



Hydraulic Bureaucracy in a Modern Hydraulic Society – Strategic Group Formation in the Mekong Delta, Vietnam

Hans-Dieter Evers

Center for Development Research (ZEF), University of Bonn, Germany; hdevers@uni-bonn.de

Simon Benedikter

Center for Development Research (ZEF), University of Bonn, Germany; sbene@uni-bonn.de

ABSTRACT: The Mekong delta in Vietnam is among the largest river deltas in Asia and one of the most productive agricultural areas in the world, in particular paddy cultivation. People in this area have traditionally been exposed to an environment shaped by the ebb and flows of water and have lived and adapted for generations to their natural surrounding without much human interference into the complex natural hydraulic system of the delta. However, the last three decades have seen dramatic changes as increased hydraulic management has become the key to the development of the lower Mekong delta especially for its agriculture.

Nowadays, a dense and complex network of hydraulic works comprising human-made canals, dykes and sluices provides flood protection, prevents salinity intrusion, and controls irrigation for agriculture and aquaculture in the delta. This transformation from a society adapted to its natural surrounding into what Wittfogel describes as a "hydraulic society" started to take place just after the end of the Second Indochinese War in 1975, after South Vietnam came under centralised socialist rule. The new regime's economic policy for the development of the Mekong delta has centred on rapid agricultural extension based on technological progress in agricultural production and intensive hydraulic management. This whole process has not only had significant impact on the delta's environment and ecology, but also has triggered social transformation in a way that new social groups have appeared, negotiating and struggling for increased access to resources and power.

Among these strategic groups, the hydraulic bureaucracy and hydraulic construction business are the most crucial in terms of the specific role they play in the hydraulic landscape of the Mekong delta. Both groups exert considerable influence on water resources management and strive for the same resources, namely public funds (including Overseas Development Aid) that is directed to hydraulic infrastructure development. This paper illustrates how both groups have emerged due to the growing need for water resources management in the delta and how they have set up alliances for mutually sharing resources in the long run. Furthermore, it is shown how both groups have adapted their resource-oriented strategies and actions to respond to the changes in the economic and political environment in Vietnam's recent history.

KEYWORDS: Hydraulic bureaucracy, hydraulic construction business, strategic group analysis, hydraulic society, Mekong delta

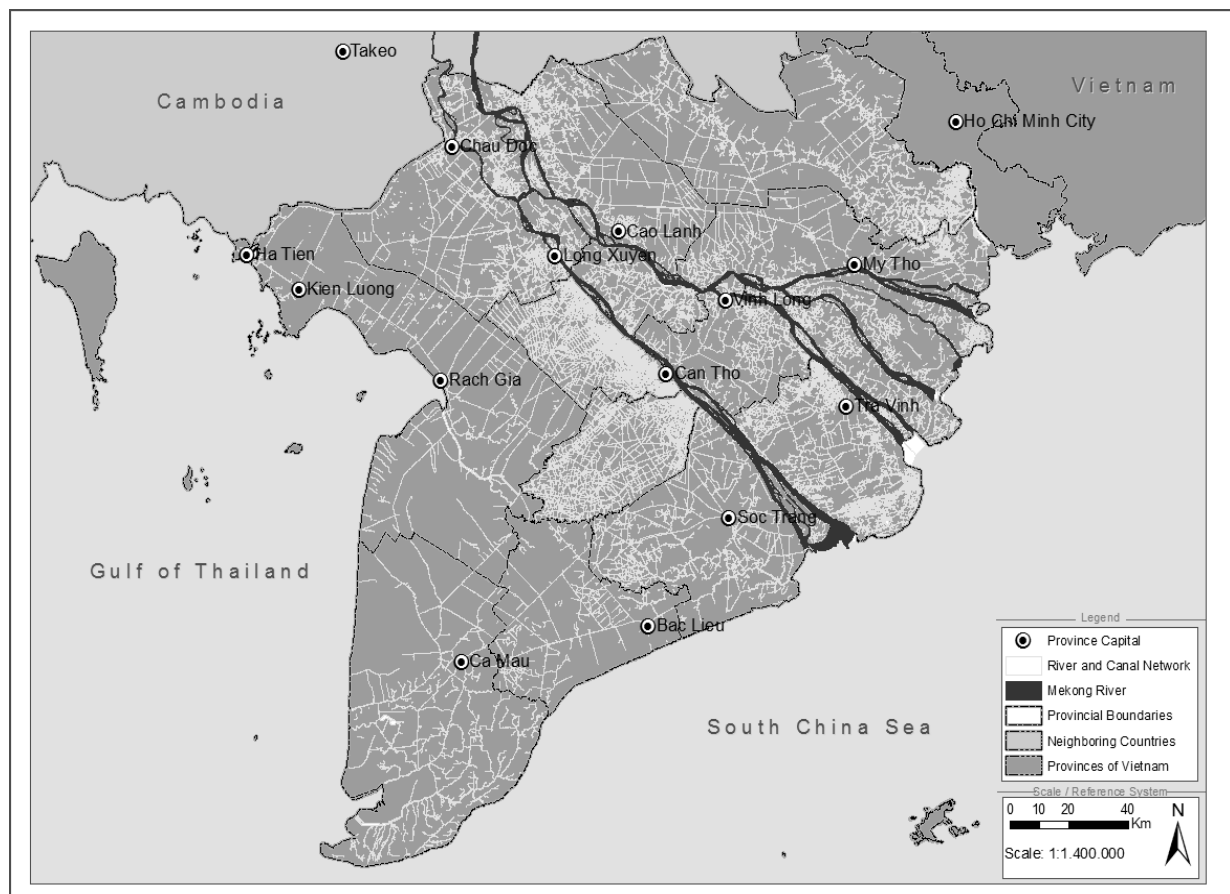
INTRODUCTION

During the past thirty years the lower Mekong delta has undergone an extraordinary transformation into one of the most productive areas worldwide in both agriculture and aquaculture ensuring food security for the country and also making Vietnam into one of the world's leading rice exporters. As the Mekong delta is to a large extent shaped by its rivers, canals and dykes, there is a necessity to control water and manage it as a basic means of production. According to Karl A. Wittfogel's theory of hydraulic societies, a powerful state bureaucracy has taken over coordinating functions when there was a need for large-scale water management for expanding agricultural production as the basis of social and

economic development (Wittfogel, 1957). However, as Wittfogel and his critics have recognised, a centralised bureaucratic apparatus by itself has never been sufficient to develop and maintain a large hydraulic system and a number of other social groups always stake their claim.

In this paper, we shall point out how technological innovation in hydraulic management combined with new agricultural production patterns has contributed significantly to the formation of new social groups in the Mekong delta. Their emergence is due to new resources that have become available at different stages of the delta's recent history. We consider these newly emerging groups as strategic in terms of their common interest and collective action in Vietnam's water sector. In this sense, we assume that natural conditions have stimulated the development of specific forms of water-based strategic groups, especially after the reunification of Vietnam in 1975, when a new government was set up in the southern part of the country. In the Mekong delta it is not scarcity of water but its 'taming' and utilisation that has been at stake. Constructing hydraulic works, using water for irrigation and digging/dredging waterways have provided opportunities to increase production, increase wealth and accumulate political power.

Figure 1. River and canal network of the Mekong delta, Vietnam.



The paper is divided into two sections. Firstly, we throw a critical glance on Wittfogel's much discussed concept of a "hydraulic society" and "hydraulic bureaucracy" and combine this with strategic group analysis to show the growing importance of new groups evolving outside and beyond the state apparatus. We thus attempt to give a brief overview of the concepts and theories that provide the theoretical groundwork of our empirical study. Secondly, in an analytical part we shall use our own survey data derived from interviews with local authorities, company managers, private persons and

local experts in the delta, mainly in Can Tho City. This is supplemented by quantitative data obtained from the Vietnam General Statistics Office and its various subdepartments located in the delta, as well as local state agencies and mass organisations.

Through an analysis of both empirical and secondary data it will be demonstrated how the Mekong delta has turned into a human-regulated environment or as we would like to call it, a 'modern hydraulic society'. With some notable exceptions like Brocheux (1995), Le Meur et al. (2005), Biggs (2004), Miller (2003), or Biggs et al. (2009), most of the research done on the delta has centred on technical and natural science aspects. While not denying the importance of the delta's natural conditions, we concentrate on the strong human interference in nature in terms of the construction of hydraulic works for flood prevention, control of salinity intrusion and irrigation. Furthermore, we show how these processes have been driven by the emergence of strategic groups, in particular, the state bureaucracy of hydraulic management and the hydraulic construction business (besides various water-related businesses) that appear to be the most powerful actors in terms of the number of members and control over financial resources.

