of the perimeters) before establishing the WUGs. However, the project had time constraints, and the CPIM had to do the same as the VAWR in Tân-Biên, and found themselves obliged to follow the TOR.

The CMEI, despite being asked to comment on the model, mainly acted as a passive observer of the establishment of the WUGs. The management agency of the Phước-Hòa perimeter in Đức-Hòa received documents from the CPIM and expressed doubts regarding the use of their structure (March 2017 interview). Although the public entity does not have any specific plan on how to organize the system, previous experience from the Lộc-Giang system¹⁸ since the 1990s is giving the system managers a feasible reference (see Figure 11). The Lộc-Giang system was operated and managed with a structure of water operators (*tổ đường nước*), i.e. individual contractors signing with the Đức-Hòa Irrigation Management Station (IMS), which was later renamed CMEI, to operate and manage the small canals, in the form of seasonal labor for the IMS. The water operator was also responsible for the collection of the irrigation service fee (before 2008), checking the irrigated area before the season, during, and at the end of the season, before a final evaluation of irrigation was conducted, and payment was then distributed to them (September 21, 2016 study). Similar to the case in Tây-Ninh province, each water operator receives 8% of the amount of the subsidy allocated by MARD to the IMS (compensation for the exemption of irrigation service fee since 2008) for these tasks, the remuneration being calculated in proportion to the area of responsibility (so far, all water operators in the area are male).

¹⁸ 3,000 ha of 5 communes are irrigated by the pumping system of Lộc-Giang which was established on a government budget line in 1990.

Figure 11.
Comparison between the WUG model proposed by the project and the model applied in the Lộc-Giang system since the 1990s



Source: EFEO, 2018.

Predictably, the decisions for the management model in the Đức-Hòa perimeter created by the Phước-Hòa project will be in the hands of the engineers of the CMEI (a possible model is envisioned in Annex 6). The process will likely be a top-down approach with a strong influence of the state management structure. However, it will not necessarily result in system inefficiency.

The current way of managing the system at local level, which works, is having individuals sign task-based contracts with the CMEI (*hợp đồng vụ việc*). The structure is explained away as a temporary solution due to current restrictions on funding and lacks in the institutions working to extend the worker's network of the CMEI (CMEI, March 2017 interview). Tasks include operating the gates of the assigned canals (secondary and tertiary canals), checking the infrastructure for any malfunction, recording/registering the irrigated area with farmer signature. Commune and hamlet cadres used to do the tasks before, and some of them continue working with the CMEI and signed contracts in an individual capacity.

In the way the system is currently set up, the commune and hamlet are informed about the irrigation schedule, and CMEI and grassroots authorities maintain close collaboration. Concerning the pros and cons of the Lộc-Giang model, should it be applied in the newly-

established Phước-Hòa perimeter, we would see social interaction between farmers, local cadres and CMEI where dialogue and co-learning exist in the Lộc-Giang system. Farmers have an absolute right on their own fields and the CMEI, besides any other agendas, is also interested in running the system efficiently. A possible problem could lie in the uneven power leverage between the management agency and farmers, leading to state imposition and tardiness in responding mechanisms to any issues with the system. Ultimately, all stakeholders fall under the dynamics of social, political conditions which will shape the interaction and decision made in the coming period.

4. On-farm canal building: between state and farmer initiatives

The making of the on-farm canal is the final link of the chain and a crucial one in connecting the irrigation system to its designed area of irrigation. In absence of an on-farm canal networks, engineers at Đức-Hòa CMEI and Tân-Biên IMT estimate that only 35 to 40% of the designed area in the two perimeters has access to water. This situation creates *de facto* inequality. Owners whose fields are located near the PST network pump or siphon water directly from the canals, while others must continue relying on groundwater pumping using individual motor pumps. This explains why the question of construction of on-farm canals is the subject of frequent discussion between researchers, technical consultants, local authorities, and farmers. Also, without an effective on-farm network, the question of choosing an appropriate management model seems to be premature, as water supply has yet been satisfactory and reliable in many locations.

4.1. Principle: designed by the project, constructed by farmers

Making on-farm canals is the responsibility of farmers as established in the Vietnamese legal framework, and the Phước-Hòa project in particular. Indeed, international donors and the Vietnamese state assume the responsibility of water users for all costs relating to the building and maintaining of the on-farm canal networks. In compliance with the project rules, the consultants in both perimeters regularly reminded the users that the project might possibly provide technical assistance for the design of the quaternary canals though the users themselves would have to bear the cost of construction, and no compensation was to be made available for land loss or related costs. Nonetheless, many users still believe that the state will finance this final link in the hydraulic system and state that they will not give up any land without financial compensation. The extent of these beliefs depends on the perimeter under consideration: farmers in Đức-Hòa tend to have more expectations regarding the possibility of state or project supports, while farmers in Tân-Biên are more certain about the absence of any possible compensation. This discrepancy originates in a rumor in Đức-Hòa regarding potential state support for the on-farm system (i.e. linking to the new rural area budget). Due to the new institution of free water since the exemption of irrigation service fees in 2008 and the state's policy of care for the people (through projects with free infrastructure and proper compensation for any land acquisition) have resulted in some common attitudes, namely waiting for state support for on-farm canals or expecting irrigation companies to invest in on-farm canals in order to collect fee later on, and other similar thoughts.

The Phước-Hòa project defined a separate package aiming at supporting the design of on-farm canals, with a required participatory approach. The package aims at working with farmer and build their capacity in designing on-farm system: the layout, size and canal; the target is to design the standard of canals, sections for different kinds of canal (earthen, concrete, brick-slope, rigid, or flexible plastic pipe), but not their construction. The rationale was that leaving farmers to decide by themselves on everything including the design and construction of the on-farm canals would take a very long time.

The activity involved lengthy discussions following pre-designed steps (see Annex 7). The first proposals were framed in both perimeters by the Long-An and Tây-Ninh PPMBs, respectively, with the support of the OSDP consultant, a long way back, during the OSDP's phase II. The support of a team of consultants in formulating the TOR, which is common in Vietnam yet not in all cases, was the way used to ensure that favorite group of consultants would win the tenders. However, this process took much longer than expected. The first terms of reference (TOR) proposal for the on-farm design was finished by the OSDP consultants in April 2016 in Đức-Hoà, and in August 2015 in Tân-Biên. That proposal focused on making the design of all on-farm canals (516 canals for Tân-Biên and 567 canals for Đức-Hoà), the design being achieved over the course of approximately 6 months. It was also the time when international consultancy team entered the scene (in April 2016). The international consultants for phase II was formed by Société du Canal de Provence in cooperation with the Vietnamese Consulting Joint Stock Hydraulic Engineering Company 2 (SCP-HEC II). After back and forth communication between the donor (AFD), the project management boards at central level (ICMB 9) and provincial level (PPMBs), as well as researchers, and project consultants (SCP-HECII), a new proposal was to be drafted by SCP in April 2017. The idea was then not to design all on-farm canals, but only a certain number and to pay more attention to local conditions and farmer needs. Such a transition happened thanks to the exchange between the project donor, project consultants, the provincial management board, and our research group.

Yet, while a longer project time could have enhanced the efficiency of PIM implementation in this project, the long planning process for the on-farm package had caused problems in the project timeline and fund mobilization; some participants even had doubts that it wouldn't be completed in time for the end of the financial timeline in March 2018. Besides, one local project management board (PPMB) also cast doubts regarding the rationale behind the designing all canals, and even the necessity for such a working package at certain points. This dynamic in the realm of communication between stakeholders in the project is framed into an idea of "it is the wish of the donor" as the main rationale in discussing activities in the water development project, adding to the miscommunication between project stakeholders. Although the donor was not in a position to impose an idea or step in the project, in this case of the on-farm design package, the donor's idea was transferred down to provincial levels through ministerial project managers as an essential activity to be implemented. For this reason, the PPMB thought it was the wish of the donor and continued working on the proposal even though they did not see the need for it. The long discussion in this case of the on-farm package with a careful check by the international consultants actually helped make clear to the PPMB that they could actually refuse. In February 2018, Tây-Ninh province confirmed that the on-farm package was not necessary for the Tân-Biên perimeter as local agencies were working on their own strategy. This special case in the Phước-Hòa project, besides the problem in terms of long-time planning and discussion, indeed testifies to the active participation of various stakeholders, and how a project should be taking into account the reality of existing water management practices.

4.2. The design of on-farm canals in Đức-Hòa (2nd stage of OSDP phase II)

The on-farm package proceeded in the Đức-Hòa perimeter following the winning bid of the CPIM. The CPIM started working from May 2018 and finished in December 2018. The whole process reflects the complexity of the project procedure, in this case leading to a better discussion and an innovative adjustment in methods. However, the long process also resulted in a disadvantage given the limited time frame of the project.

The TOR that defines the work of the CPIM is called “Consulting Services for Surveys and Participatory Design of Farms in the Area of the OSDP Program.” The definitive TORs were divided into two main tasks. The second task on the participatory design for on-farm canal consists of three main components to be carried out simultaneously to achieve an on-farm network design that is both feasible and sustainable, and accepted by all the stakeholders involved. The three components are: (1) community consultation; (2) topographical survey; and (3) the design of the on-farm irrigation system. We will focus our analysis on the first component.

In the first version of the TOR, as revised by the international consultants, the SCP insisted that priority should be given to the negotiation-consultation process between water users who would share water from the same on-farm canals¹⁹.

“Wide consultation with the beneficiary communities in the irrigation area: The consultant should play a facilitating role in stimulating the dialogue within and among the farmers sharing the same off-take for on-farm canal. ... The solutions of canal routes and work structure have to be based on the discussion between farmers with technical support of the consultant.” (TOR draft version, undated: p.15).

In this matter, the SCP proposes “two consultation meetings in the field with the concerned people of each on-farm canal: (1) First meeting for information dissemination, discussion and decision-making on the route, type of canal, location of outlet and election of the leader; (2) Second meeting for possible updating, funding, means and work schedule.”

Based on the number of 837 on-farm canals (an overestimate that was reduced to 567 by the CPIM), the SCP proposed that 1,674 consultations (two meetings per on-farm canal) be conducted across the perimeter. Unfortunately, due to financial limitations and time constraints, this individualized approach based on each on-farm canal was missing in the first TOR written by CPIM and proposed by the Long-An PPMB. The basic unit of consultation in the first TOR remained the WUGs. Thus, facing the challenges of financial and time limitations narrowed down the choice of better approaches for the OSDP consultants as well as the chances of successfully implementing PIM.

It was foreseen that choice to focus on the WUG units would have a significant impact on building consensus among farmers sharing water from the same on-farm canal. As the CPIM points out in its report, “... the construction of the on-farm canal will inevitably be difficult because there is no mechanism to support land compensation ...”. Pursuant to Vietnamese regulations, the responsibility of building, operating, and maintaining on-farm canals lie with water users. Nevertheless, reality has witnessed the step-over into

¹⁹ This principle was adopted by the VAWR in the Tân-Biên area, although it was not implemented (see Figure 7. Water Users Team).

this process of various actors ranging from irrigation managers to local authority. In case of Đức-Hòa, there have been attempts from the district authority to invest in on-farm canals to develop a vegetable-growing area. In all cases, farmers were not to be compensated for the land loss for on-farm canal. However, there *could* be a mechanism for cost sharing between farmers because not all would be losing the same amount of land and the one losing more land would not necessarily derive more benefit from the canal. Such mechanisms should be in place, either officially enacted by the authority or socially accepted by the people.

The CPIM had indeed conducted a survey during the first phase of the OSDP among 1,882 households in the 43 hamlets and 12 communes belonging to the irrigated area. The results showed the inevitable difficulties and, consequently, the key challenge of conducting a negotiation/consultation process that would fit as closely as possible to the socio-economic realities of farmers:

"In case on-farm canals cross the fields of farmers, 690 out of 1,882 households (representing 36.7% of the total) agreed to contribute land for canal construction and required a reduction in contributions. The rest expressed no comments, suggesting that they were still confused in what to choose: they do not want to both contribute to canal construction and lose land without compensation. ... Regarding, the contribution to the construction of on-farm canals, among the 1,882 households surveyed, only 749 households responded. Among these, contributions as cash was the majority answer (55.7%), followed by contributions in labor (39.4%), and construction materials (8.4%)." (On-farm canal design package TOR, 08.2016: 8)

In the TOR approved by the project, the process is organized following four farmer consultation meetings preceded by a field trip. The field trip was intended to update the on-farm canal plans made at the end of the first phase of OSDP II (at the end of 2016). According to this scheme, the first meeting was to deal with the "Consultation on the canal's layout and construction of the system," the second with "Decision making on canal's layout," the third "Consulting WUGs on on-farm design solution" and the fourth, "Consulting on-farm canal design solutions (hardware cost estimates)."

In the field, we were able to take part in four meetings organized by the CPIM with five WUGs (one was organized jointly for two WUGs). The meetings were all in one hamlet, Tân-Mỹ, in which 59 on-farm canals of a total length of 24.42 km were to be built to theoretically irrigate 870.50 ha of land. However, as was the case throughout the perimeter (see below), the number of on-farm canals decreased to 29 canals at the end of the CPIM's mission.

The objective of this series of meetings was to present the design of the on-farm canal and have it validated by the users after discussions. At the end of these four meetings, we identified several common features of the process.

1 – The four meetings followed a standard format (PowerPoint presentation): (1) presenting the Phước-Hòa project and the study conducted to obtain the design; (2) presenting and explaining the design of canals; (3) discussing and overtly voting by hand raising to validate the design; (4) briefly reviewing the ongoing agricultural development programs in the district and conditions to be met for on-farm canal building.

2 – At the beginning of each meeting, a document was given to each farmer indicating the number of households concerned by each on-farm canal and a plan showing the route and the names of the owners of the plots that each canal was to cross. The farmers were not able to see the proposed route before the meeting. As a result, they did not have the opportunity to meet and discuss with the others with whom they will share (maybe) water from the same canal and possibly start a round of discussion to try to find an agreement on the route, the type of canal to be built (e.g. earth, brick, concrete, PVC pipe) and their contribution (land donation, contribution in cash and/or in kind such as labor).

3 – The attendance rate at meetings we attended was around 40% of total potential users. The participation in the meeting of November 8, 2018 which completed the participatory cycle, as defined by the CPIM, was much weaker with a low level of participation of water users, except for one WUR (figure obtained from a commune cadre of Tân-Mỹ). These last meetings aimed at choosing the canal type in which cost of construction is an important and “sensitive” subject.