HYDRAULIC SOCIETIES AND STRATEGIC GROUP ANALYSIS

Strategic group formation in hydraulic societies

In 1957 Karl Augustin Wittfogel published his work on "Oriental Despotism", in which he assumes that since prehistoric times in many places of the world the necessity for large-scale water management results in the emergence of a specific form of social order. The need to regulate water for irrigation and to cope with floods as disastrous natural events through hydraulic works such as reservoirs, aqueducts, canals, embankments and sluices created forms of social order that are characterised by strong organisational structures of rule or government. Wittfogel grants such civilisations great ability in organising, coordinating and managing natural and human resources to harness and regulate water for agricultural production. He therefore considers them as hydraulic or agrobureaucratic societies characterised the existence of a strong centralised state bureaucracy commanding huge armies of *corvée* labourers that were required to build massive hydraulic works for water management purposes:

All team work requires team leaders; and the work of large integrated teams requires on-the-spot leaders and disciplinarians as well as organizers and planners. The great enterprises of hydraulic agriculture involve both types of direction. The foreman usually performs no menial work at all; and except for a few engineering specialists the sergeants and officers of labour force are essentially organizers. (...) Under hydraulic conditions of agriculture, certain large operations of construction and management must be organized. Other organizational activities are not imperative, but they are made possible by a political economy which compels the government to maintain centers of direction and coordination in all major regions of production. Being able to establish its authority not only over a limited "royal domain" and a number of royal towns – as does the typical feudal state – the hydraulic regime places its administrators and officers in all major settlements, which virtually everywhere assume the character of government-controlled administrative and garrison towns (Wittfogel, 1957).

Even political power of the ruling elite was very much linked to the ruler's and his bureaucracy's ability of controlling water. In imperial China, where large scale irrigation schemes for rice cultivation were highly developed in early times, much of the king's ruling power was legitimised by his success in regulating the big streams of the country, as illustrated by the mythic legend about China's first ancestral ruler:

In China the legendary trail blazer of governmental water control, the Great Yü, is said to have risen from the rank of a supreme hydraulic functionary to that of king, becoming, according to protohistorical records, the founder of the first hereditary dynasty, Hsia (Wittfogel, 1957).

In brief, following Wittfogel's terminology of a "hydraulic society", it can be assumed that in water-based societies and economies the necessity to regulate water through hydraulic management has created strong centralised hydraulic state bureaucracies, which hold considerable power over how to utilise nature as a means of production, namely water and land for agriculture. Since they are the great planners, builders and maintainers of the economical infrastructure in form of hydraulic works, hydraulic bureaucracies are an inherent and typical element of hydraulic societies and thus play a key role in shaping the economical and political framework, which are both predominantly based on intensive water resources management as a precondition for development.

Wittfogel's final conclusion that hydraulic societies consist of static and unchangeable social and political orders ruled by despotic regimes ("oriental despotism") was harshly criticised by many scholars (e.g. Eisenstadt, 1958; Eberhard, 1958), though his intention to unmask the Soviet Union as a despotic state was much appreciated by right-wing politicians under the circumstances of the Cold War. Nonetheless the concept of a "hydraulic society" has been used to describe various societies, from Sri Lanka (Leach, 1959) and Thailand (Wijeyewardene, 1973) to California (Worster, 1982).

Eisenstadt's comprehensive review may be quoted here as a relevant sociological point of view (Eisenstadt 1958). He finds it doubtful "whether a general uniform type of either 'hydraulic' or 'Oriental despotic' societies can be found, and whether the two -hydraulic and Oriental despotic- are necessarily so closely connected" (Eisenstadt, 1958). Furthermore he doubts that the political process in these societies has been adequately analysed, "especially with the extent of the influence of various social groups on the political structure and government activities in these societies, and with the impact of social changes on this political structure" (Eisenstadt, 1958). We could not agree more with this criticism and have therefore combined Wittfogel's analysis of hydraulic societies with strategic group theory, thus responding to Eisenstadt's critique. Though we are not entirely in line with the far-reaching social and political implications Wittfogel associates with "Oriental Despotism", namely that hydraulic societies necessarily are subject to eternal despotic rule of centrally organised state bureaucracies over a static society, it remains relevant to keep in mind that state bureaucracies might play an important role as a leading strategic group in water-based landscapes such as Vietnam's Mekong delta. Pushing this idea forward, we intend to embrace a more diversified approach to hydraulic societies. We do not deny strong hydraulic bureaucracies are a significant feature of such social and political order, but we recognise other actors have a powerful stake as well.

The functions of the bureaucracy are not only to administer hydraulic works and to mobilize resources for the ruler and for themselves. Even in order to be able to do this, the bureaucracy has to perform various functions for the different groups in the society, and to mediate to some extent between such various groups. And in such mediation it must sometimes uphold the interests of these groups against the wishes and interests of the rulers, or to find some *modus vivendi* between the two, even if the *modus vivendi* is greatly biased in favour of the rulers (Eisenstadt, 1958).

In the context of strategic group theory (Evers, 1973; Evers and Schiel, 1988; Evers and Gerke, 2009; Heberer 2000), we assume that the arena for power and resource acquisition in hydraulic societies is indeed diverse and complex. Strategic groups are neither elites nor social classes. They cut across hierarchies, its members do not carry cards or identification tags, and they may follow different lifestyles and follow different beliefs. They are, however, united by one common goal: to secure present and future chances to gain access to resources; to share opportunities of appropriation of resources and their distribution. Different strategic groups compete for access to these resources that are, by definition, scarce. The deregulation of the Vietnamese economy after the economic liberalisation policy (*Đổi mới*) provided such an opportunity to appropriate newly available resources. If new resources are created by the action of a strategic group, others nevertheless attempt to get a (perhaps undeserved) share, calculating costs and gains in terms of a cost-benefit analysis.¹ In our case study control over

¹ This section draws on Evers and Gerke, 2009, where strategic group theory is explained in greater detail.

water appears to be the strategic resource. The management and control of the flow of water, its use for irrigation, aquaculture, river transport or industry provide a bundle of resources to which actors strive for access. In this sense competition and strife for resources resembles a market model, where the actors are not individuals but social groups and where the overarching strategy is not necessarily immediate profit but institutional change, including rise in social status, political power and honour. Strategic action aims at creating social, political and economic structures and institutions that enhance the chances to appropriate resources.

This implies that apart from the hydraulic bureaucracy there are, as already indicated by Eisenstadt (1958), additional strategic groups such as private business, for instance hydraulic construction companies or consulting firms for water resources management, or simply users of water and hydraulic works such as rice farmers, fish farmers and waterway transportation companies. Indeed, in water management "there is growing recognition that multiple actors are interacting with diverse rules across complex decision-making arenas that are beyond individual coordinating bodies" (Saravanan, 2008).

Beside those in power and with access to resources, now shaping the political and economical framework of society, we possibly might also identify counter-strategic groups that attempt to oppose and even challenge the powerful. In this respect, a highly diverse and dynamic societal portrait appears, embracing water related businesses, hydraulic bureaucracies or even certain professions like hydraulic engineers as strategic groups interacting or competing with each other in an arena centred on water as a resource (Evers and Benedikter, 2009). Though we are fully aware that there are more groups than only those of the hydraulic bureaucracy and hydraulic construction business,² this paper puts a strong focus on these two groups, as we would like to highlight the specific role both groups have played so far in transforming the lower Mekong delta into a modern hydraulic society. Moreover, we would like to show that both groups are, at the same time, the social outcome of this transformation process itself; both groups have, in particular, recently undergone significant change with respect to their strategies and modes of interaction due to Vietnam's renovation policy of economic liberalisation initiated since 1986. The institutional changes toward a market-based economy have forced them to adapt their long-term strategies and modes of resources appropriation to the new reality of post-*Đổi mới* Vietnam.

Vietnam – A hydraulic society?

The struggle against nature, among others features,³ has always been a defining feature of Vietnamese history. Water, which is abundant in a country shaped by big rivers and deltas, provides favourable conditions for agriculture on the one hand, but also poses a dangerous threat on the other. Disastrous storms and floods have caused enormous damage bringing suffering to the Vietnamese people for generations. Therefore, regulating waters has always been an important issue for Vietnamese society.

According to the latest ADB Water Sector Review Report on Vietnam, 80 percent of the country's total estimated water use is utilised by the irrigation sector (66,000 million m³ per year), of which the Red River delta and the Mekong delta account for almost 70 percent.⁴ In 2007 the total area under irrigated agriculture harvested was over 8 million hectares out of a cultivated area of 9.7 million (Kellogg Brown and Root Pty Ltd., 2008). According to the Vietnamese government, there were 100 large-scale irrigation schemes and over 21,000 medium and small-sized hydraulic works all over Vietnam in 2006, including about 2000 reservoirs (Tiep, 2008a).

² During recent years there is a tendency that points to the formation of further water-related strategic groups in the delta, including aquaculture business or the revival of big landownership, only to mention two examples (Evers and Benedikter, 2009).

³ Other distinctive continuums in Vietnamese history were the eternal struggle against Chinese attempts to invade and control Vietnam, a strong autonomous village society based on local-governance principles and not least Vietnam's expansion towards the south, which ended with the colonization of the Mekong Delta by Vietnamese settlers.

⁴ There are several big river basins and deltas in Vietnam, of which the Red River and the Mekong Delta are the two main ones.

Water and flood management already played a crucial role when the Vietnamese civilisation was born in the Red River delta several centuries B.C. In the early days of Vietnamese history, centrally ruled kingdoms first emerged on the basis of irrigated wet paddy production, which required large-scale hydraulic works such as dykes and canals especially to control natural hazards caused by the unpredictability of the Red River. Early in Vietnamese history, possibly before the Christian era, the Vietnamese developed an elaborated system of dykes and canals and the rudiments of governmental authority to control and channel the supplies of water (SarDesai, 1998).

The importance of hydraulic management and water control in Vietnamese society is also reflected in its language. *Quản lý tài nguyên nước* is basically the correct translation for water resources management into Vietnamese. However, in many Vietnamese reports dealing with water management issues commonly the term *quản lý thủy lợi* appears, a Sino-Vietnamese term that means water for irrigation, but not water in general. So, traditionally, water management and irrigation management are closely linked in the perception of the Vietnamese people.

As stated earlier, Wittfogel argues that the rise of early civilisations in Asia, like imperial China or the Khmer Kingdom, was only possible due to the creation of a strong and centrally ruled state whose power and legitimacy was based on the state bureaucracy's ability to manage massive quantities of water used for irrigation as the basis of agricultural production and public welfare.

To sum up, in Vietnam the necessity of building hydraulic works for regulating water for irrigation is as old as the Vietnamese civilisation itself. Being under Chinese occupation for more than a thousand years, the old Vietnamese kingdoms were very much influenced by the Chinese concept of administration and rule, and its skilful tradition in hydraulic management. As in ancient Vietnam, today one central function of the state bureaucracy is to manage the country's huge number of hydraulic works through a complex and hierarchically structured administrative system, which theoretically still follows the country's governance principle of a centrally-ruled state (democratic centralism).⁵ The *Đổi mới* policy, which predominantly constitutes the shift from a central-planning based economic system towards a market-based one, has led to deregulation and state withdrawal in many spheres that were formerly entirely state dominated. For the hydraulic sector, in the context of this renovation policy, the government started to shift operation and maintenance responsibilities of hydraulic infrastructure, including costs, away from the central state to local authorities and farmers. In the Mekong delta, for instance, being faced with enormous costs to keep hydraulic works run properly, especially canals and dykes, local authorities increasingly have shifted the burden onto the shoulders of farmers, while at the same time the (local) state⁶ holds power over the planning and management of hydraulic works (Tiep, 2008b; Biggs et al., 2009).⁷

Despite reform efforts the state remains the prevailing power in the sector, mainly due to the fact that irrigation works are public infrastructure, serving agricultural production and ensuring food security for the entire Vietnamese nation. The enormous government expenditures flowing into the irrigation sector annually (including flood protection and drainage), reflect how important the sector is: in 2002, for instance, the state spent 4,211 billion VND to preserve and enlarge hydraulic infrastructure, which represents 3 percent of the 2002 budget, not including Overseas Development Aid (ODA) funds (Government of Vietnam, 2005).

⁵ In Vietnam "democratic centralism" implies that democratic decision making processes officially take place at the center of the centrally-organized party state and resulting policies then are enforced by the state bureaucracy through rigid top-down-processes (Porter, 1993).

⁶ Although the Vietnamese state often is described as a centrally-managed state with hierarchically static structures, there are clear features indicating that the central state is weak with respect to enforcement of power at the provincial/local level. The struggle between the central state and local states (provinces) is a permanent feature of Vietnamese history (Koh, 2001; Großheim, 2004; Marr, 2004).

⁷ Interviews with cadres from irrigation agencies revealed that farmers are increasingly burdened by contributing money for preserving irrigation works, though the irrigation fee was officially abolished in 2008. State cadres called this "voluntarily" made contributions, while the Vietnamese medias talk about the arbitrary establishment of funds by local cadres for all kind of public purposes, including operation and maintenance of hydraulic works (Tuoi Tre, 2009).

To use Wittfogel's terminology of hydraulic society in the context of Vietnam is justified, however, with some reservations remaining. By combining selected aspects of Wittfogel's theory on hydraulic societies with strategic group theory we intend to challenge Wolfram Eberhard's doubt that Wittfogel's theory could "be used as a tool in sociological analysis" (Eberhard, 1958).

HYDRAULIC MANAGEMENT FOR AN HYDRAULIC SOCIETY – THE EMERGENCE OF AN HYDRAULIC BUREAUCRACY AND ITS CLIENTS IN THE MEKONG DELTA

From pioneer colonisation to foreign rule – Hydraulic management until the end of decolonisation

Using Wittfogel's terminology and argument, though not necessarily following his conclusions, this section attempts to illustrate how the lower Mekong delta was transformed from a society adapted to its natural environment into a modern hydraulic society, in which hydraulic management plays a predominate role for economic development. Furthermore, it is argued that this process was the result of technological progress in hydraulic management accompanied by innovations in agricultural production patterns.

While the Red River delta traditionally is a "water" landscape that is very much shaped by human action, in the Mekong delta extensive hydraulic development for agricultural started under French rule. Before that, in large parts of the delta people's livelihoods were, more or less, adapted to the surrounding natural environment, growing floating and rain-fed rice as well as engaging in fishing (Sanh and Xuan, 1998).

For the inhabitants of the Cuu Long delta, as the Vietnamese call the lower Mekong delta, water is the basis of life, serving agricultural production, aquaculture, transportation and daily domestic use, including drinking water in many cases. When the first pioneer Vietnamese settlers reached the delta as the final destination of what in Vietnamese is called *Nam tiến* (March to the South) by mid of the 18th century, they found themselves in a wild landscape of rivers, ecologically shaped by the flooding of the Mekong river, the monsoon climate and the tides of the South China Sea. In those days, as a never ending flow of Vietnamese and Chinese settlers entered the region and colonised the delta along its rivers and natural canals, the delta turned into a so-called Water-River-Civilisation (*văn minh sông nước*). The new settlers and their civilisation adapted to the natural conditions (Brocheux, 1995; Be et al., 2007).

The first interference into the delta's waterscape took place under the Nguyen reign in the early 19th century with the excavation of the Vĩnh Tế Canal, today forming parts of the Vietnamese-Cambodian border. However, it was not until the French colonial rule was established over Cochinchina (southern Vietnam) in 1885 that water management and human interference into the natural environment started to play a certain role in the development of the delta region (Biggs, 2003). According to Brocheux (1995), additionally dug canals served mainly transportation and military purposes but did not focus on drainage, irrigation or flood control (Brocheux, 1995). Further historical research by Biggs revealed that French hydraulic management of the delta started much earlier, from 1866 on (Biggs, 2004). Water pumps and dykes were used already shortly after 1900, when "scientific agriculture" was practiced and extensive dredging campaigns were carried out in the 1920s (Biggs, 2004). There were, however, setbacks and the French colonial administration never managed to gain full hydraulic control over the Mekong delta.

Later on, during the Cold War, US American experts initiated programs centred on water regulation to address the problem of seasonally occurring floods in upstream areas and salt water intrusion in the coastal areas of the delta that were seen as obstacles to agricultural development and success of the "green revolution" in the South of Vietnam. More precisely, the objective of this policy was to build up structures that allow water flow control into and out of the entire delta to enable double and triple-

cropping. However, apart from some small-scale hydraulic work projects, the realisation of these plans turned out to be difficult because of the continuing military conflict and overwhelming communist presence in the delta (Käkönen, 2008).