WUG	Number of households involved	Number of on-farm canals	Present during the meetings on October 4–5, 2018	Present during the meetings on November 8, 2018
Bàu-Công	30	6	13 (43 %)	19 (63 %)
Bàu-Công & Lập-Điền	66	15	15 (38 %)	0 (0%)
Bến-Long	63	10	26 (41 %)	8 (13 %)
Chánh-Hội	37	5	16 (43 %)	4 (16.2%)

4 – During the meetings we attended, the question of having to give the land required for the passage of the canals was not mentioned either by the consultants or by the farmers present. The subject remains nevertheless as sensitive as that of construction cost. It is true that the speed with which the meetings were conducted (1.5 hours for each meeting with 2 meetings scheduled for the same morning, 45 minutes being devoted to the official presentation of the CPIM) did not provide enough time for thorough discussion in all related matters.

5 – We also noted that the consultants sometimes had inadequate knowledge of the realities on the ground. In fact, several farmers confirmed that the names of some owners on the distributed maps were no longer relevant because the land had been transferred, sometimes to residents of Hồ-Chí-Minh City. In another case, the layout of a future canal appeared on the plan while a canal already existed on the ground. When asked about the issues, the head of WUG Bàu-Công explained that the first field survey for making route plan went too fast. In fact, the route of the 6 on-farm canals under the boundary of his group was determined by the team in one day. The team consisted of himself and two other members of the WUG, an experienced farmer, the secretary of the hamlet party unit, the hamlet chief and 2 CPIM consultants. Farmers (future users of the studied canal) were also present for the layout of two of the six channels, but none for the layout of the other four.

6 – Finally, at the end of each meeting, the proposed design was anonymously voted on by participating farmers although they represented only a minority of the total number of WUG members. Moreover, organizing the vote at WUG level does not make sense since the voters are involved maybe on only one canal (and maximum two) and are thus therefore not legitimate to decide on the layout of other canals that didn't concern them.

At the end of their mission, the SCP drafted a mid-term evaluation report on the implementation of the TORs by the CPIM. One of the recommendations is quoted as follows:

“The participatory approach is at the core of the project and shouldn't be neglected. Meetings with WUGs are very important and should be handled as soon as possible. They are crucial moments for farmers to express their questions/remarks/doubts concerning the project and a lot of time should be spent on discussions with farmers.” (SCP-HEC II; 07.2018:10).

It seems that this recommendation has not been followed up²⁰.

4.3. Local state initiative: the construction of on-farm canals in Đức-Hoà

To our knowledge, as at October 2018, only two on-farm canals had been built under farmer initiatives. Several factors can be put forward to explain this wait-and-see attitude.

First, the unreliability of water supply in many sections (except the upstream communes) adds to the low incentive of farmers in constructing an on-farm network. The system seems to rely on direct water access for those whose lands are adjacent to the canals, by both gravity and pumping. In some parts, water is shared between fields by overflow, but to very small extent (observed in December 2017). There is still a persistent rumor that the state and/or the project will continue doing on-farm canals the way PST system was done. The other feature is the lack of farmer incentive to self-invest in on-farm canals given their small land-holding sizes (3,000 m² to around 1 ha per household). Smaller landholding means significant loss of land and higher costs to invest on something such as on-farm canals.

Second, an initiative of the CMEI and Department of Agriculture and Rural Development (DARD) of Đức-Hoà district bolstered the rumor that the state would pay/support the making of on-farm canals. These two organizations mobilized the force from present provincial agenda for program “New rural area” (*nông thôn mới*), in which irrigation infrastructure is listed in the scope of investment. The program was combined with the Đức-Hoà district agenda to invest on a zone of 285 ha of vegetable as part of the “High-Tech Vegetable Production Program” (concerning 5 communes of Đức-Hoà and 3 having lands belonging to Phước-Hòa perimeter). With a VND 5 billion budget, DARD started the process of working with independent consultants (not CMEI) for surveying and the design on-farm canals in the designed vegetable zone (see Figure 12). This intervention applies top-down state investment manner with commune authority acts as collaborator when

²⁰ The comparison of the TOR and CPIM's final report also shows a significant decrease in the number of on-farm canals, from 567 canals for a total length of 309.5 km to 341 (-40%) and 167 km (-46%), respectively. It is regrettable that CPIM's report does not provide an analysis of causes of this sharp decrease or, at least, hypotheses that could explain this trend. In any case, we can only hope that arrangements and solutions will be gradually identified by farmers themselves with the support of water managers (CMEI) and state managers, are important actors in the irrigation perimeters.

being asked only. This special case of investment may affect farmers' perspective towards waiting for the state support; yet could start a process of working on on-farm system in the area. In concrete terms, farmers think that public authorities, either DARD or CMEI, will pay for the canal construction while farmers will contribute in-kind by giving their land for canal construction.

Figure 12.
On-farm canals built under the district program for hydraulic development,
Tân-Mỹ commune, Đức-Hoà perimeter (October 12, 2017).



Top left: From the tertiary canal to an on-farm outlet;
Top right: Outlet and on-farm canal through a pipe;
Bottom: Two outlets from on-farm canals to the field.
Source: EFEO, 2019.

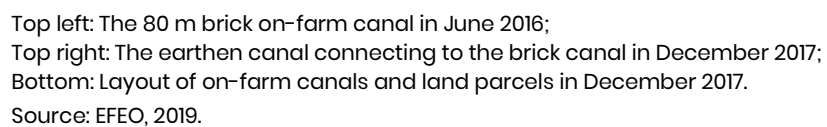
Finally, the third factor, mentioned above, favors a wait-and-see attitude: the influence of current dynamic of land market. Facing with the increase in land trade and constant increase in prices offered, some farmers hope to sell their fields in the short to medium term and are therefore not ready to make any investment, even constructing such modest infrastructure as an on-farm canal.

4.4. Self-construction of on-farm canals in the Tân-Biên perimeter

Tân-Biên presents a complex picture with strong dynamics coming from various networks, Tây-Ninh IMC, the commune government, and farmers. Tân-Biên has a number of advantages over Đức-Hoà due to large landholding, larger extent of water availability through which farmers have been able to test and compare the advantages of canal water over groundwater pumping. The issues had already been discussed in daily social gatherings about how on-farm canal could help farmers get better access to water, and whether any rule for contributions could be set up (e.g. on-farm canal could have to run along parcel borders in order to minimize the use of land, and farmers already having access to water directly from the bigger canal would only have to give land but not have to join the construction of the on-farm canal). Besides, thanks to the consistency in information dissemination during OSDP II, farmers in Tân-Biên were well aware of their responsibility to build the on-farm canals.

The very first case of on-farm canal constructed by farmer was a brick one.²¹ The first section of 80 m canal N16-1-10 in Phước Vĩnh commune was built in June 2016 by farmer initiation, followed by the gradual extension of an earthen canal network to irrigate to more than 10 ha in December 2017 (see Figure 13a). Another case of three on-farm canals in Thạnh-Tây commune (N 2-22-11, -13, and -15) mobilized by the commune authority, starting end of 2016 and continued during 2017 with various meetings, formal signed agreement, and the collective construction of canal N 11 (see Figure 13b).

²¹ Brick is a building material used to make walls, pavements and other elements in masonry construction. Clay bricks can either be fired or not. Those used for the on-farm canal in Phước-Vĩnh were fired.



A case is also recorded in Hòa-Đông-A hamlet, Hòa-Hiệp commune, where Khmer farmers pulled the work together for an on-farm canal. Eight farmers, including four members of the same family, dug a 500 m long on-farm canal from the canal N3-6 to irrigate 15 ha of rice fields. For this purpose, they rented a digger (backhoe loader) for 30 million VND (€1,200).

A conclusion for the three case studies (Pannier and Huynh, 2017) is that the making of an on-farm canal as a form of collective action could be derived from and limited by various factors ranging from natural factors (climate—rainfall; groundwater availability; soil characteristics, the position of the plots relative to roads, transport conduits, canals, and tube wells), to the pre-existing infrastructure for irrigation and drainage, to agricultural features such as cropping patterns and farming techniques, and to the human and social factors (previous experience/observation/information about canal irrigation; solidarity, moral obligations and social cohesion including kinship and neighbor relations; and the articulation of individual logics and collective dynamic). Above all, the principle of having reliable water, i.e. the trust of farmers in the working capacity of the system, proved to be the first condition for any action to be taken. As farmers repeatedly responded when asked if they would participate in the construction of an on-farm canal: *“it depends if there is enough and constant water in the tertiary canal”* (farmer interviewed on December 21, 2016 in Thanh-Tây commune). The extent of influence of each factor varies between cases and there are signs of interdependence between them. One factor can make the others carry more or less weight. Because these factors determine the motivation and the capacity of farmers to engage in on-farm canal building, they should be taken in consideration to foster and design on-farm canal in the Phước-Hòa project area.

4.5. In short, each on-farm canal should be treated as a unique case

All in all, the building of each on-farm canal is a unique case and cannot be standardized. Such process includes informal negotiation and arrangement between a group of farmers who will share the water delivered and maintenance of the one on-farm canal that brings water to their fields. The case extends to the nature of institutions process in shaping irrigation governance (Ostrom, 1992; Cleaver, 2012). It, continuously, comprises the complex co-existence of rules and norms which, through the interaction between stakeholders in-project and everyday activities, are refined to accepted practices. Thus, it implies the potential for outside support or external rules introduced by the project or the government. However, it must be one by one with careful work joint by all stakeholders. A farmer stated the following in the workshop about on-farm canal in Đức-Hoà:

“To make it fast, we should come to each area, over here, we have farmers, local cadres and consultants. We will all discuss and decide how to do the canal, the start and the end, by PVC pipe or by concrete. All must be made in detail. Then we agree, the consultants [on the design, the potential cost] and the farmers [on land loss and canal direction]. Then we proceed to construct the canal. In that way, it will be fast.” (WUG leader, Đức-Lập-Hạ, interview on October 5, 2016)

This one-by-one method maximizes the participatory approach and should ensure higher efficiency of the canals when finished. However, this process takes much more time than an 8-month package of consultancy can handle. This speaks again to the mismatch between

reality timing and project timing in PIM implementation. One action worth considering is whether longer project time and capacity building for local expertise (e.g. CMEI and IMC) would make sense to continue the work of project after its official completion. In the Đức-Hòa perimeter, official discussions regarding farmer contributions of land for on-farm canal construction is common, occurring *via* the current network of state administration and state policy in agricultural investment. At the same time, in the Tân-Biên perimeter, which benefits from more than thirty years of experience in water use from the Dầu-Tiếng reservoir, the water manager (IMC/IME) seems to have a more relaxed approach of the subject, preferring to let things come naturally, as he believes on-farm canals will be built when the farmers really feel they are necessary. What will happen next in the two perimeters will be interesting to observe.

5. Overview of PIM implementation in the Phước-Hòa project and future outlook of irrigation management

5.1. PIM implementation in the Phước-Hòa project

The implementation of PIM in the Phước-Hòa project through the OSDP program attempted to build up a new practice of water user participation into the system operation and maintenance, which in longer term would facilitate better system efficiency and empower the water user in relation to the system manager (state-owned entities). The initial training as regards the concepts, and the establishment of the water user organizations were conducted in an area with no experience in user participation in all steps and all levels of irrigation operation and management (PIM), and where collective practices had faded after decades of state hierarchical management structure and/or through the newly established practices of individual farming (i.e. the new economic zone of Tân-Biên). Thus, a model that worked elsewhere in places with much experience in self-administration, such as in rural Nepal (as documented by Ostrom, 1992; Pradhan, 2000) or Mexico (Rap, 2006) may not work in the case of two perimeters of Phước-Hòa. As Meinzen-Dick (2007:15204) forewarn: *“Groups with a long cultural tradition of irrigation are likely to be more involved than users who have recently started irrigating.”* Instead of importing models or institutions, interventions should therefore identify existing institutions and build upon them (*ibid*).

5.2. Project time versus farmer time

The very first issue in irrigation development under a multi-purpose project is the gap between “project time” and “farmer time.” Projects have a predefined duration and do not allow much room for interval and expansion in the sequence of planned actions. Farmers, on the other hand, wish to have an “observation round” in order to empirically assess the quality of water supply (in terms of regularity, stability, and quantity) as well as the models before engaging in any form of collective (or non-collective, yet constructive) action. As a result, the Phước-Hòa project, despite its efforts to facilitate PIM, hurriedly gave birth to a series of user organizations whose legitimacy, efficiency, and sustainability have been called into serious question. It should not be forgotten that WUGs and WUAs were created in areas devoid of traditions in the collective management of common goods and where a reliable water supply at all sections of the canal system is available.

Changing perspectives and habits and/or creating incentives takes time. Farmers and local irrigation managers need more time to consider and decide what is to be done in terms of system operation and management. PIM training and establishing WUAs as supported by the project happened much too earlier, at a time when most farmers did not (reliably) see any water in the canals and were still unable to assess the benefits of switching from groundwater to canal irrigation, and from an individual to a cooperative style. The financial incentives and motivation generated by the trust in local authorities and experts were reflected in the participation in the project’s organized meetings, and very few

farmers truly took part in the PIM process. The diversity of cropping patterns made

the intervention even more challenging and time-consuming due to the shifts in land use over time (from sugarcane to cassava, to rubber, then to vegetables). As a result, PIM and the WUAs remained alien to water users.

At the donor level, the need for longer time in building PIM is recognized, as asserted in the following: *“Successful irrigation and drainage projects require participation by all stakeholders in planning, implementation, and Operation and Maintenance (O&M) to create a sense of ownership of and consequent commitment to the project. This requires that project planning allows time for beneficiaries to participate in planning and influence decisions affecting their future”* (ADB 2012). However, project institutions with complex procedures often leave few opportunities for flexibility and provide insufficient time frames. Project interventions should therefore focus on initiating a collective process rather than trying to finalize at all costs. The ambition should then be to acquire enough knowledge of the socioeconomic and political structures and dynamics of each locality to design appropriate “collective choice rules” in a truly participatory way, leaving it to users to shape the “operational rules” at their own pace.

5.3. Top-down and bottom-up approach

While PIM remains an exterior, ideal terminology, citizen participation in state matters and the WUGs in Vietnam are regulated officially by legal documents. The engagement of citizens in state matters was promoted through grassroots democracy policies. However, in the bureaucratic implementation of the policy, the participation of water users is set as a “designed or regulated participation,” which is very much top-down and bureaucratic. According to the Ministry of Agriculture and Rural Development’s Central Project Office for Water projects (CPO, 2012), the participation of citizens is regulated as follows:

“Methods of participation include participating (to share one’s opinion) when asked, reviewing when requested, participating in monitoring (according to regulation), participating in the design, construction, and management (attached with responsibilities and benefits), contributing financially according to regulations (procedure, policy) and complying with all requests during the process from planning, designing, investing, constructing, and managing.” (Central Project Office for Water projects—CPO, 2012).

By and large, participation continues to follow steps that are pre-designed by the state and implemented by consultants. This reflects the strong influence of the existing government structure. The Vietnamese government’s involvement in irrigation follows a trend in modern state-funded and state-managed irrigation. Leyronas and Calas (2019) define this, in the context of Cambodia, as the *“administered commons,”* in which the public service aims to delegate its responsibility to new or previously existing informal “communities” that it seeks to give structure to. The authors assert that *“the State does not have control over the reconfiguration of norms, which are the bases of legitimization for a new local institution and for the processes of trust and solidarity required for proper application of rules”* (*ibid*:11). The case presented in this paper adds to the argument to demonstrate how participatory irrigation management administered by a top-down approach fails to accommodate the diversity in the realities and nature of norms and/or

practices formation. However, we value the necessity of involving the state in managing irrigation in the case of Vietnam; this argument will be further developed in the next section. The Phước-Hòa project attempts to combine both top-down and bottom-up approaches. Our research demonstrates that the adequate sharing of information about new systems is required and is then to be translated to the co-development of a system management mechanism. Conventional training has not empowered the farmers however, rather, it reflects a reproduction of preexisting power relations and a bureaucratic top-down structure. It is therefore the unavoidable task of project and state managers to make themselves available for technical and institutional support when requested. Under the existence of inequality in social power (experts and state authority tend to have or be given more voice and power in negotiation by farmers), an appropriate setting for participation is essential. Such an approach would have to promote the genuine involvement of farmers, including decision-making power. Only then can the value and feasibility of a combination of top-down and bottom-up approaches prevail (which is the rightful approach adopted by donors and mentioned by OSDP consultants).

5.4. The role of the government in PIM implementation

In OSDP I, future water users remained passively on the sidelines of the program's activities, including the consultation of Primary, Secondary and Tertiary (PST) design. The "no state involvement" rule derives from the "users only" principle, as the system is managed by the users and for the users (World Bank, 1996, as cited in Van Vuren *et al.*, 2007). Part of the practice also results from the attempt to create a form of farmer organization that is autonomous from the state system. This proved successful in Nepal, the Philippines, and Mexico in achieving effective management and stronger accountability of water users while lowering costs for the state. Nevertheless, applying the same principles in the case of Đức-Hoà and Tân-Biên irrigated areas did not seemingly bring about similar outcomes.

Applying a "no state involvement" rule in PIM in Vietnam introduces the risk of neglecting the main protagonists that could shape and determine the success of PIM and the effectiveness of the system. Local cadres, such as commune and hamlet cadres, who are at the lowest echelon in the chain of governance in Vietnam's hierarchical state system, have been the "prolonged arm" of the state in implementing policies and in social mobilization. In this system, macro policies and divisions of tasks defined in legislation create and allow a framework for enforcement and implementation at lower levels. At the blurred interface between society and local government, when most of the latter are also farmers, excluding the local state apparatus leads to neglecting a number of prominent people and those with authority. Given that Vietnamese society is formed and strongly influenced by state-controlled management, the population in the Tân-Biên and Đức-Hoà perimeters have developed a sense of overlap between governmental and social leaders. In other words, those with authority in the area also possess social prestige; thus they might be more able than others to gather people for PST design reviewing, PIM and WUA discussions and training, and at the later stage for on-farm canal discussions.

Over the course of the OSDP, commune cadres and hamlet cadres were then asked to support OSDP consultants in solving problems/conflicts, gathering people for training workshops, and some hamlet cadres became the leaders of the WUA established by the project. The Phước-Hòa project again fell into an ambivalent position in the ongoing debate over the autonomy of local irrigation management from the state system, and whether

making use of the local system that can also bring in benefits. On the one hand, the inclusion of local cadres potentially transfers the existing bureaucratic system of top-down mandate into the community-based WUA. On the other hand, it makes use of the inclusion of many of the most prominent and experienced leaders in the area. In reality, the case of Tân-Biên irrigated area demonstrates a significant diversity on the perspective and capacity of local cadres in PIM building (while this is yet unclear in the Đức-Hòa case). While some express deep understanding of the social and agriculture situation and great potential for PIM building, others are embedded in a rigid state management style of a bureaucratic command and control regime. Additionally, in both perimeters, farmers have been living somewhat self-directed lifestyles since decollectivization (in the later 1980s). Their independent farming system has been connected to the state system in which social authority and ability for social mobilization has been exercised through local cadres. Over time, autonomous organizations among farmers and cooperation in groups have become alien to farmers in this area.

Development projects and interventions are often initiated at the central level and by way of governmental structures of management. Yet, it is not necessarily a bad thing. Experience in irrigation management worldwide confirm that a polycentric combination of institutions favoring public, collective, or private ones should be considered instead of single solution attached with single institutional pillar (Merrey *et al.*, 2007). In such context, the effective water organizations could become the partners of state agencies and creators of pressure for reforms and accountability (Uphoff, 1991).

The strong involvement of the government is both advantage and disadvantage for PIM process. As asserted in the case of PIM and Irrigation Management Transfer in the Beni Amir irrigation scheme in Morocco, *"the existence of a strong central government can be, at the same time, a catalyst and a constraint for the PIM/IMT process: a catalyst because a real motivation of a central government can speed up the process, but a constraint because of the difficulty to change strong bureaucracies"* (Van Vuren *et al.*, 2004). A similar situation is demonstrated in the Phước-Hòa case where the strong influence of state institutions has supported the dissemination of a new ideology of cooperative water management, by training and disseminating the idea of PIM, of working together to acquire water from canals. However, *via* organized delegated participation, the current structure restricts possibilities for functional role sharing and spatial role sharing in which every farmer gets the opportunity to participate in the decision process, the key success factor for PIM in Japan (Kono *et al.*, 2012). Thus, the strong influence of state structure, if not carefully adjusted, risks reproducing bureaucratic rigidity and imposing a top-down PIM approach that will then result in *"a reinstating of a similar bureaucracy around why and how WUAs are formed, ..."* (Biradar, 2012:2). Above all, it is crucial to maximize the catalyzing effect of the bureaucratic structure while minimizing the disadvantage of top-down rigidity, then giving space for building PIM from within.

5.5. When WUGs become an end in itself

The case of PIM implementation in the Phước-Hòa project demonstrates how components for certain objectives can become an end in itself. WUGs or WUAs are only tools or options in building PIM, yet, over time, become targets to reach in projects. The link between WUGs and PIM is strongly supported by project guidelines and pursuant to Vietnamese institutional rules:

“Participation has to be through organizations and agencies that are established with proper legal status. This is the prerequisite for participation. In the case of individuals, the households that use water from irrigation structures have to participate through their water user organization; the organization is established according to the law, have legal status, and are financially autonomous.” (Central Project Office for Water projects—CPO, 2012)

The entire procedure for preparing and creating collective organizations has been standardized, unified, and organized according to a top-down model. What happened for WUAs and WUGs in the two perimeters turned PIM into a blueprint, though one that has been repeatedly identified as an unsuitable one (Groenfeldt and Sun, 1997; Ostrom, 1997; Van Vuren *et al.*, 2007). Some reasons stand out, such as time constraints, legal incompatibilities, the lack of training for farmers, and the top-down bureaucratic functioning of the Vietnamese administration. This organization also results from the ease of reporting back to international donors and the central government.

Criticisms of PIM or new policy implementation in the irrigation sector worldwide touch upon its affiliation with the engineering discipline (Rap, 2006), standardized solutions for a large diversity of irrigation systems which is common among planners operating through routinized bureaucracies (Mollinga and Bolding, 2004). In spite of the critics throughout the world, due to institutional constraints in projects, the issue persists. At the end of the day, the WUAs/WUGs are potentially following PIM’s unfortunate implementation formula: *“As long as the project exists, PIM exists; once the project is completed, PIM disappears!”* (March 2017 interview with PPMB Tây-Ninh). The survival of WUAs in Tân-Biên and WUGs in Đức-Hòa and collective practices in irrigation operation and maintenance will rely on different factors including the management regime for irrigation shaped by the irrigation companies, the local motivation for collective actions, and one decisive factor are economic returns, as Meinzen-Dick (2007) concludes regarding the significant influence of financial incentive in irrigation management.

5.6. The ideological limits of PIM implementation

PIM implementation in Phước-Hòa faces limitations due to main common assumptions of the development agenda. The first considers the rural world as a homogeneous space of very similar local communities (villages, hamlets), which at the same time become the primary socioeconomic units to which a standard management model is applied, without seeking adaptations to specific local contexts (Lavigne Delville, 2009). Similarly, each local community is perceived as a uniform whole, when local communities are in fact structured into differentiated social groups and are affected, as in all peasant societies in the world, by conflicts, power issues, economic inequalities, and so on (Papin and Tessier, 2002). The second is based on the principle that forms of collective action will emerge and be spontaneously structured simply because the actors share a common set of objectives and interests. This simplistic vision neglects an empirical reality: not all actors participate equally in the participatory governance of a common good, as some seeking to take advantage of the resources without investing in it, or assuming their natural share. It is the behavior of these “stowaways,” to use E. Ostrom’s expression, that weakens collective action. On this point, Olson states:

In reality, the case of very small groups aside, unless coercive measures or some other specific provisions encourage them to act in their common interest, reasonable and

interested individuals will not voluntarily seek to defend the interests of the group (Olson, 1978).

This points to the fundamental challenge to the logic applied in PIM implementation in Phước-Hòa project. The project strives to create collective structures without asking a fundamental question: what are the drivers that could make local actors marshal their efforts? *“Collective action is exercised for the defense of a collective interest which, by definition, exceeds the sum of individual interests”* (Weisten, 2017). Some key drivers that are widely discussed in the literature are the scarcity of resources, certainty of access to water, and availability of a fee system for operation and management. However, none of them is an absolute assurance that users will coordinate their actions collectively. Rather, there is a play of interdependent factors not limited to natural conditions, preexisting infrastructure, agricultural features, and human and social and political factors.

Last but not least, the success of and extent of need for PIM is decided by different factors requiring local context to be taken into account seriously. In their investigation of the Beni Amir system in Morocco, Van Vuren *et al.* (2004) determined that although the system somehow possesses the preconditions for PIM/ Irrigation Management Transfer such as water scarcity, the relatively good performance of infrastructure, the availability of cash money from farmers, PIM did not find its place there due to the good performance of the relevant public water entity, the strong social focus on central rule, rigid labor relations in the civil service, and farmer hesitation in taking over new responsibilities. It raises the issue of the necessity of PIM, which is often not questioned in PIM interventions. There has been assessment on PIM(-related) projects in Vietnam. Nguyễn Xuân Tiệp stated that PIM was mostly been established as a requirement in certain projects and each project has had different approaches to implement PIM (Nguyễn Xuân Tiệp, 2008: 81). Therefore, those projects *“... [are] biased [towards] achievements and [can] hardly be effective. Many PIM models return back to their starting point after projects are completed regardless of the projects’ scale and funding sources”* (ibid:81).

Conclusion

What happens next? The future outlook of irrigation management

Upon project completion, CMEI Đức-Hoà and IMC Tây-Ninh will take over the infrastructure. The CMEI's role is to check on any physical problems and repair them gradually with its assigned resources, while Tây-Ninh PPMB and IMC carry out various projects within the overall agenda to improve Tây-Ninh irrigation. Thus, Phước-Hòa's infrastructure become a new component of the local irrigation agenda that must be operated and managed through existing institutions and under the influence of socioeconomic dynamics. The amalgamation is obvious in the decision to merge the Irrigation Management Team (IMT) of Phước-Hòa in the Tân-Biên perimeter to the preexisting Tân-Biên and Châu-Thành irrigation enterprises (IMEs). Hydraulic boundaries and administrative borders are interwoven, probably impacting system efficiently negatively in certain way, yet also ensuring consistency in the IMC's management structure. The pros and cons of the decision are to yet be seen.

In particular, the sixteen WUAs in Tân-Biên and forty-three WUGs in Đức-Hoà that are reported in the project documents and formally recognized by the commune authority will be observed closely by local stakeholders. Above all, though they may be confused and/or unclear about the benefits of different models, water users aren't decided on whether and how they will participate. Such "wait-and-see" behavior is embedded in the farmers' attitudes, as they constantly negotiate between different factors in order to earn a living for their household. At the same time, the informal structure of discussion, decision-making, and action taking for on-farm canal in some areas reflect a working model at the local level. This model may or may not fall into the defined boundary set by WUGs/WUAs, but one thing is certain, if it is formed, it works, and with a lesser level of formality. Thus, while being inferior in terms of leveraging power when facing local authorities, as is particularly evident in public meetings and project training workshops (where rarely any dissent is expressed), farmers or waters users in the area retain a power to decide on their participation to state/project-initiated activities, and in decision-making. What happens next after the OSDP is shaped and refined by local dynamics of interaction between stakeholders and with institutions (rules and norms) being negotiated. Such local socio-economic dynamics will also be informed by current development towards urban or industrial expansion. They purportedly put enormous pressure on agriculture system, challenging the vitality of irrigation system (Turral, 2010). In the case of both Phước-Hòa perimeters, the industrial and residential development adjacent to the Đức-Hoà perimeter and the general out-migration of rural labor in both irrigated perimeters are contributing to the lack of labor and lack of incentive to invest/contribute to system operation and maintenance.

Located about 30 km from Hồ-Chí-Minh City and connected with this agglomeration by the National Highway 22, the commune of Tân-Mỹ is an attractive destination for investors and, a series of entertainment venues have been built such as the Mỹ Quỳnh Zoo and the Tân-Mỹ golf course. And in December 2017, Long-An province approved Vingroup's investment project of a 900 ha residential complex and a 200 ha leisure center. Though local authorities are adamant that these investment projects will not impact agricultural land, due to the proximity of these projects with the irrigated area, land prices in Tân-Mỹ have shot up fourfold over the course of a single year.