From adaptation to control – The birth of a modern hydraulic society in the Mekong delta under the rule of bureaucratic socialism⁸

After the war ended and North and South were reunited, the process of bringing the natural environment of the delta under human control was re-initiated. Under the new socialist regime new canals were dredged (mainly secondary and tertiary canals) to ensure water supply. Furthermore, dykes were set up to control floods during the monsoon season. This steady enlargement of hydraulic infrastructure made it possible to shift from traditional (floating and deep water rice) to high-yield varieties which only grow under intensive and controlled irrigation. Later on in the 1990s, under a production-oriented water policy of the government, more dykes were constructed and hydraulic works grew in size. Double and triple-rice cropping based on irrigation schemes started to expand across the delta (Miller, 2006; Yasuyuki, 2001).

This whole process started when the new socialist government realised the great agricultural potential of the Mekong delta to provide food security for a rapidly growing population. Strengthening agricultural output by introducing high-yield varieties of irrigated rice in the delta required strong human intervention into the delta's natural hydraulic regime for ensuring flood management in the wet season and sufficient fresh water supply during the dry season. Hence, the government's new policy of agricultural extension centred on both the development of new agricultural production patterns (farming systems) as well as intensive hydraulic management through hydraulic works such as canals, dykes and sluices.

In the first years after reunification (1976) financial resources were rather scarce and machines for dredging canals and building embankments were rarely available in the delta. As there was no other choice than to dig by hands, the newly established local authorities, in particular the departments of irrigation at provincial level (*Sở Thủy Lợi*) and the irrigation offices in the districts (*Phòng Thủy Lợi*) mobilised thousands of farmers, soldiers and cadres for digging new irrigation canals by hands during public labour campaigns.⁹ While throughout the war farmers, cadres and soldiers were mobilised to fight for an independent and united Vietnam, they were now called to serve on the irrigation front (*mặt trận thủy lợi*), where they contributed to building up the new socialist economy in the delta, based on collectively-organised agricultural production units (*tập đoàn sản xuất*). Newspaper articles of those days attest to the great efforts made by people's hands and sweat that helped create the hydraulic infrastructure for the present-day success story of agricultural growth. Much of the nationalist propaganda language deployed during the war was directly transferred to the post-war era in order to mobilise the masses for collective labour campaigns and to praise the achievements of the new socialist society:

Hau Giang Province mobilises its forces to assault at the irrigation front. 100 000 cubic metres of earthwork have been dredged, including the four canals of O Mon, Nang Mau, Dai Ngai and Kinh Ngang (Hau Giang Newspaper, 19.01.1977).

About 50,000 fellows, cadres and soldiers euphorically joint public irrigation labour campaigns. Thot Not: 22,000 people dredged 17 000 metres canal in 10 days. Long My: 14 army battalions dredged a canal to link up the communes of Thuan Hung and Vinh Vien. Vinh Chau: 7 000 Vietnamese, Chinese and Khmer fellows completed a dyke of category I, that is 40 000 metres long. O Mon: 5000 fellows of 12 communes and towns, dug a canal 8 300 metres long (Hau Giang Newspaper, 16.03.1977).

⁸ "Bureaucratic socialism" is borrowed from Gareth Porter, 1993.

⁹ PRAs (Participatory Rural Appraisal) conducted with cadres from the irrigation stations of three districts in Can Tho City (Phong Dien, Co Do, Vinh Thanh). Interviews conducted with the Irrigation Agency of Can Tho City.

The people from Long Phu contributed 485.000 working days for public irrigation labour campaigns. From the beginning of 1978 until now, the Irrigation Office of Long Phu District has tightly coordinated in cooperation with the localities the mobilisation of the people's irrigation movement for completing many irrigation works such as dykes, canals, sluices, dams... serving the enlargement of agricultural areas for the summer autumn crop and the traditional crop (Hau Giang Newspaper, 04.07.1978).

It was also in the late 1970s that the first large-scale electric and petrol-run pumping stations appeared in the Mekong delta, following the irrigation policy for the Red River delta (Hau Giang Newspaper, 31.05.1978, 29.08.1978).

We have to understand the formation of a hydraulic bureaucracy in the Mekong delta against the backdrop of a growing demand for hydraulic infrastructure serving agricultural production. This demand was satisfied by the intensive input of labour forces that needed a strong and centralised coordination. When the North and South were reunited and the Socialist Republic of Vietnam proclaimed in 1976, the administrative structures in the South were modelled on those of the centrally-managed socialist state in the North. Under these circumstances, new state agencies for hydraulic management were established at all administrative levels in the southern part of Vietnam under the subordination of the Ministry of Irrigation (*Sở Thủy Lợi*) in Hanoi.¹⁰

Due to the urgent need to staff thousands of newly created civil servant positions, social mobility was relatively high in those days at lower administrative levels, in particular for those who managed to obtain some knowledge on hydraulic and irrigation management and fought on the 'right side' during the war. However, high-ranking positions in the newly established bureaucratic apparatus of hydraulic management were almost confined to a circle of cadres from the North, who graduated from universities in Hanoi, such as the University of Water Resources,¹¹ and were then sent to the South to work in either central-state institutions or organisations of the provincial governments, while others made careers in large-scale state-owned construction companies building hydropower dams or irrigation works. Thus, in the top management of both important state hydraulic institutions and large-scale hydraulic construction companies today, the presence of people from the northern part of Vietnam in high-ranking positions remains a prevailing feature.¹²

Government investments in irrigation works increased significantly for the first time during the very late 1970s. Whereas before, digging was mainly done by hand, now technical equipment such as machines for dredging canals and building embankments started to increase in numbers in the southern delta and further accelerated the area's transformation into a human-controlled waterscape (*thủy lợi hóa*). Since private business activities were almost totally abolished after the communist victory, state-owned hydraulic construction companies filled the gap and became the clients of the freshly established hydraulic bureaucracy. In Can Tho City state-owned hydraulic construction enterprises emerged at the provincial level as well as in each district under the provincial department of irrigation. The new implementing units possessed the machines and technical equipment required to maintain and build irrigation works on behalf of the state. Government funds destined for hydraulic services were therefore transferred from the provincial departments (*Sở Thủy Lợi*) to the districts for project implementation. In case of large-scale hydraulic works with high investment, the Ministry of Irrigation (*Bộ Thủy Lợi*) itself took over the management and supervision of construction works through a special Investment and hydraulic construction management board that was set up soon after

¹⁰ The administrative system of Vietnam officially includes four levels of government (central government, provinces, districts, communes). After the war the hydraulic management system was structured as follows: central government: Ministry of Irrigation (*Bộ Thủy Lợi*); provinces: Department of Irrigation (*Sở Thủy Lợi*); districts: Office of Irrigation (*Phòng Thủy Lợi*), communes: irrigation service units.

¹¹ *Trường Đại học Thủy Lợi Hà Nội*: For long this was the only university that provided higher education in water resources management in Vietnam. In 1997, a branch of this university was opened in Ho Chi Minh City.

¹² Interview with a former student of the Water Resources University in Hanoi whose father was a professor for more than 30 years there and an adviser to the Ministry of Irrigation after the war. Interviews conducted with managers of large-scale hydraulic construction companies in Can Tho City.

reunification that came to represent central government's interests in local hydraulic management affairs in the delta.¹³

Whereas before the 1990s, the focus was exclusively on canals, during the 1990s larger dykes and gates began additionally to play an increasingly important role in the successful continuation of intensification in the delta, replacing traditional farming systems through multi-cropping patterns that require irrigation and flood control schemes.¹⁴ Further hydraulic works and mechanisation were allowed by increasing financial resources from the government and growing influx ODA inflow in the context of high economic growth and global integration after *Đổi mới*.

Figure 2. Number of pumps in the Mekong delta by year (from 1975 to 1999).



From the 1990s onward the government's new policy of economic liberalisation led to profound changes in the structure of the hydraulic management system. De-collectivisation of agriculture and the official return back to household-based modes of production resulted in tendencies of deregulation in the hydraulic management sector. Since the number of hydraulic works had grown considerably in provinces like Can Tho, provincial state-owned irrigation works management and exploitation companies (*công ty quản lý và khai thác công trình thủy lợi*) were established under provincial administrations¹⁵ to ensure the maintenance of hydraulic works and to set up further irrigation schemes. Though these companies were state-owned, they were entitled to operate autonomously and run their business in a manner similar to that of private companies. They were equipped with

¹³ During an interview with staff from the management board we found out that during the last 30 years almost all staff had exclusively been sent from the North by the ministry.

¹⁴ Most of the first dyke systems were August dykes, also known as semi-dykes, which provide flood protection for the second crops and are inundated after the second crop has been harvested (double-cropping). Many of these semi-dykes have been upgraded to become high dykes, which provide flood protection all year round and therefore allowing farmers to do triple-cropping, in particular in An Giang Province.

¹⁵ Also in this period hydraulic management structures were adjusted according to the system in the North, where such companies had been already established by the end of the 1980s (Fontenelle, 2001). Despite the government's equitization policy, hydraulic management and construction companies still exist in many provinces of Vietnam. Also compare Fontenelle, 2001; Harris, 2009 and MARD, 143/2003/ND-CP.

machineries for dredging and other related works, and in many cases set up smaller operation units or subsidiaries at the district level.¹⁶

The maintenance of irrigation works incurred additional costs to the provincial government and the renovation policy made it possible to shift these costs onto the shoulders of farmers. The state collected irrigation fees from all farmers who enjoyed the benefits of hydraulic works for doing double and triple rice cropping. Revenues generated by the irrigation fees were used for both, to run the newly established hydraulic management and irrigation exploitation companies and to ensure the maintenance of existing hydraulic works as well as to build new ones.¹⁷ However, in reality these management companies have turned out to be financially inefficient, partly due to non-transparent and arbitrary management by cadres (Davidson et al., 2005; Fontenelle et al., 2007).

It was also in this period when the Ministry of Irrigation was merged with the Ministry of Agriculture and Rural Development (MARD). The merger aimed at creating an integrated and cross-sector approach for effectively developing Vietnam's rural areas under the coordination and leadership of one strong state agency. As part of this change in institutional arrangements the full administrative structure of hydraulic management was integrated into MARD and from then on has existed under its umbrella. Although the bureaucratic polity of hydraulic management partly lost its sovereignty as an autonomous institution, its power continued to grow with the steady enlargement of hydraulic schemes and the need to maintain and operate them.¹⁸

By the end of the 1990s much of the delta's territory had been transformed into a hydraulic landscape under human control, where typical hydraulic management devices such as pumps¹⁹ can be found in most parts of the delta (Le Meur, 2005). Even more impressively, at present the delta's hydraulic infrastructure comprises not less than 7000 kilometres of primary canals, about 44,000 kilometres of secondary and tertiary canals, and 23,000 kilometres of dykes. Furthermore, 500 sluices (wider than 3 metres) and 125 pumping stations have been setup to regulate water flows (MARD, n.d.). This huge amount of hydraulic works is managed and run by a pervasive bureaucratic machinery under MARD, attesting to the establishment of a hydraulic society.

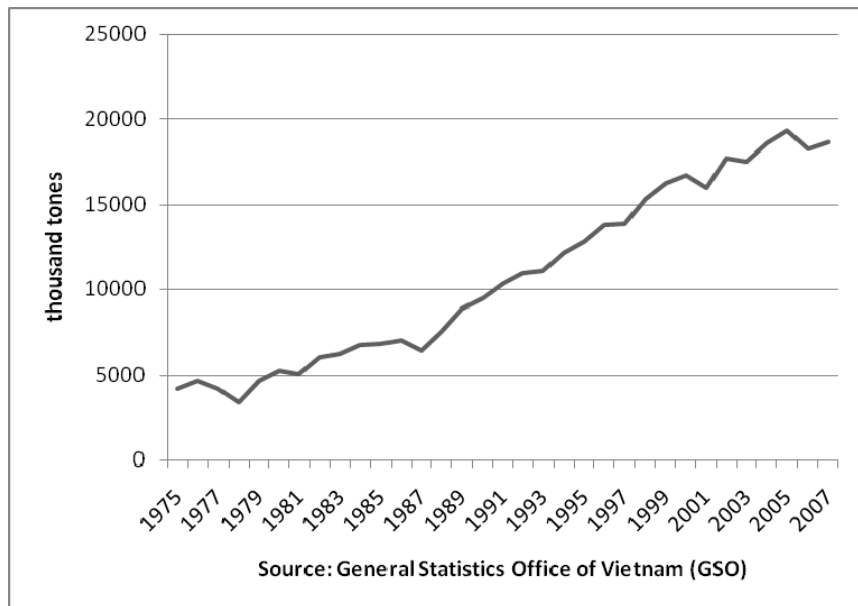
¹⁶ PRAs (Participatory Rural Appraisal) conducted with cadres from the irrigation stations of three districts in Can Tho City (*Phong Dien, Co Do, Vinh Thanh*). Interviews conducted with the Agency of Irrigation of Can Tho City and the former hydraulic management and irrigation works exploitation company of Can Tho City.

¹⁷ The irrigation fee was imposed all over Vietnam in 1992 and was abolished in 2007 again.

¹⁸ Here we shall note another profound restructuring within the water bureaucracy due to growing influence of multinational pressuring on Vietnam to follow IWRM principles in the late 1990s. With the establishment of the Ministry of Natural Resources and Environment (MONRE) in 2002 the Vietnamese government intended to create and state management agency in charge of overall water management and started to shift parts of state management functions in water resources management from MARD to the new ministry and its respective local agencies. However, briefly saying, this has created new confusions caused by ministerial overlapping of functions and power struggle over the hegemony in the water sector between the two ministries, including competition for state funds and ODA. To date, MARD still is entirely in charge of hydraulic infrastructure planning, engineering and operating, as well as flood and storm control, hosting powerful institutions such as the ministerial Department of Irrigation, Institute of Water Resources Planning or the Vietnamese Academy of Water Resources and a large range of state-owned hydraulic construction companies. MARD therefore remains the crucially important state management agency in the hydraulic sector, putting a strong focus on water resources engineering (Molle and Hoanh, 2009).

¹⁹ Here we mean small-scale pumps, mostly powered by petrol. Such pumps can be easily transported from one place to another. In contrast to the red River Delta, there are hardly any large-scale pumping stations in the Mekong Delta.

Figure 3. Gross output of paddy in the Mekong delta from 1975 to 2007.



Generally, the trend towards more hydraulic control is still continuing: investment into large-scale hydraulic schemes, often serving flood control and preventing salinity intrusion, dominates the state's policy of water resources management in the delta and maintains the flow of public funds into the sector. Many of these large-scale new schemes, which still refer to the NEDECO Master Plan for the Mekong delta (NEDECO, 1993), are directly implemented by MARD on behalf of the central government. Since 2000 several new hydraulic projects have been realised and further projects are in the pipeline for implementation.²⁰ For the period 2006-2010 alone, the central government is carrying out 13 large-scale hydraulic projects in the delta worth about US\$ 35 million. Another US\$ 75 million is being disbursed for 45 medium-sized hydraulic management projects out of government funds, not to mention the hundreds of small-scale projects at the district level (Long An Government, 2008). Future investment in the sector is expected to grow further. Enormous investment is needed to make the "delta machine" (Biggs et al., 2009) run properly and safeguard the dense canal network from damages caused by sedimentation and bank erosion. Furthermore, new threats caused by climate change are expected to change the delta's ecology and affect people's livelihoods dramatically in the future. To cope with a forecasted sea level rise of at least one metre, the government's response is to further intensify hydraulic engineering as a means of prevention and mitigation. There are plans to set up more dykes and gates, in particular in coastal areas to prevent further salinity intrusion and even permanent inundation. All this supposes a massive flow of investment, thereby providing resources to feed the hydraulic bureaucracy and the hydraulic construction business at all scales (Huu, 2007; Carew-Raid, 2008; Biggs et al., 2009).

²⁰ Nowadays, planned and partly constructed large-scale hydraulic works serving irrigation and flood control in many provinces of the delta, include the O Mon – Xa No scheme (Can Tho City, Hau Giang and Kien Giang), Nam Mang Thit (Vinh Long and Tra Vinh), Quang lo – Phung Hiep (Soc Trang, Bac Lieu and Ca Mau) that all have been recently set up with loans from the World Bank.

Table 1. Currently implemented large-scale hydraulic construction projects in the Mekong delta under MARC as investor.