Besides, the management of both Phước-Hòa perimeters and the PIM will be strongly influenced by the current discussion regarding irrigation reform in Vietnam. At the end of 2016, DARD Tây-Ninh province discussed another model of irrigation operation and management. Learning from past experience of the inefficiency of system management due to low returns leading to financial dependency on the limited state budget and the lack of local human resources to maintain tertiary canals, Tây-Ninh joined other Vietnamese provinces such as Vĩnh-Phước to try out the new model. This model will expand the role of the IMC and the IME to the outlet from bigger canals to on-farm canals, leaving only the stewardship of the on-farm canals to farmers. According to the DARD of Tây-Ninh province, this is a first step to arrive at ambitious water supply service to all households. The IMC will then become a service provider providing water for farmers as customers. This model, if applied, will eliminate the role of WUA in tertiary level operation and maintenance. The debate continues, and Tây-Ninh's attempt for reform has yet to be approved and remains under discussion, especially under the light of the new irrigation law passed in 2017. The new irrigation law indeed challenges the free access to irrigation water implemented since 2008, aiming to transform irrigation into a paid service based on the establishment of a contractual relationship between a "service provider" and a "customer", i.e. users rather than a group of users. In this model, all tasks relative to the operation and maintenance/repair of the networks will be carried out by company workers and contracted workers, in return for a fee payment. However, the law remains to be enacted through decrees and other legal documents (see Annexes 1 and 9 for more details on the applicable legal framework).

It is not yet clear whether Vietnam will change its approach to water service fees as it has been a heated policy debate²² (see Annex 8 for a history of irrigation service fees in Vietnam). Although the idea of using economic incentives to promote an efficient use of resources is becoming popular, remains the perception that "*water is not a conventional commodity*" (Meinzen-Dick and Rosegrant, 1997; Perry *et al.*, 1997). Experts have warned about second-generation problems regarding privatized irrigation systems, including insecure water rights, inadequate revenues, uncertainty about responsibilities for future rehabilitation, and weak financial and administrative skills (Svendsen, 1997). Another warning regarding irrigation water pricing is that "*Charging for water use or disposal is not an end in itself, but an instrument for achieving one or more policy objectives*" (Molle and Berkoff, 2007:21). The experts convened in the workshop on agricultural water pricing in Hà-Nội²³ shared the same view, asserting that although irrigation service fees (ISFs) can generate revenue, they are not always effective in incentivizing improvements in farm-level water management because water demand is often highly inelastic, and more than

²² There has been a shift in Vietnam's Irrigation Service Fee policy. It started with a rather stable market mechanism for twenty-five years (1962–2003), with farmers benefiting from the service and paying when satisfied with the service. During a second period, from 2003–2007/2008, users were partly exempted (in the case land affected by disasters, the IMC could ask for state support pursuant to Decree 143), and the state provided the remained. Then with Decree 154/2007 and Decree 115/2008, the state now pays for farmers, following the principle of "third-party paying the service" (Nguyễn Trung Dũng, 2015). So, since Decree 115, farmers stopped paying any fee related to irrigation, and the IMC and its line agencies have been operated and managed through the state budget for ISF compensation (*cấp bù thủy lợi phí*). The policy releases the IMC from difficulties in collecting the ISF and securing financial capacity, and farmers from the financial burden of paying for irrigation, while securing a minimum budget for O&M (Operation & Maintenance). However, in the absence of fee collection, state budget for the sector is increased, there is a risk of loss of farmer accountability regarding the operation and stewardship of water infrastructure and IMC accountability to users, as well as the risk of erroneous reporting on irrigated areas.

²³ This workshop was organized by "FE2W Network and Initiative for Sustainable Landscapes in Vietnam", ISLA Vietnam, in June 2016.

a single policy tool is needed to achieve such a policy goal. While it is not clear what will happen next in terms of irrigation management in Vietnam, and whether the current structure of management for the Phước-Hòa perimeters will be effective, one thing is certain: a water (service) pricing system for irrigation has a long way to go given the diverse level of irrigation infrastructure and the current government agenda to support rural development and promote the image of a government that is close to the concerns of its people.

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List of Acronyms and Abbreviations

ADB	Asian Development Bank
AFD	Agence française de développement (French Development Agency)
BNN-TL	Bộ Nông Nghiệp-Thủy lợi [Ministry of Agriculture – Irrigation]
BVI	Black & Veatch International
CPIM	Center for Participatory Irrigation Management
CPO	Central Project Office for Water Projects
DARD	Department of Agriculture and Rural Development (at provincial or district level)
DANIDA	Danish International Development Agency
Đức-Hòa CMEI	Center for Management and Exploitation of Irrigation (formerly IMS)
Đức-Hòa IMS	Irrigation Management Station
ICMB9	Hydraulic Project Investment and Construction Management Board No.9
IME	Irrigation Management Enterprise (at district level in Tây-Ninh)
IMT	Irrigation Management Transfer
INPIM	International Network on Participatory Irrigation Management
MARD	Ministry of Agriculture and Rural Development
NGO	Non-Governmental Organization
OSDP	On-farm and Social Development Program
O&M	Operation & Maintenance
PIM	Participatory Irrigation Management
PVC	Polyvinyl chloride
PPMB	Provincial Project Management Board
PST	Primary, Secondary, and Tertiary (canals)
QH11	Quốc hội 11 [General Assembly 11]
SCP	Société du Canal de Provence

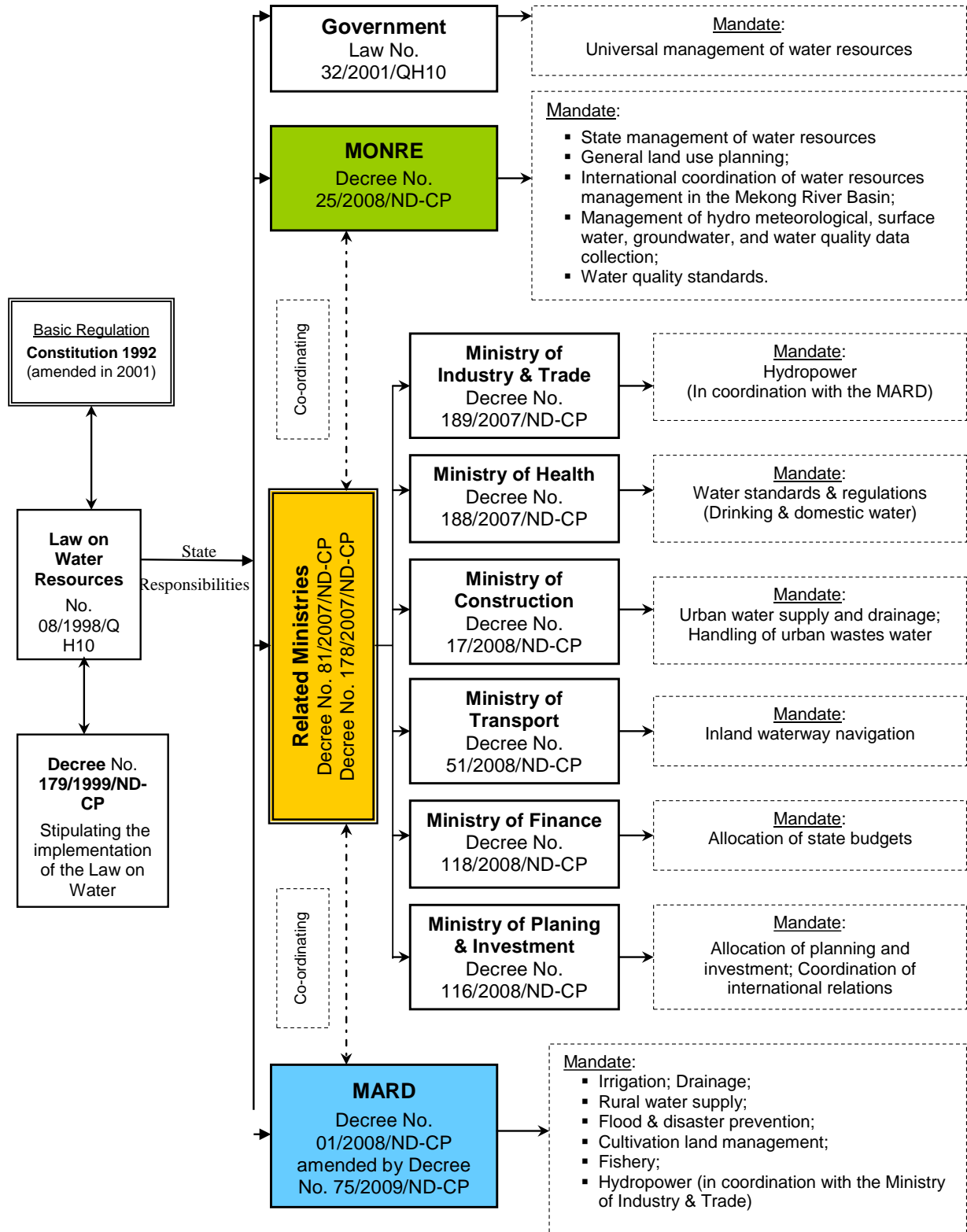
HECII	Hydraulic Engineering Consultants Corporation II
Tân-Biên IMT	Tân-Biên Irrigation Management Team (in the Phước-Hòa project irrigated area)
Tây-Ninh IMC	Irrigation Management Company (at provincial level)
SISS	Southern Institute for Social Science
TOR	Terms of Reference
TT-BNN	Thông tư – Bộ Nông nghiệp [Circular – Ministry of Agriculture]
TU	Tertiary Unit
VAWR	Vietnam Academy for Water Resources
VWRAP	Vietnam Water Resources Assistance Project
WUA	Water User Association
WUG	Water User Group
WUO	Water User Organization
WUT	Water User Team

Annexes

Annex 1. The legal framework of Vietnam's water sector

Water is among the natural resources defined by the Vietnamese legal system; its management falls under the responsibility of various ministries and line agencies. For instance, the Ministry of Natural Resources and the Environment holds the general management of the water as a resource, including the monitoring of water quality. At the same time, the Ministry of Agriculture and Rural Development has been the main manager of irrigation water, and is in charge of managing irrigation-related infrastructure such as dykes and embankments. Other ministries also play a role, e.g. the Ministry of Construction is responsible for managing the water supply in urban areas while rural water supply is under the purview of the Ministry of Agriculture and Rural Development.

Figure A1.
State responsibilities for water resources management
 Nguyễn Thị Phương Loan, 2010.



The current key legal basis for water management in Vietnam is the amended Law on Water Resources of 2012, which replaces a 1998 law. The Law was passed to address the demands of socioeconomic development, environmental protection, and sustainable development in a period of strong industrialization, modernization, and international integration.

"The amended Law on Water Resources of 2012 confirms that water is an essential natural resource of Vietnam and aims to protect water resources effectively, use them reasonably, and to prevent and remediate damages caused by water while strengthening government management of water resources. While the LWR in 1998 focused primarily on the water resource protection, the new amendments focus on the three key issues: (1) creating favorable conditions (i.e. tax incentives) that encourage organizations and individuals to adopt advanced technologies and invest capital into the development and efficient use of water resources; (2) diversifying investment resources (either capital or environmental-friendly technologies) in the protection and development of water resources and water supply; and (3) prohibiting more activities that lead to over-exploitation of water resources. The most important effect in the amendments is to change water resources into a kind of public goods and provide greater opportunities to turn the management and use of water resources into an economic sector (e.g. the introduction of water exploitation fees – Article 65)." (Nguyễn Thị Phương Loan, 2013)

Other relevant laws are the Law on Environmental Protection (No. 52/2005/QH11) and the Law on Dykes (Luật Đê Điều) No. 79/2006/QH11. The law provides regulations on planning for flood prevention for river areas with dykes and the planning of the construction, repair, upgrading, solidifying, managing, protecting, maintaining, and utilizing dykes by organizations and individuals with operations in relation to dykes within the Vietnamese territory (Nguyễn Thị Phương Loan, 2010). In spite of the heavy framework in place, Vietnam's water sector still faces challenges regarding institutional complexity and the fragmentation of state management functions with regard to the management of water resources, as well as deficiencies in law enforcement (*ibid*).

The key piece of legislation defining the legal basis for irrigation in Vietnam is the Ordinance on the Exploitation and Protection of Irrigation Works (*Pháp lệnh Khai thác và Bảo vệ Công trình T huỷ lợi*), promulgated by the Standing Committee of the General Assembly (No. 32/2001/PL-UBTVQH10 dated April 4, 2001). The exploitation and protection of irrigation works also touches upon to dykes, flood and storm prevention works and hydroelectric works, as well as water supply and drainage works for urban areas. Irrigation charges and wastewater discharging fees are regulated by the ordinance and the legal documents detailing the ordinance. It was detailed by Decree 143/2003/NĐ-CP in 2003 and amended by Decree 154/2007/NĐ-CP in 2017, which was later replaced by Decree 115/2008/NĐ-CP in 2008, in turn replaced Decree 67/2012/NĐ-CP in 2012. Since 2008 and Decree 115/NĐ-CP, most farmers are legally exempt from irrigation fees. Sanction for breaches in irrigation exploitation and protection are governed by Decree 139/2013/NĐ-CP dated October 22, 2013.

Current development in the irrigation sector includes the attempt to restructure irrigation through system modernization and shifting towards more self-centered benefit generation for supply providers and system management agencies. Decision 794/2014/QĐ-BNN-TCTL dated April 21, 2014 of the Ministry of Agriculture and Rural Development approved the irrigation sector restructuring program. The latest enactment of the Law of Irrigation 08/2017/QH14 dated June 19, 2017 of the 14th General Assembly has the potential to change the

management landscape of irrigation sector. Debates happened during the preparation of the Law with much focusing on the possibility of the return of irrigation service fees or a water price. The ambition is to build a cost-effective irrigation service provider while increasing supply productivity.

References

Nguyễn Thị Phương Loan (2013) “The Legal Framework of Vietnam’s Water Sector: Update 2013.” ZEF Working paper. ZEF: Bonn. ISSN 1864-6638.

Nguyễn Thị Phương Loan (2010), “Legal Framework of the Water Sector in Vietnam.” ZEF Working paper ZEF: Bonn.

Annex 2. The two perimeters: the irrigation system

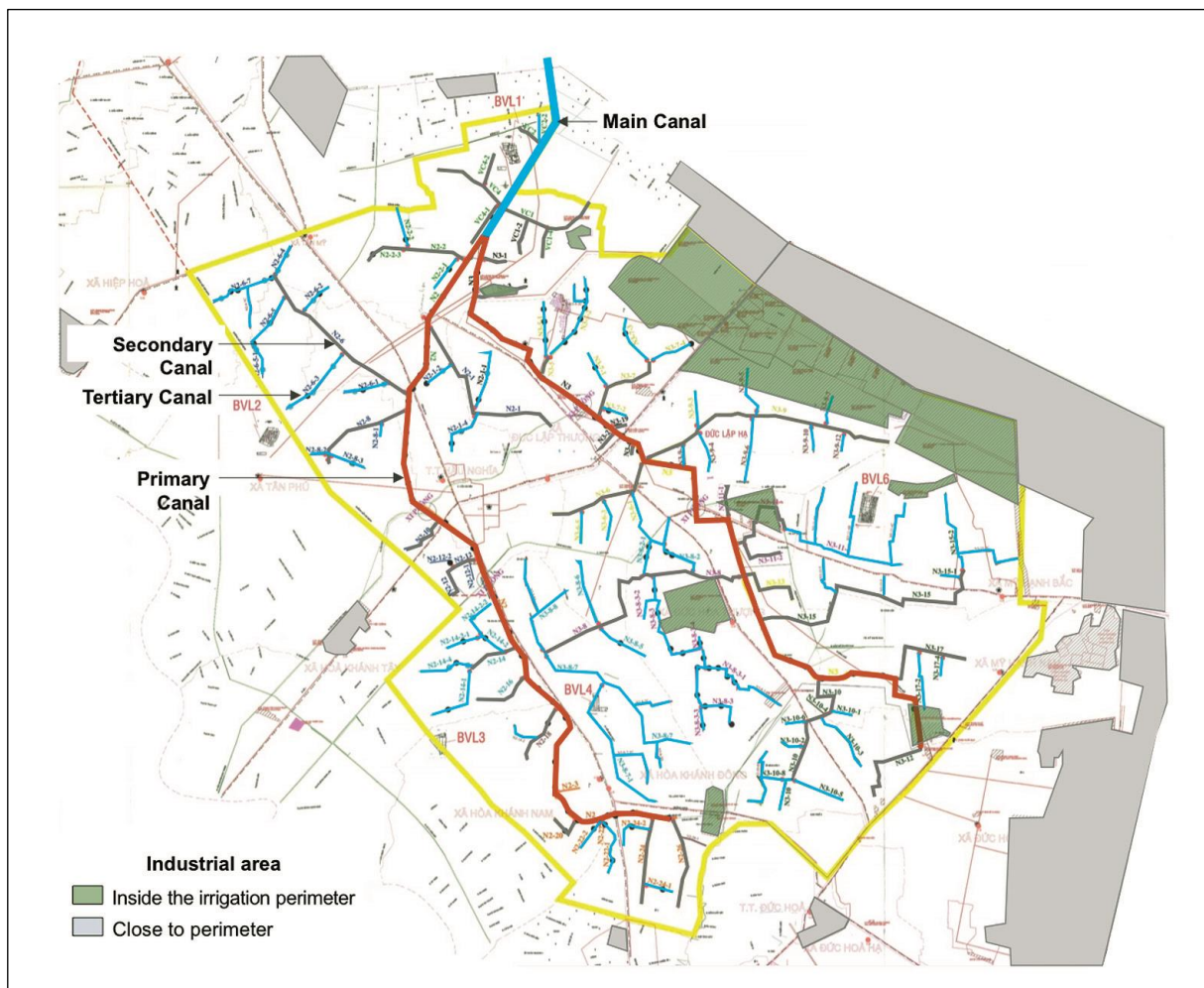
The Đức-Hòa irrigated perimeter

The irrigation system includes primary, secondary and tertiary canals as follows:

- Primary canal: 2 canals, for a total length of 31,766 m
- Secondary canals and direct outlets: 38 canals, for a total length of 62,310 m
- Tertiary canals and branches: 86 canals, for a total length of 88,114 m.

No.	Commune	Canals	Total length (m)	Irrigation area (ha)
1	Đức-Lập-Thượng	70	36,649.1	1,260.8
2	Hoà-Khánh-Nam	28	18,440.0	523.8
3	Mỹ-Hạnh-Bắc	38	19,273.1	924.3
4	Đức-Hoà-Thượng	107	49,091.0	1,727.7
5	Đức-Lập-Hạ	62	56,468.0	1,189.7
6	Hiệp-Hòa	9	3,376.1	202.7
7	Hoà-Khánh-Đông	68	37,559.8	1,072.9
8	Hoà-Khánh-Tây	35	12,705.0	602.9
9	Mỹ-Hạnh-Nam	35	18,728.7	711
10	Tân-Mỹ	59	24,420.8	870.5.3
11	Tân-Phú	38	21,394.2	670.5
12	TT. Hậu-Nghĩa	18	11,417.0	424.0
	Total	567	309,522.8	10,181.1

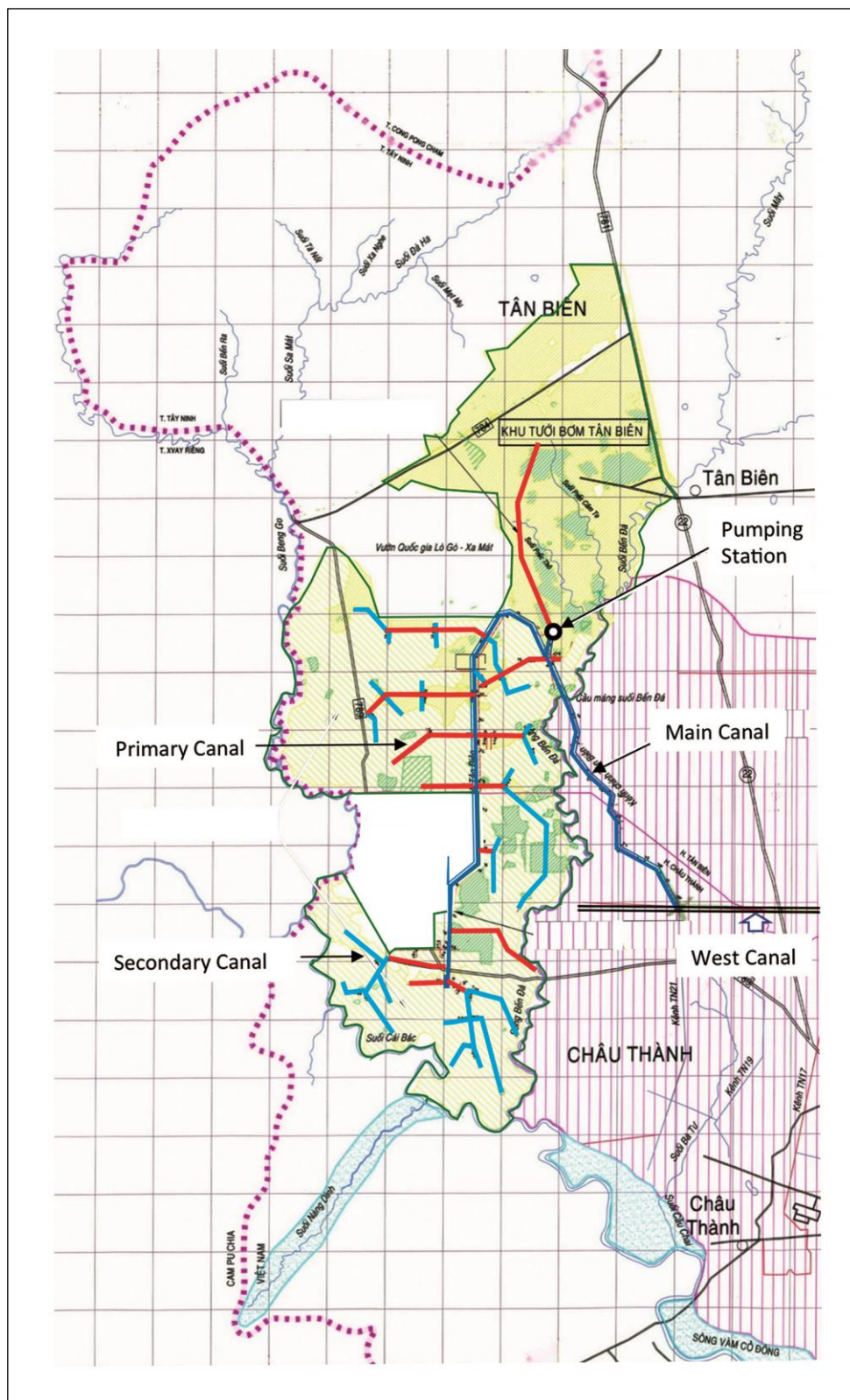
Figure A2a.
The Dực-Hòa irrigated perimeter



Source: EFEO, 2018.

The Tân-Biên irrigated perimeter

Figure A2b.
The Tân-Biên irrigated perimeter



Source: EFEO, 2018.

The irrigation system includes primary, secondary and tertiary canals as follows:

- 20 primary canals, for a total length of 34,279 m, and including 223 regulation structures
- 37 secondary canals, for a total length of 38,782 m, and including 323 regulation structures
- 46 tertiary canals, for a total length of 31,994 m, and including 519 regulation structures.

There are 1,065 structures including: 124 drop structures, 163 road crossing conduits, 4 spill regulators, 34 siphons, 6 spillways, 669 head intakes, 52 end spillways, 13 aqueducts, 3 downstream drainage canals at the drainage sluice No. 1, 2, 3 on Tân-Biên main canal.

No.	Commune	No. of canals	Total length (km)	Total command area (ha)	Number of canals with command area > 10 ha
1	An-Co	36	9.0	261	10
2	Phước-Vinh	212	49.0	1,941	91
3	Mỏ-Công	4	0.9	56	0
4	Tân-Phong	6	1.8	56	0
5	Hòa-Hiệp	142	40.5	2,822	30
6	Tân-Bình	91	28.5	810	22
7	Thạnh-Tây	48	14.8	444	2
	Total	539	144.5	6,407	

Total command area is 6,407 ha (including 230 ha of aquaculture): gravity irrigation area is 5,230 ha and pumping irrigation area is 1,177 ha.

Annex 3. Stakeholder responsibilities.

In the Đức-Hòa irrigated perimeter

No.	Stakeholders	Responsibilities
1	Long-An DARD	Project owner
2	ICMB9	Responsible for project implementation. Providing an interface with ADB and AFD. Responsible for providing overall management assistance and coordination, and providing instructions to the DARDs and PPMBs.
3	Long-An PPMB	Implementing duties as authorized by the DARD; representative of the project owner. Providing survey, design, construction completion profiles of the Đức-Hòa irrigation system, and mapping the layout of primary, secondary, and tertiary canals for the consultants. Direct stakeholder as authorized by DARD.
2	International consultant on monitoring and evaluation (SCP-HECII)	Technical assistance to ICMB9, DARDs and PPMBs for implementation of the OSDP.
4	CMEI	Monitoring implementation status; reporting to the province, district, and DARD on the progress of the surveying and design by consultants. Dispatching professional staff in collaboration with the consultant to be involved in the surveys and public consultations.
5	Đức-Hòa District's People's Committee	Coordinating with consultants regarding implementation. Directing the district's specialized units and communal units to establish the on-farm irrigation development board and coordination with consultants to implement activities related to on-farm canals.

6	District DARD	<p>Consulting the DPC on the implementation of related tasks.</p> <p>Appointing professional staff to collaborate with the consultants during the survey and public consultation.</p> <p>Providing information concerning agricultural production planning, and agricultural production models at the local level.</p>
7	Commune's People's Committee	<p>Establishing a steering committee for the on-farm irrigation development program.</p> <p>Coordinating with the consultants for project implementation.</p> <p>Appointing professional staff to support the activities of consultants at the local level.</p> <p>Directing hamlets and water user organizations and beneficiaries towards performing coordination tasks.</p>

In the Tân-Biên irrigated perimeter

No.	Stakeholders	Responsibilities
1	Tây-Ninh DARD	Project owner
2	ICMB9	<p>Responsible for project implementation.</p> <p>Providing an interface with ADB and AFD.</p> <p>Responsible for providing overall management assistance and coordination, and providing instructions to the DARDs and PPMBs.</p>
3	Tây-Ninh PPMB	<p>Implementing duties as authorized by the DARD; representative of the project owner.</p> <p>Providing survey, design, construction completion profiles of the Tân-Biên irrigation system, and mapping the layout of primary, secondary, and tertiary canals for the consultants.</p> <p>Direct stakeholder as authorized by DARD.</p>

2	International consultant on monitoring and evaluation (SCP-HECII)	Technical assistance to ICMB9, DARDs and PPMBs for implementation of the OSDP.
4	Tây-Ninh IMC	Monitoring implementation status; Reporting to the province, district, and DARD on the progress of the surveying and design by consultants. Dispatching professional staff in collaboration with the consultant to be involved in the surveys and public consultations.
5	Chau Thanh and Tân-Biên DPC	Coordinating implementation with consultants. Directing the district's specialized units and communal units to establish the on-farm irrigation development board and coordinating with consultants to implement activities related to on-farm canals.
6	District division of economic infrastructure	Consulting the DPC to perform related tasks. Dispatching professional staff in collaboration with the consultant to be involved in the surveys and public consultations. Providing information relative to the planning of agricultural production and agricultural production models at local scale.
7	CPCs	Establishing the on-farm irrigation development steering board. Coordinating with consultants to implement local activities. Dispatching professional staff in collaboration with the consultant for activities at local scale. Driving hamlets, water user organizations, and people to perform their tasks.

Annex 4. Establishment of the WUAs in the Tân-Biên perimeter in 2016

Details on the creation process and initial organization

Different stages in the founding WUA assembly in the Tân-Biên irrigated area

The commune leader made an opening speech.

OSDP representative explained the context and the progression of discussions relating to the charter and rules of the WUA by “us”—meaning the farmers—: being approved by “superior” authorities (cấp trên, including the project PMU, Tây-Ninh IMC, and the commune’s People’s Committee), being sent back to the commune’s People’s Committee and the hamlet’s People’s Board for further comments, and the absence of any comments, eventually leading to the printing and presenting of the charter and rules of the WUA to the assembly.