Name of project	Location	Project duration
Kênh Phước Xuyên - Ha Tám	Dong Thap and Long An	2007-2010
Kênh An Phong - Mỹ Hòa - Bắc Đông	Dong Thap and Long An	2007-2010
Kênh Đồng Tiến - Lagrange	Dong Thap and Long An	2007-2010
Kênh Núi Chắt Năng Gù	An Giang and Kien Giang	2007-2010
Kênh Hà Giang	Kien Giang	2001-2009
Hoàn thiện dự án Bảo Định GĐ 2	Tien Giang and Dong Thap	2007-2010
CTKS lũ Tân Thành - Lò Gạch	Dong Thap	2007-2010
CT thủy lợi Ba Hòn - T3	Kien Giang	2000-2010
Kênh nối sông Tiền - sông Hậu	Dong Thap and Vinh Long	2007-2010
HTTL phân ranh mặn ngọt Quảng Lộ-Phụng Hiệp	Bac Lieu, Soc Trang and Ca Mau	2007-2010
HT đê bao Long Mỹ - Vị Thanh	Hau Giang	2007-2010
Kênh Hà Giang	Kien Giang	2001-2009

Source: Own data derived from MARC

To summarise, in a short period of 30 years, the entire Cuu Long delta has been transformed into a human-regulated environment by hydraulic engineering and has taken a central place in the country's agricultural production. This whole process was principally based on technological improvement in hydraulic management and flood control, creating the pre-conditions for agricultural development and economic growth in the delta. While in the 1980s rice production could not ensure food security for the entire nation, by the mid 1990s Vietnam had developed into both the rice bowl and the new aquaculture centre of Vietnam (Käkönen, 2008). This rapid development was accompanied by the emergence of a new hydraulic bureaucracy in the socialist state that totally absorbed power over water and its flow by monopolising hydraulic works planning, operating and construction.

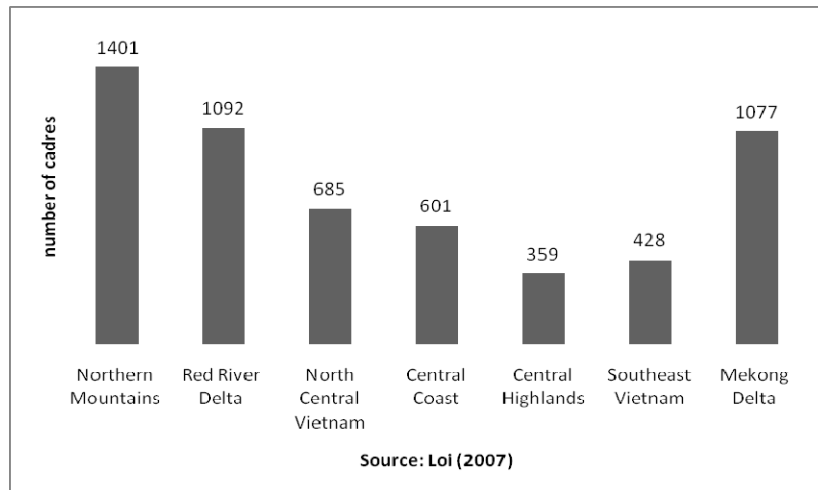
Hydraulic engineering in transition – Liberalisation, modernisation and mechanisation in the Mekong delta

During the late 1990s the Mekong delta's sector of hydraulic management, engineering and construction began to profoundly change again, when the government's policy of economic renovation started to exert some pressure towards market liberalisation and stronger withdrawal of state engagement from the sector, in particular with regard to hydraulic construction services. This whole process came along with administrative, fiscal and legal reforms that caused some changes in hydraulic management. Strengthening decentralisation of the administrative apparatus by transferring decision making power and financial resources to lower units of government, in particular to the provincial level, has been a major objective in these administrative and legal reform programs. Furthermore, the state started to privatise (*cổ phần hóa*) state-owned enterprises to adapt to the new reality of a market-based economy (Benedikter, 2008; Thanh, 2004).²¹

²¹ Traditionally, Vietnam is a highly centralized state, in which decision and policy making takes place at the highest level of government in Hanoi. Though the central government has launched administrative and legal reform programs under support of donors for strengthening decentralization, the national level officially still remains dominant in politics and policy making.

While before, the irrigation sector was monopolised by an alliance embracing the state bureaucracy as planner and state-owned enterprises as its implementing clients, the sector increasingly opened up, allowing private enterprises to compete over projects in the market. More and more public-funded hydraulic construction projects were offered on open market tenders resulting in private hydraulic construction companies and private construction cooperatives getting involved in implementing these projects for the state.

Figure 4. Number of cadres in hydraulic management state agencies by region (provincial and district level).

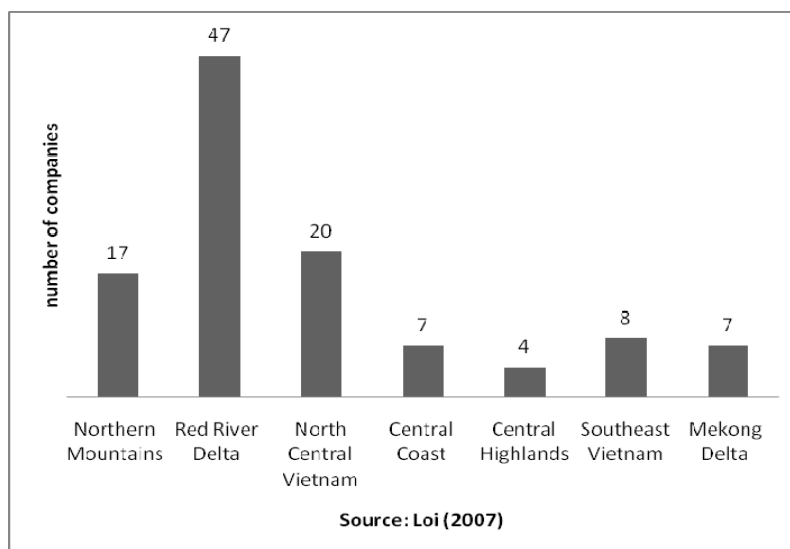


At the same time many of the state-owned hydraulic construction companies and irrigation companies in the delta started to be equitized.²² In Can Tho City, the state-owned hydraulic management and irrigation works exploitation company as well as some other state-owned hydraulic construction companies have been converted into joint-stock companies from the end of the 1990s onward.²³ Similar processes took place in other provinces of the delta like in Soc Trang or Vinh Long. As a result, state-owned companies partly lost their long-standing secured access to governmental resources and presently find themselves in a new environment where they increasingly face competition from other companies coming from all over the Mekong delta and Ho Chi Minh City. On the opposite side, all sorts of private construction enterprises have largely profited from market liberalisation, with the introduction of free tenders releasing resources for construction projects that were formerly only available within the bureaucracy. Hence, nowadays participation in tender procedures is no longer exclusively confined to state-owned enterprises, but instead hydraulic construction business in the Mekong delta has formally become an almost free market.

²² Equitization (*cổ phần hóa*) is the Vietnamese way of privatizing state-owned enterprises by transforming them into joint-stock companies, thereby adapting state-owned enterprises to the new reality of a market-based economy.

²³ Interviews conducted with the Agency of Irrigation Can Tho City and equitized state-owned hydraulic construction companies in Can Tho City.

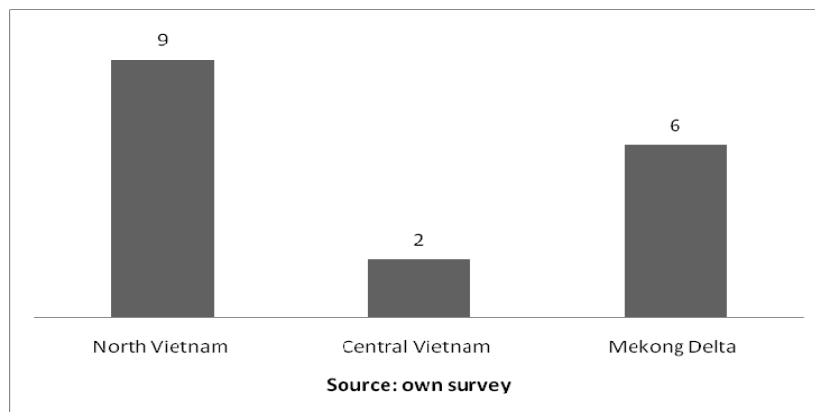
Figure 5. Number of hydraulic management and hydraulic works exploitation companies by region.