The leader of the Irrigators’ group (Tổ trưởng tổ thủy nông) read the charter and rules out loud.

Discussion and opinions from the water users (supposedly about the charter, rules, and organization, but in practice, in the assemblies we observed, farmers didn’t express any opinion on these, and when they did, they concerned the situation regarding water allocation).

Response and/or opinions from the “leaders”—“managers”—and “delegates” (the leader of irrigator group, the PMU, the Canal management team, the Commune’s People’s Committee, the OSDP, Phước-Hòa international consultants).

Farmers were asked to raise their hands to approve the charter and rules (biểu quyết thông qua), which only occurred in Thạnh Tây and Tân Bình communes after the recommendation of the irrigation cadre of Thạnh Tây commune. This is a symbolic action that no farmer would dare to oppose in public, more so given that many of them didn’t know about the rules and charter before the meeting was held.

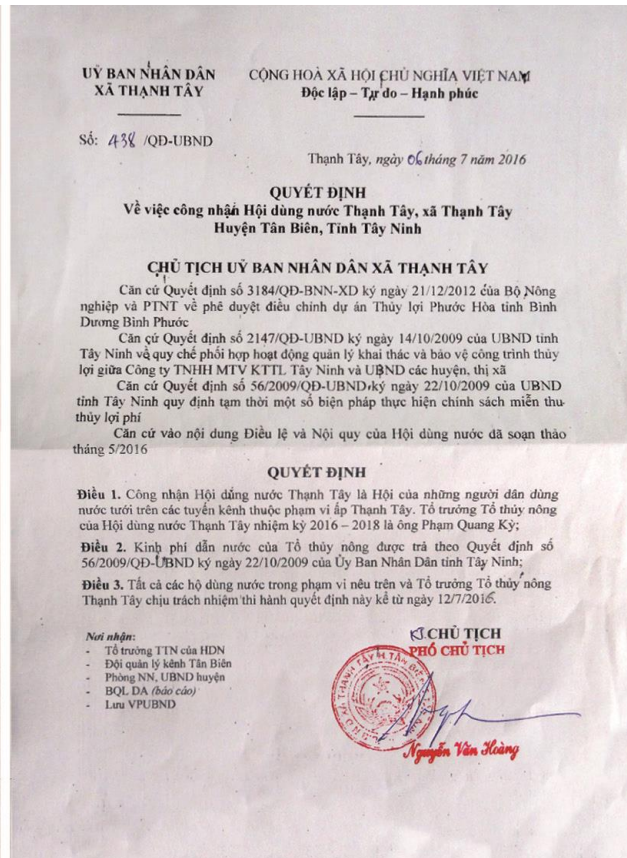
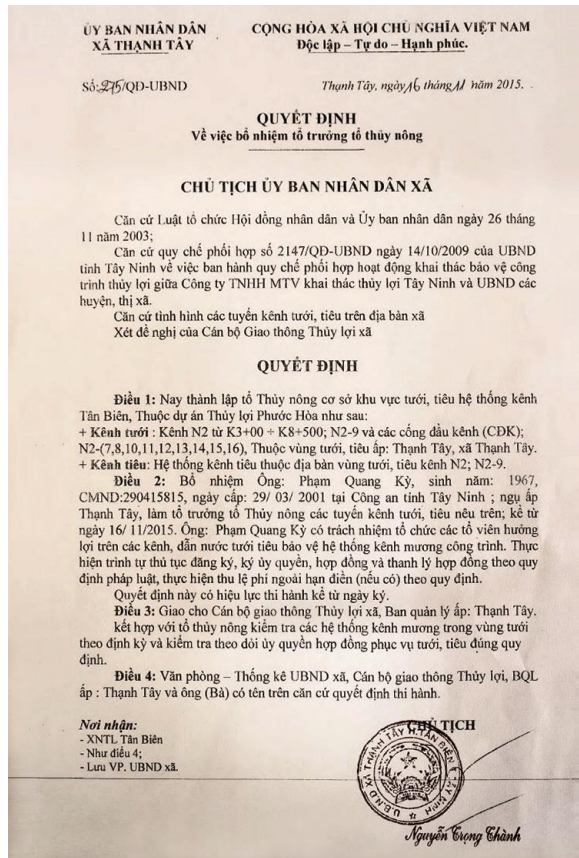
The commune’s People’s Committee leader read the decision signed by the CPC to recognize the WUA (as a form of approval); he/she then handed the decision document to the leader of the WUA.

The whole event was moderated by the OSDP team, Ms. Diệm in particular.

Based on the current *Tổ đường nước* working model applied in Lộc Giang and a small pumping system in Đức-Hòa (under informal discussion only).

Photos A4 A & B.
Commune decision recognize a Water Operator Group (2015)
and Water User Organization (2016).

People's Committee of Thạnh Tây commune, November 16, 2015
 & People's Committee of Thạnh Tây commune, July 6, 2016.



Left: Document formalizing a Water Operator Group (according to the IMC model) and identifying the leader of the group and the canals under the group's responsibility;
 Right: Document formalizing a Water User Association (in the OSDP model) and specifying the hamlet's administrative boundary as the line of demarcation.

Photo A4 C & D.

**WUA assembly in Phước Lập, Phước Vinh commune;
More than 50 farmers attended (out of 100 invited), 16 of whom were women**



**Left: The OSDP representative moderated the assembly;
Right: The deputy head of the community monitoring group reading
the rules of the WUA out loud.**

Source: EFEO, July 4, 2016.

Photo A4 E & F.

**WUA assembly of Thanh Tây, Thanh Tây commune;
30 women and 18 men took part in the assembly**



**Left: Mr. Ky, the hamlet chef and leader of irrigation group of the WUA
(the irrigation group of the IMC) is about to read the rules of the WUA;
Right: farmers in the at Thạnh Tây hamlet, Thạnh Tây commune**

Source: EFEO, July 12, 2016.

Photo A4 G & H.
WUA assembly in Tân Thạnh, Tân Bình commune;
19 women and 17 men took part in the assembly.



Source: EFEO, July 13, 2016.

Annex 5. Summary of the WUA charter and rules in Tây-Ninh in the OSDP model

The charter of the WUA of the Tây-Ninh model includes 6 chapters and 20 articles.

Here are some highlights:

Defines the WUA as cooperative organization of all people having irrigated land that use water from particular canal(s) belonging to certain hamlet; and the WUA is voluntarily established by the people.

Clarifies that the commune's People's Committee hands over to the WUA the right to protect, manage and operate the exploitation of canal system and structures on them.

Clarifies the boundaries.

WUA – *Hội dùng nước*: all households using water from canals within a hamlet.

WUG – *Tổ dùng nước*: all households using water from one outlet of the canal at one level lower than primary or secondary canal.

WUT – *Nhóm dùng nước*: all households using water from one outlet of the canal at one level lower than secondary or tertiary canal.

Clarifies the positions and terminology relating to water users organizations, stating that the all leaders of WUGs (*Tổ trưởng tổ dùng nước*) must be members of irrigator groups – the Chairman of the WUA (*Tổ thủy nông*).

The activities of the WUA include: operating the irrigation system for the production, protection, management and exploitation of the constructed irrigation system within the boundary of hamlet, developing on-farm canal systems within the boundary of the WUA in order to ensure all the command area has an adequate system of irrigation and drainage.

Introduces the organization of the WUA specifically for each hamlet.

Clarifies the responsibilities of the commune's People's Committee, as well as the duties, rights, and benefits of the Irrigator groups, of the leader of the WUT, and of water users.

Clarifies the structure handed over to the WUA. The canals and other structures are owned by the the state, which means that the WUA cannot destroy, renovate, or use them for other purposes.

Clarifies the source of funding of WUAs as well as expenditures.

Defines awards as well as the fines for offenders acting against WUA rules.

The charter is signed by the leader of the irrigator group and the chairman of the People's Committee.

The rules governing the WUA in Tây-Ninh has 7 articles, among which:

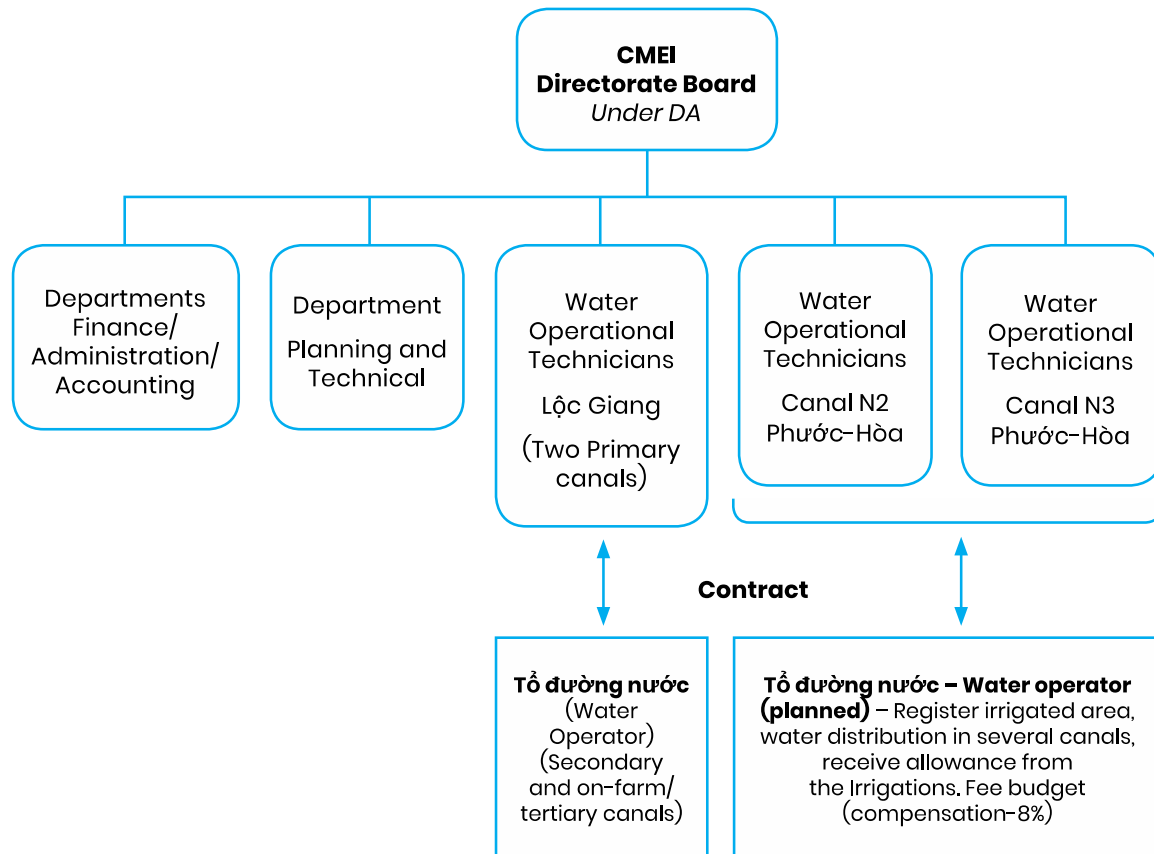
States the rules applied for water users, leaders of the WUT, and members of irrigator groups.

States the fines for breach of rules and who assigns the fines.

The rules are signed by the leader of the irrigator group.

Annex 6. The water management model proposed by the CMEI

Based on the current *Tổ đường nước* working model applied in Lộc Giang and a small pumping system in Đức-Hòa (under informal discussion only).



Annex 7. Project negotiation timeline for the on-farm system participatory design package (2015–2018)

Date	Progress
April 2016 – Đức-Hòa August 2015 – Tân-Biên	CPIM and VAWP deliver the TOR based on the request of the PPMB. PPMB's wishes to put the on-farm package as an extension of the contract of OSDP II (no bid- ding). AFD disagreed.
April 2016	SCP – HEC II starts being involved. SCP-HEC II is requested to get involved with the On-farm package's TOR.
Between April and December 2016	ICMB 9 requests SCP-HEC II to comment on the existing draft of TOR. SCP comments three times. July 2016 – PPMB Tây-Ninh expresses the possibility of canceling the package
April 14, 2017	Project meeting. AFD confirms that there would be no extension of OSDP consultants for on-farm package – bidding required. SCP-HEC II assigned to rewrite the TOR for the PPMBs.
April 20, 2017 – Long-An April 24, 2017 – Tây-Ninh	Meeting between the SCP and the PPMB to discuss the TOR for on-farm design.
June 2017	SCP-HEC II finishes the TOR, planning for 10-month of work (without cost estimates). AFD sends a No Objection letter. MARD gives its approval. Work on a TOR with cost estimates in handed over to the PPMB.
November 27, 2017 – Long-An November 15, 2017 – Tây-Ninh	Meeting between the PPMBs and SCP-HEC II. SCP-HEC II comments on the cost estimates. PPMBs have to adjust costs.

February 2018	PPMB Tây-Ninh official rejects the package, rebooting the DARD's other plan. Long-An PPMB and SCP-HEC II agree on the cost estimate for the on-farm package TOR so that the bidding can proceed.
May 2018	CPIM wins the bidding process and starts the on-farm package in Đức-Hòa. Contract signed between the CPIM and the PPMB. Work package runs from May to December 2018 (8 months).
July 30, 2018	SCP-HEC II completes its work. PPMB Long-An continues supervising the package.

Annex 8. Irrigation Service Fees (ISFs) and on-farm ISFs in Vietnam: a brief history

Thủy lợi phí was defined in 1962: “All irrigation system created or rehabilitated by the state, when in stable operation and when productivity of land increase, are under the responsibility of the people, cooperatives or state-owned farms to bear the cost of management and maintenance. That cost is called irrigation fee.” (Decree of Ministerial Council 66/1962/HĐBT).

It was redefined in the Ordinance on exploiting and protecting water infrastructure, *Thủy lợi phí* being then defined as “service fee for water collected from organizations or individuals using water or providing service from the irrigation infrastructure for the purpose of agriculture production. The fee is to contribute to the cost of management, maintenance and protection of the irrigation infrastructure” (Ordinance of exploiting and protecting water infrastructure 32/2001/PL-UBTVQH10).

Changes in ISF policy and implementation.

1984–2003

In 1984, the Ministerial Council issued decree 112/1984/HĐBT regarding the collection of Irrigation Service Fees (ISFs). Pursuant to the decree, ISFs were to be calculated based on the percentage of average harvest and the rate was different depending on the season, and between gravity irrigation and pumping, or by both methods. For instance, winter-spring rates averaged 4 to 7,5%, summer-autumn rates 4,5 to 8%, while rainy season (*vụ mùa*) rates were lower at 3 to 6,5%.

During the period from 1984–2003, ISFs were collected from farmers at the above-mentioned rates. And ISFs were only one kind of fee: there was no notion of an on-farm ISF.

In 2001, the Steering committee of the 10th National Assembly issued ordinance 32/2001/PL-UBTVQH10 on the exploitation and protection of irrigation works. The ordinance defines terms, principles to exploit and protect the irrigation infrastructure. The ordinance defines

the division between state/company-managed area and farmer/water user organization-managed area with *cổng đầu kênh*, the responsibilities of each governmental levels, the payment for water usage (water fee and charge, waste discharge fee); the ownership, responsibilities to irrigation infrastructure of the state, companies, other organizations (e.g. WUGs).

Due to the lack of an implementing decree, during the 2001–2003 period, ISFs were still collected pursuant to Decree 112/1984.

2003–2008

In 2003, the government promulgated decree 143/2003/ND-CP detailing and guiding the implementation of a number of articles in the Ordinance 32. The decree mentions *Cổng đầu kênh* as the boundary between state or IMC-managed areas (upstream the *Cổng đầu kênh*) and farmer or WUG/cooperative-managed area (from the *Cổng đầu kênh* to the field). Yet, the decree did not provide a definition and means of identifying the *Cổng đầu kênh*, which was later done by circular 65/2009). The decree issues the list of ISFs to be collected, and stated that the standard ISF was separate from the on-farm ISF.

The on-farm ISF or *Phí dịch vụ thủy lợi nội đồng* was defined as the service fee for getting water of the water user organization, counting from after the *Cổng đầu kênh* to the field (on-farm canal).

While the on-farm ISF is left for local water user organization to decide, the state regulates the ISF. The provincial People's Committee has the responsibility of issuing the detail of how much ISF is to be collected according to crop types; and the upper limit of on-farm ISF that water user organization and the commune state could collect from the water users/farmers.

Cổng đầu kênh, while being mentioned in all legal documents since the decree 143 to separate two levels of responsibility, the term and detail of the division is made in circular 65/2009/TT-BNNPTNT. According to the circular, exploitation and protection of irrigation infrastructure is divided into two levels:

Upstream from *Cổng đầu kênh*: managed by Irrigation company or provincial and district state agencies.

From *Cổng đầu kênh* to the field: managed by Water User Organizations (WUGs, WUAs, or cooperatives).

The *Cổng đầu kênh*, or canal outlet, as defined in article 2, circular 65/2009/TT-BNNPTNT, is the structure used to convey water for irrigation or drainage to a certain beneficial area under the management of the beneficiaries (farmers).

In implementation the policy, in Tây-Ninh, the People's Committee issued the decision number 46 in 2012 to hand over to commune level or the water user organization, in this case is the water operator group (*Tổ thủy nông*) to manage from tertiary canals down to the field which irrigated an area less than 50 ha. So far, Long-An People's Committee did not regulate similar boundaries.

Collection of ISFs and on-farm ISFs from 2003 to 2008

From 2003 until 2008, IMC got ISFs from two sources (Nguyễn Xuan Tiep 2008):²⁴

1. The beneficiaries (farmers, other users for domestic use, industry, aquaculture, and so on) which only achieved 50–60% of requirements.
2. State support: only achieved 20–50% of the amount requested.

And the farmers have to pay ISFs to two agents:

1. To IMC;
2. To water user cooperative organizations (WUGs, cooperatives, so on) – the on-farm ISF.

According to Nguyễn Xuan Tiep (2008), ISF rate in Decree 143 was calculated based on salary, depreciation, structure main repair, frequent repair, electricity price, cost of management of enterprise, and other costs. And he asserts that either ISF set by decree 112/1984 or by decree 143/2003, the rate, even when collected fully, is not adequate for operation and maintenance, not to mention main repair. The amount provided by the government later after decree 115 is also limited posing great risk infrastructure deterioration.

Research in the Mekong Delta reveals that ISF in this period in some provinces was often collected among other fees and charges, by hamlet cadres (An Giang and Cần Thơ). In Tây-Ninh, farmers paid the ISF to the district Irrigation Management Enterprise (*Xí nghiệp thủy nông*) through water operators (*tổ thủy nông*). In Đức-Hoà, farmers paid the ISF to water operators (*Tổ đường nước*), the funds being then transferred to the Irrigation Management Station (*Trạm thủy lợi*).

On-farm ISF since decree 143 is mentioned to be separated from the state-regulated ISF and decided by the farmers within their organization (WUG or cooperative). However, it had never been collected, and not recognized nor visible to the farmers.

From 2008 to today

Before 2007, local initiative for exemption was recorded in Vĩnh Phúc province, serving as a pilot for the upcoming ISF policy.

In 2007, decree 154 marked a big change in ISF policy to exempt farmers from the ISF in the area from the water source to the *cổng đầu kênh* (the IMC-managed zone) while the on-farm ISF should be paid according to discussion between farmers and local organization (WUG, cooperatives, and so on). In 2008, decree 115 is issued to further detail the exemption of the ISF and the state compensation for the ISF. Because of some difficulties in implementing the policy, in 2012, the government continued issuing decree 67/2012/NĐ-CP.

The shift in the ISF policy was described by an economist: it started with a rather stable market mechanism during twenty-five years (1962–2003) with farmers enjoying the service and paying when satisfied. During the second period, from 2003–2007/2008, users were partly exempted (for land affected by disasters, and the IMC could ask for state support,

²⁴ Nguyễn Xuan Tiep (2008) investigates the issues surrounding the ISF in Vietnam as well as possible solutions. Published on *VNCOLD in August 2008* and collected directly from the author.

pursuant to Decree 143), and the state provided part of the funds. Then with Decrees 154/2007 and 115/2008, the state now pays for farmers, following the principle of the “third party paying for the service” (Nguyễn Trung Dũng, 2015).

So, from 2008 on, farmers do not pay the ISF to the IMC, and the IMC receive funds from the state. The amount of ISF provided by the state is calculated based on the actual irrigated area registered by the farmers and reported by IMC. The ISF exemption does not apply to the on-farm ISF for which farmers are not exempted. However, as during the previous period, on-farm ISFs continued to be ignored. So, since decree 115, farmers stopped paying any fee related to irrigation, and IMC and its line agencies have been operated and managed with state budget for ISF compensation (*cấp bù thủy lợi phí*). This model of “third party paying” has pros and cons:

Pros:

- Releases the IMC from the burden of have to collect the ISFs and securing financial capacity.
- Releases farmers from a financial load.
- Secures a minimum budget for O&M.

Cons:

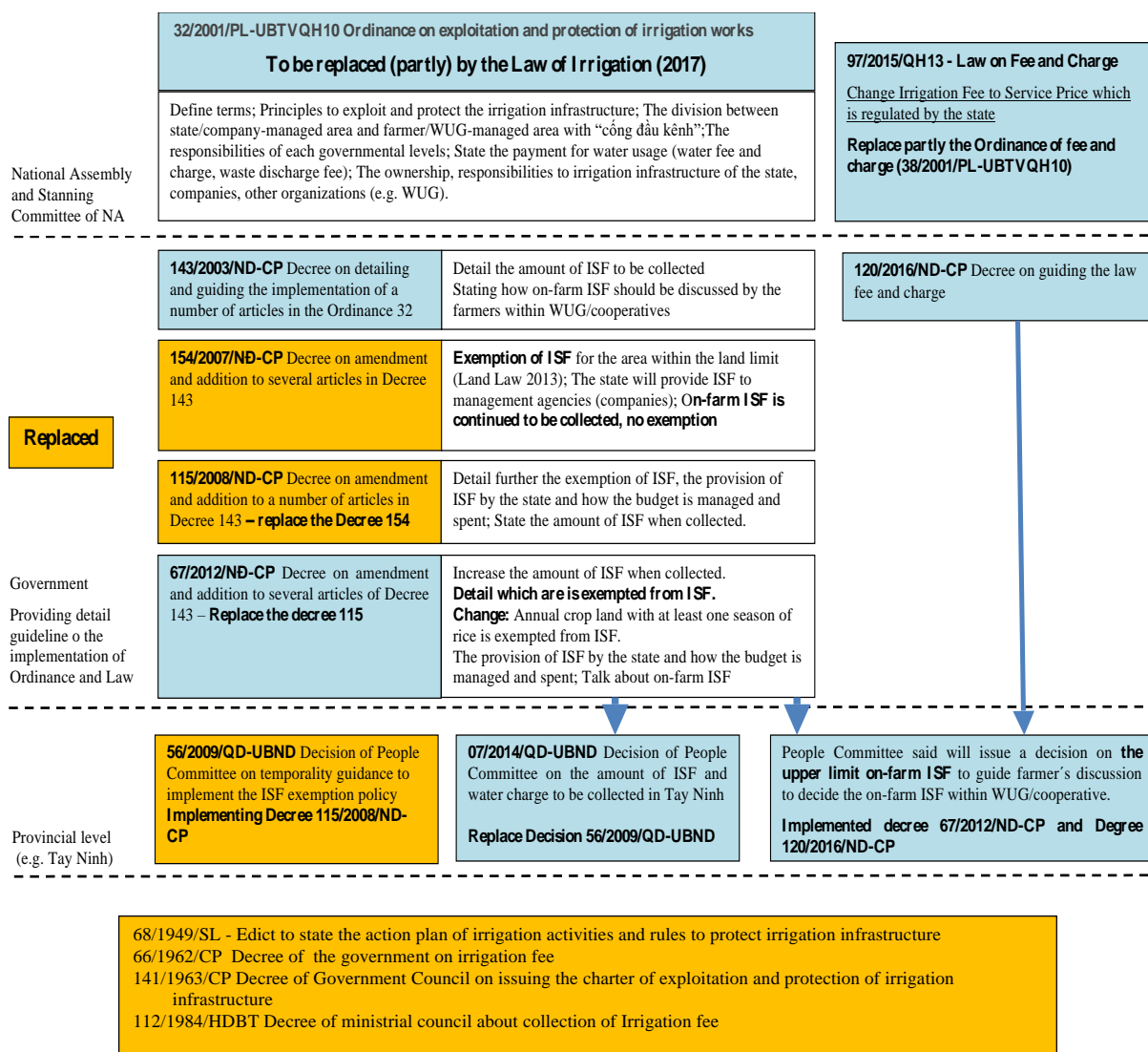
- Weighs on the state budget.
- Carries the risk of loosing accountability of farmers to exploiting and protecting the water infrastructure, and of IMC towards water users.
- The limited budget provided by the state is never sufficient to keep infrastructure from deteriorating.
- Risk of false reporting on irrigated area.

The policy remains in force today though there are ongoing discussions about the problem of ISF exemption. Since then, the Vietnam PIM and the ISFs experts have been involved in a heated debate about the impacts of policy change and whether the ISFs should be reinstated or whether another form should be put in place to guarantee the farmers’ contribution to irrigation management, and incentivize them to save water.

The ISF exemption has resulted in various and contradictory impacts on the financial situation of irrigation sector. On the one hand, it was assessed in some North and Central provinces that the change in ISF exemption and the provision of ISF compensation has had two main benefits. First, the policy reduces the contribution from farmers, therefore supports farmers among the poorest in the remote rural areas. Second, by providing another direct budget, IMCs and/or local state agencies have more resources for irrigation exploitation and management, i.e. being able to actively provide services for production, repairing structures, and dredging canals. According to provincial leaders, those benefits imply better living standards for both farmers and local irrigation management organizations staff, and consequently result in better efficiency in irrigation services (“Report on Implementation assessment of Decree 115 and Circular 65”, CPIM-AFD, 2012).

However, with the ISF exemption, the sense of accountability decreases not only among farmers or service users but possibly also among the IMCs or service providers. When IMCs are financially secured by the state's ISF compensating provision, this means the IMCs staff do not any longer rely on the fee paid by the farmers, and farmers are using water at no cost (Đặng Minh Tuấn, 2010:05). This induces a risk of low accountability from the IMCs in providing service and farmers in using water.

An overview of the legal framework for Irrigation Service Fees

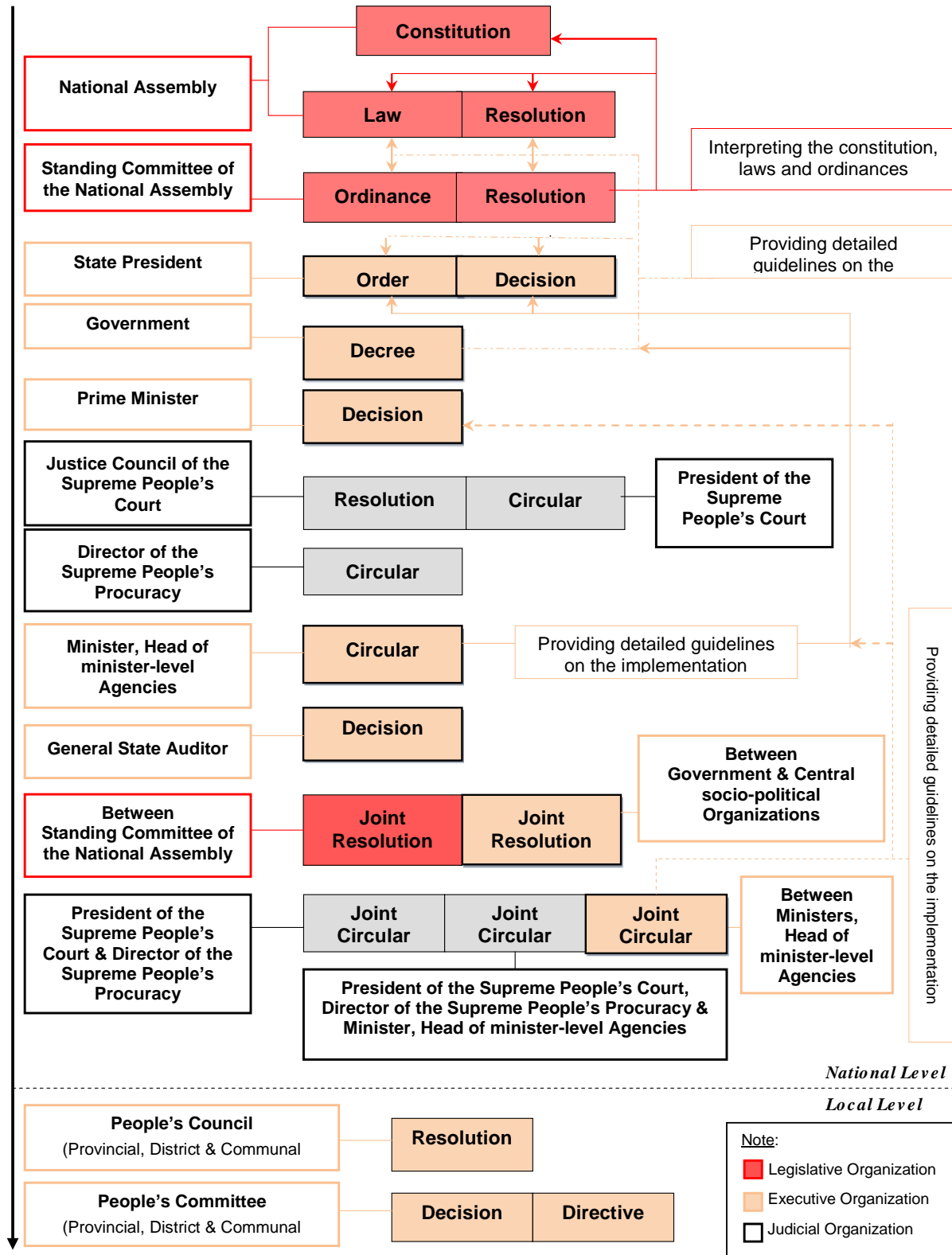


Annex 9. Official documents relative to the Phước-Hòa project and irrigation in general

The legal framework includes a hierarchical system of documents ranging from laws, ordinance issued by the General Assembly to decisions taken by the Prime Minister, followed by decrees, and finally circular detailing laws and ordinance (see Figure A9. “The hierarchy of legal documents in Vietnam”).