With regard to the Mekong delta's level of bureaucratisation in hydraulic management, it can be generally argued that the number of cadres working in hydraulic management state agencies at local levels is similar to that of the Red River delta, which is the second largest delta of Vietnam. However, when the number of staff working in hydraulic management and irrigation works exploitation companies is also taken into consideration – these companies are predominately located in the North and employ nationwide a total staff of about 22,500 cadres –, it becomes obvious that bureaucratisation of hydraulic management is on a higher level in the Red River delta and other parts of the North (Phuc, 2007). With 11,764 cadres almost half of the total staff of state-owned irrigation works exploitation companies in Vietnam is working in the Red River delta (11 provinces), while the seven companies that have remained in the Mekong delta only employ a total staff number of 768 cadres (Tiep, 2008a). This numeral discrepancy and the strong state presence in irrigation management in North and Central Vietnam might be due to different hydrological conditions. While irrigation and drainage in the North relies heavily on big pumping stations and gravity irrigation canals that need high investment, farmers in the Mekong delta, for instance, partly can make use of natural waterways and the tidal phenomenon. Moreover, in the Mekong delta surface water is abundant and the state only manages and invests in large canals (primary and secondary canals). However, smaller canals providing water supply to fields and within fields have to be managed and maintained by farmers themselves, who therefore usually set up production groups (*tổ hợp tác*) or water user associations (*hội dùng nước*) that are partly under coordination of local authorities. Many of these groups directly contribute capital and labour force to maintain canals and dams, and even money for the construction of new hydraulic works, which then are set up under the supervision of the local state agencies.²⁴

²⁴ Interviews conducted with irrigation agencies in different provinces of the Mekong Delta (Can Tho, An Giang, Vinh Long, Hau Giang, Soc Trang, Dong Thap, Bac Lieu). Also see Tiej, 2008a.

Figure 6. Regional origins of directors and vice directors of six equitised state-owned hydraulic construction enterprises in Can Tho City.



So far, it can be argued that recent institutional restructuring of the Mekong delta's hydraulic bureaucracy has resulted in a stronger division of institutional functionality. This more precisely means that the hydraulic bureaucracy remains in charge for managing and planning, while construction and maintenance activities have been increasingly out-sourced to all sorts of hydraulic construction companies through the introduction of open tendering procedures.²⁵ However, state agencies at all scales of administration still keep control over the distribution of resources by steering tender procedures and, eventually, make decision on which companies should be contracted to carry out construction and maintenance works such as dredging canals, building dykes or installing sluices. Therefore, special hydraulic construction project management boards exist at all scales of administration, including the Investment and Hydraulic Construction Management Board No. 10 responsible for large-scale investment projects of the central government in the Mekong delta, taking care of large-scales schemes such as *Ô Môn – Xà No* (Kien Giang, Can Tho, Hau Giang) or *Nam Mang Thít* (Tra Vinh, Vinh Long). These project management boards organise the tenders of construction sub-projects and monitor construction works, often including ODA-funded projects.

Another change emerged after the irrigation fee was recently abolished all over Vietnam. Whereas government resources for preserving hydraulic works were already scarce before, this has become even more serious with the removal of the irrigation fee. This central government decision resulted in local authorities and state-owned irrigation works exploitation companies increasingly facing severe shortages of financial resources. Hence, farmers now are increasingly forced to contribute additional capital to the maintenance and building of irrigation works in the delta, in particular on lower administrative levels.²⁶ Though they have to pay, farmer's participation in planning and implementing construction works of dykes or canal dredging is rather poor. Local cadres normally collect farmers' contributions and coordinate construction works, including biddings. These new resources are additionally tapped by the hydraulic construction business, especially small-scale businesses like construction cooperatives that operate at the lower segment of the hydraulic construction market.

So far it has been discussed how reformation and liberalisation towards more marked economy-based management structures, accompanied by the mechanisation of hydraulic construction activities, has largely changed the entire institutional landscape of the delta towards more diversity. Furthermore it was argued that Vietnam's renovation policy had resulted in resources reallocation, as new players got access to resources. Nevertheless, from a strategic group analysis perspective it remains unknown

²⁵ Before 2000, all projects were directly assigned to companies, mostly state-owned enterprises by the authorities (*chỉ định thầu*) without official bidding. This has changes and today free tenders have been introduced (*đấu thầu rộng rãi*), based on the principle of bidding and procurement (88/1999/ND-CP).

²⁶ Expert-interview conducted with Nguyen Xuan Tiep (Vietnamese Academy of Water Resources, Hanoi).

who are the individuals having a stake, or in other words, who are the group members with regard to their individual social background. In order to explore the growing diversity of actors in the hydraulic sector as well as to understand recent trends of strategic group development in this context, we examined a range of hydraulic construction enterprises in Can Tho City, including both equitised state-owned and military-owned construction companies as well as small-scale private businesses such as construction cooperatives and private construction companies with limited liability.²⁷ The interviews revealed two major findings. Firstly, equitised state-owned enterprises are still a strong player in the field, as they are still in possession of appropriate technical equipment and human resources for all kinds of large-scale and complex hydraulic works, which are often financed directly by MARD or the provincial administration. Secondly, a high number of small-scale hydraulic construction businesses have emerged during recent years, which commonly have a strong focus on small-scale projects at the very local level of administration (districts and communes) and keep close and, in many cases, very personal relations with the local level bureaucracy for mutually sharing resources, as shown in the following.

With regard to state-owned enterprises, previously in this paper we described how after reunification many cadres from the North were appointed to high-ranking positions in the newly established socialist administration of the South, including state-owned companies. In Can Tho City we found this phenomenon to be still of relevance today, when we investigated management boards of equitised state-owned construction enterprises operating in the hydraulic construction business. During interviews we encountered an overwhelming presence of North Vietnamese among the positions of directors and deputy directors. Many of them hold degrees in engineering in fields such as hydraulic construction or irrigation, which they commonly received from one of the main national universities in Hanoi. When asked about their regional origins, most of them named provinces located in the North of Vietnam, however, Hanoi as the center of state bureaucracy was never mentioned but only surrounding provinces such as Thanh Hoa, Hoa Binh or Thai Nguyen. When asked about their company's current position in the market, most of them emphasised that competition has become fiercer during the past years as well as informality seems to play a major role for successfully running a business in post-*doi-moi* Vietnam. Here, informality especially embraces personal contacts and relations to those steering resource flows, namely the hydraulic bureaucracy under MARD and its subordinated local agencies under the local People's Committees (provinces and districts). In this context, informally receiving information about future projects and how to arrange tender application files in the best way "to win" procurement can be a decisive advantage for hydraulic construction companies. The director of one of Can Tho's largest hydraulic construction companies emphasised their tight relationships with those organising tender procedures as a crucial criterion for getting access to projects: to win tender procedures depends mainly on two factors, to be cheaper than others and to have good relations.²⁸

Furthermore, we were explained that it is rather difficult to succeed for those who are unable to integrate informal means in their business strategies (*không đi ban đê m được*), whereas those who use informal ways do better.

Such signals of growing interlinkages between politics (bureaucracy) and business (entrepreneurship) through coalition and even hybridisation in the context of *Đổi mới*, are also pointed out by

²⁷ State-owned companies, mostly established by the late 1970s and now under equitization, except military companies. Military-owned companies are under management of the military and were also established after the war. We do not have any detail information on these companies as our request for interviews were turned down. Private companies appeared in large number after tenders were introduced by the late 1990s, entirely on the basis of private capital. There are various forms of private enterprises now.

²⁸ Interview with the management board of Can Tho Joint Stock Hydraulic Construction Company: "*Đấu thầu dựa trên 2 yếu tố chính, đấu giá rẻ hơn và có mối quan hệ tốt là trúng*". Before the company was the hydraulic management and irrigation works exploitation company of Can Tho Province, but has been equitized. Today the company has the same business status as any other equitized state-owned hydraulic construction company.

Gainsborough (2003, 2007), who conducted empirical research on the changing political economy of Vietnam, with case studies from Ho Chi Minh City and Tay Ninh Province:

In interviews, company directors frequently explained their success, or why the state did make trouble for them, by reference to their connections to provincial leaders or their reputation because they used to work for the provincial government. That is accessing resources, whether it be money, contracts or information, did not depend on a set of rules which were the same for everyone. Instead, it depends on who you know (Gainsborough, 2007).

Interviews with other recently equitised state-owned hydraulic construction enterprises²⁹ in various provinces of the Mekong delta revealed strong individual linkages between companies and the hydraulic bureaucracy. In many cases we found out that shares of state owned construction companies released to the free market were purchased by either staff of companies itself, mostly directors and vice directors, or in some case also by cadres from the local authorities. In this respect, many directors of state-owned enterprises became private entrepreneurs and bureaucrats increasingly are getting involved in the private sector of hydraulic construction, at the same time still holding their strategic positions in the bureaucratic machinery of hydraulic management and planning.