Figure A9.
The hierarchy of legal documents in Vietnam

Nguyễn Thị Phương Loan, 2010.



1. Irrigation

Law 08/2017/QH14 dated June 19, 2017 of the 14th General Assembly on Irrigation.

Decision 794/2014/QĐ-BNN-TCTL dated April 21, 2014 of Ministry of Agriculture and Rural Development (MARP) approving of the program of irrigation sector restructuring.

Law 33/2013/QH13 dated June 19, 2013 on disaster prevention and response.

Decree 139/2013/NĐ-CP dated October 22, 2013 imposing penalties for administrative breaches in irrigation exploitation and protection.

Law 17/2012/QH13 dated June 21, 2012 on water resources.

Decree 67/2012/NĐ-CP dated September 10, 2012 of the Government on adjustment and addition to the some of the articles of the decree 143/2003/NĐ-CP dated 28/11/2003 of the Government regulating in detail the implementation of some articles of the Ordinance of Irrigation structure exploitation (replacing Decree 115/2008/NĐ-CP).

Circular 40/2011/TT-BNNPTNT dated May 27, 2011 of MARD stating the capacity of the individuals and organizations involved in irrigation exploitation and management.

Circular 56/2010/TT-BNNPTNT dated October 1st 2010 of MARD regulating some issues in the activities of the organizations involved in managing and exploiting irrigation infrastructure.

Circular 65/2009/TT-BNNPTNT dated October 12, 2009 of MARD on guiding the operational organization and task division in managing and exploiting the irrigation infrastructure.

Decision 1590/2009/QĐ-TTg dated October 9, 2009 of Prime Minister approving the Strategic Vision to Vietnam's irrigation development.

Decree 115/2008/NĐ-CP dated November 14, 2008 to amend and add to some articles of the Decree 143/2003/NĐ-CP dated 28/11/2003 of the Government regulating in detail the implementation of some articles of the Ordinance on irrigation exploitation and protection (replacing 154/2007/NĐ-CP) – **Replaced**.

Decree 154/2007/NĐ-CP dated October 15, 2007 of the Government to amend and add to some articles of Decree 143/2003/NĐ-CP dated November 28, 2003 of the Government regulating in detail the implementation of some articles of the Ordinance on irrigation exploitation and protection – **Replaced**.

Decree 143/2003/NĐ-CP dated November 28, 2003 of the Government regulating in detail the implementation of some articles of the Ordinance on irrigation exploitation and protection.

Ordinance 32/2001/PL-UBTVQH10 dated April 4, 2001 on irrigation infrastructure exploitation and protection.

2. Ministry of Finance

Circular 41/2013/TT-BTC dated April 11, 2013 on guiding the implementation of some articles of Decree 67/2012/NĐ-CP dated 10/09/2012 amending and adding some articles to the Decree 143/2003/NĐ-CP dated 28/11/2003 of the Government regulating in detail the implementation of some articles of the Ordinance on irrigation exploitation and protection.

Circular 36/2009/TT-BTC dated February 26, 2009 on guiding the implementation of some articles of the Decree 115/2008/NĐ-CP dated November 14, 2008 to amend and add to some articles of the Decree 143/2003/NĐ-CP dated November 28, 2003 of the Government regulating in detail the implementation of some articles of the Ordinance on irrigation exploitation and protection – **Superseded.**

Circular 11/2009/TT-BTC dated January 21, 2009 on guiding the ordering and assigning projects and plans to the agencies that are tasked with irrigation infrastructure management and exploitation and financial management statute of state-owned companies involved in managing and exploiting irrigation infrastructures.

Circular 26 /2008/TT-BTC dated March 28, 2008 on guiding the implementation of Decree 154/2007/NĐ-CP dated October 15, 2007 of the Government to amend and add to some articles of Decree 143/2003/NĐ-CP dated November 28, 2003 of the Government regulating in detail the implementation of some articles of the Ordinance on irrigation exploitation and protection – **Superseded.**

3. Public Service

Decision 38/2007/QĐ-TTg dated March 3, 2007 of the Prime Minister on issuing the criteria and category of enterprises with 100% state capital.

Decision 256/2006/QĐ-TTg dated November 9, 2006 on regulations regarding the bidding, ordering and plan assigning for production tasks and product provision, public services.

Decree 31/2005/NĐ-CP dated March 3, 2005 of the Government on procuring and providing public products and services.

4. PIM

Announcement 3213/2004/ BNN-TL dated December 12, 2004 of MARD on Strategic Framework for PIM development in Vietnam.

5. Water User Cooperative Group

Circular 04/2008/TT-BKH dated July 9, 2009 of Ministry of Planning and Investment guiding some regulations stated at the Decree 151/2007/NĐ-CP dated October 10, 2007 of the Government on organization and operation of the cooperative groups, and guiding the establishment, improvement and development of the water user cooperative groups

Decree 151/2007/NĐ-CP dated October 10, 2007 of the Government on organization and operation of the cooperative group, and guiding the establishment, improvement and development of the water user cooperative groups.

Circular 75/2004/TT-BNN dated December 20, 2004 of MARD on guiding the establishment, improvement and development of the water user cooperative groups.

6. Irrigation Service Fees before the Decree 143/2003/NĐ-CP

Decree 112/1984/HĐBT dated August 25, 1984 of the Ministerial Committee on Irrigation Service Fees collection.

Decree 141/1963/CP dated September 26, 1963 of the Ministerial Committee issuing the rules on irrigation infrastructure exploitation and management.

Decree 66/1962/CP dated June 5, 1962 of the Government to regulate the collection of Irrigation Service Fees.

Decree (Sắc lệnh) 68/1949/SL dated June 18, 1949 to assign the plan to implement irrigation activities and rules to protect the irrigation infrastructure.

7. Standards and national technical regulations

National Technical Standards – main regulations on design (QCVN 04-05:2012).

Reservoirs – Irrigation infrastructure – Regulations on formulating and issuing the operation and monitoring procedure (14 TCN 121-2002).

Irrigation infrastructure – Procedure to operational management, exploitation and monitoring of water reservoir (TCVN 8414-2010).

Hydrology activities in hydraulic systems (TCVN 8304-2009).

8. Reservoir and Interreservoir Operation in the Đồng-Nai river basin

Decision 471/2016/QĐ-TTg dated March 24, 2016 of the Prime Minister issuing the inter-reservoir operation procedure in Đồng-Nai river basin.

Decision 5279/2014/QĐ-BNN-TCTL dated December 10, 2014 on issuing operation procedure for Phước-Hòa reservoir in Bình Dương, and Bình Phước provinces.

Decision 1892/2014/QĐ-TTg dated October 20, 2014 of the Prime Minister on issuing interreservoir operation proceduren for Đồng-Nai river basin – **Cancelled.**

Decree 112/2008/NĐ-CP dated October 20, 2008 of the Government on integrated management, protection and exploitation of natural resources and environment of in hydraulic reservoirs and reservoirs with hydropower production.

Decree 120/2008/NĐ-CP dated December 1st, 2008 of the Government on river basin management.

Decision 285/2006/QĐ-TTg dated December 25, 2006 of the Prime Minister on the authority to issue and organize the implementation of hydropower operation procedures.

Decision 38/2001/QĐ-BNN-TCCB dated April 9, 2001 on establishing the management board of for Đồng-Nai river basin planning.

Decision 137/2000/QĐ-BNN-QLN dated December 18, 2000 on issuing temporary operational procedures for Dau Tieng Reservoir. – **Superceded.**

9. Phước-Hòa Irrigation project

Decision 3184/2012/QĐ-BNN-XD, dated December 21, 2012 of MARD on approving the amendment of Phước-Hòa irrigation project (to reduce the irrigated area in Tân-Biên to 6,407 ha due to the increase in rubber plantations, and in Đức-Hòa to 10,180 ha).

Decision 3415/2010/QĐ-BNN-XD dated December 21, 2010 of MARD approving the Phước-Hòa Irrigation investment project, additional loan stage 2.

Document (Công văn) 3440/2010/BNN-HTQT dated October 21, 2010 amending the decision to approve the project list “Phước-Hòa irrigation, additional loan stage 2” issued (*approving the designed area of Tân-Biên at 11,520 ha, including 6,725 ha of irrigation and 4,795 ha of rubber development, and the Đức-Hòa perimeter with 17,560 ha, including 13,821 ha irrigation and 3,739 ha belonging to industrial zones*).

Decision 2851/2008/QĐ-BNN-XD dated September 17, 2008 of MARD on approving the amendment of the Phước-Hòa irrigation project in Bình Dương and Bình Phước provinces.

Decision 2266/2007/QĐ-BNN-XD dated August 9, 2007 of MARD on assigning the tasks of investment capital management to construct primary canals and land clearance and compensation for the Phước-Hòa irrigation Project (loan number 2025 VIE-SF) in Bình Dương and Bình Phước provinces.

Decision 1485/2007/QĐ-BNN-XDCB dated May 28, 2007 on establishment the Task Force of Phước-Hòa Irrigation project.

10. Tây-Ninh related legal documents

Decision 49/2013/QĐ-CT of the president of the Tây-Ninh People’s Committee defining transportation boundaries to protect irrigation infrastructure in Tây-Ninh province.

Decision 46/2012/QĐ-UBND dated October 18, 2012 of the People’s Committee on issuing the task division in managing, operating, and protecting irrigation infrastructure in Tây-Ninh.

Decision 56/QĐ-UBND dated October 22, 2009 of the Provincial people’s Committee on implementing the exemption of water service fees collection (*confirming the transfer of a fixed amount of 8% from irrigation management company to water operators*).

Decision 2147/2009/QĐ-UBND dated October 14, 2009 of the People’s Committee on issuing the collaborative mechanism in managing, operating, and protecting the irrigation infrastructure between the state-owned company of irrigation operation of Tây-Ninh and the People’s Committee of districts and communes.

Tây-Ninh management transfer from 1989–1990 (reference)

Decision 257/1990/QĐ-TCCB-LĐ dated July 16, 1990 to assign Tây-Ninh to manage and exploit water resources from the outlet of the primary canal up to the fields on the east and west canals (from K0 to K34+644), within the boundary of Tây-Ninh.

Decision 14/QĐ-UB dated April 11, 1990 of the Provincial People's Committee to establish an Irrigation Company under the Tây-Ninh Department of Water Resources.

Resolution 35/1990/NQ-TU dated March 2nd, 1990 Guidance of Ministerial Council on the meeting on November 13, 1989 and January 6, 1990.

Decision 205/1989/QĐ-UB dated August 28, 1989 of Tây-Ninh People's Committee on assigning responsibility over the operation and management of canals from primary level downwards to the Irrigation Department (Sở Thủy lợi) and District People's Committees over the whole area.

Directive 221/1989/HĐBT dated August 22, 1989 of Ministerial Council on continuously constructing to complete and exploit the Dau Tieng reservoir project.

11. Long-An

Program 1658/DA-UBND dated April 25, 2016 of Đức-Hoà district's People's Committee on efficiently making use of Phước-Hòa irrigation system in Đức-Hoà district over the period 2016–2020.

Resolution 03/NQ-HDND dated April 8, 2016 of the Đức-Hoà District People Council on approving the program to efficiently make use of the Phước-Hòa irrigation system in Đức-Hoà district over the period 2016–2020.

Resolution 05/NQ-HU dated April 1st, 2016 of the Đức-Hoà District Party's Steering Committee on efficiently making use of the Phước-Hòa irrigation system in Đức-Hoà district over the 2016–2020 period.

Decision 01/2013/QĐ-UBND dated January 7, 2013 of the Provincial People's Committee on the management, exploitation, and protection of the irrigation system.

Terminology related to water user organizations

	Tân-Biên Perimeter		Đức-Hoà Perimeter	
	OSDP model	IMC model	OSDP model	Loc Giang model
<i>Hội dùng nước</i>	Water User Association (WUA)			
<i>Tổ thủy nông</i>	Water Operator Group within a WUA	Water Operator		
<i>Tổ dùng nước</i>	Water User Group under a WUA (WUG)			
<i>Nhóm dùng nước</i>	Water User Team under a WUG			
<i>Thủy nông viên</i>	Water Operator		Water Operator under WUG	
<i>Tổ giám sát cộng đồng</i>			Community Monitoring Group	
<i>Nhóm sáng lập</i>			WUG Founding Group	
<i>Tổ hợp tác dùng nước</i>			Water User Group	
<i>Tổ đường nước</i>				Water Operator

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