Somehow similar are our findings from the very local scale of administration, mainly from district scale, where we particularly identified small-scale construction cooperatives and other sorts of small-sized private businesses specialised on smaller hydraulic construction projects with lower investment inflow.³⁰ Almost all entrepreneurs we met at this level were people who had their family roots exclusively in Can Tho City. Also here informal personal relations appear to be a significant feature that becomes probably even more crucial when taking into consideration that managers of cooperatives (*chủ nhiệm hợp tác xã*), or other small-scale private enterprises, seldom received any professional education in hydraulic construction or engineering, but mainly relied on the personal experience they have gained in the sector.³¹ One young manager of a family-run construction business (*kinh doanh cá thể*) explained his success entirely as a matter of his excellent personal contacts with the local state bureaucracy and not as result of his high professionalism or educational knowledge on water engineering:

In Vietnam it is not of interest whether a company is big or small, strong or weak. If a company does well or not in its field of operation is a matter of having enough capacity for building up relations with those being powerful in the sector it is operating in. Regarding myself, even though my studies in university [English language and literature] are not related to my current job, my business is going pretty well due to the good and wide relations I have in the construction sector [state agencies and companies].³²

When asking about his family background, he explained that two of his uncles are holding leading positions in the provincial government of Can Tho City and his mother works as a manager in a local state-owned enterprise. He introduced us to his wife who is the accountant of the company. They just got married a couple of months ago. Her father runs a large construction company in neighbouring Hau Giang Province. Sometimes he helps out there as a kind of sub-contractor. This example shows the extent to which bureaucracy and private entrepreneurship can be linked together through family ties in an era of economic transition thus forming powerful business groupings and clans.

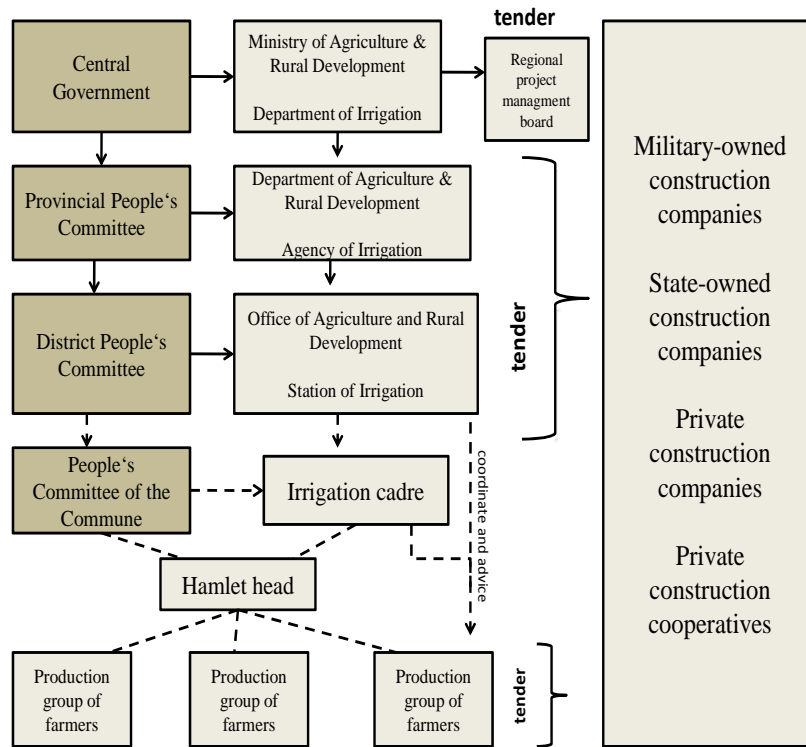
²⁹ Interviews conducted with directors of TICCO Tien Giang, Ca Mau Joint Stock Hydraulic Construction Company and VINACONEX Dong Thap and some other formerly state-owned hydraulic construction companies.

³⁰ Cooperatives and small-scale private companies have not enough registered capital (assets) to participate in large-scale projects and thus mainly put their focus on small-scale projects with less investment capital, but suitable to their capacity.

³¹ Almost all of the managers of cooperatives or other sorts of small-sized business we talked to do not have professional degrees in construction related subjects. Engineers and other professionals are normally hired on the basis of short-term contracts according to the company's demands.

³² Interview with the manager of a private family-run construction business in Can Tho City.

Figure 7. Simplified set up of hydraulic management structures in Can Tho City.



There are other examples proving kinship ties to be an important factor for business success. A young woman, only 25 years old introduced herself as the head of a construction cooperative³³ (*chủ nhiệm hợp tác xã*) just established in northern Can Tho City. When we asked whether there are members of her family engaged in the cooperative's business,³⁴ we were told that her father is a member and does much of the daily management. Later on, she further confessed that in fact her father is the one running the business, although officially she is the head, as her father is the party secretary in a commune nearby. For this reason he is not allowed to register and manage the cooperative in his own name. Also here we have another case proving the growing linkage between state and business through family relations.

In another two hydraulic construction cooperatives we found cadres from the district authority among the cooperative's shareholders, who had invested their private capital to set up businesses after the sector started to be liberalised and resources were increasingly delegated to local administrative levels by decentralisation policies. The bureaucracy normally does not officially manage such businesses but acts beyond formal structures. They skilfully use their strategic position within the state to influence resources flows in a way that is most beneficial to them and their counterparts. Such scenarios come close to what is defined as hybridisation in strategic group analysis, namely efforts made by groups to expend their strategy to other resources fields. In the scenarios above, clans that predominantly make their livelihood as state bureaucrats now have discovered business as a new resource field. The

³³ Construction cooperatives differ insofar from agricultural cooperatives that they are structured similarly to joint-stock companies, but are much smaller with regard to their assets.

³⁴ In this case we interviewed a construction cooperative, which are similar to joint-stock companies, but smaller with regard to their assets (office, machines, etc). Normally, several people jointly invest and vote a manager, who is then authorized to officially run the business on the shareholders' behalf.

positions they hold in the local state and the wide contacts they keep with other bureaucrats in their immediate social surrounding help them to access resources easily in new business arenas.

The local bureaucracy's strong efforts in penetrating business also have to be considered as a response to inadequate payment schemes offered to civil servants. Due to a continuously growing state apparatus, salaries of state officials could only be increased slightly since renovation policy started and are currently at a level that is not sufficient to feed a family. Government officials' salaries are even "not enough to pay for one's daily breakfast", a local cadre complained with David Koh, a researcher who works on local government structures in Vietnam (Koh, 2001; Hung, 2006). The discrepancy between state cadres' payment and the rising costs of living in Vietnam is probably a driving force that pressures bureaucrats to generate additional income, often also by informal ways or occasionally even through illegal means.

From a small-scale entrepreneur we learnt that it is rather difficult to get one's foot in the door without building up networks and relations, no matter whether we talk about hydraulic construction or other fields in the construction business that primarily depend on public funds, like for instance the construction of public administration buildings, schools or hospitals. Another one, who just flocked into the construction sector, complained about informal practices that force him to frequently favour local cadres by inviting them out for drink and food from time to time for improving personal contacts. He further mentioned that sometimes such favours are going far beyond food and drink. In this context, entrepreneurs with only little personal relations and informal contacts are forced to invest time and money for building up trust with those in power to decide how and to whom resources flow; otherwise they would never get a foot in the door or would be out of the business soon. Only if you manage to become part of the informal network and consolidate your position within it can your business prosper in the long run.

CONCLUSION

Since the Mekong delta came under Vietnamese control some 250 years ago, it has undergone a significant transformation from a relatively unspoiled landscape into a human-made environment and eventually developed into Vietnam's most productive agricultural zone. This whole process can also be described as shift from a water-born landscape, in which people lived and adapted to the natural conditions they found, into a hydraulic landscape, in which people have started to strongly interfere into and reshape the natural ecology of the delta. This transition took place in several steps, all epitomised by significant historical events such as the Vietnamese expansion towards South, the French colonisation, decolonisation during the Indochinese Wars, socialist-Leninist rule, and the more recent economic reforms (*Đổi mới*).

With Vietnam's reunification of the country in 1976 and establishment of socialist rule in the South, the transformation of the delta into a hydraulic landscape accelerated considerably. Rapid agricultural extension combined with strong efforts in hydraulic management, including irrigation and flood control, required strong state management structures for planning irrigation works and coordinating large public labour campaigns, in which thousands of people dug hundreds of new canals and built embankments for flood control. This was the era when a hydraulic bureaucracy was born in the delta as a child of the new socialist state and constantly consolidated its power over water as a means of production. This historical trajectory of the delta reminds us of Wittfogel's concepts on hydraulic societies, in which the hydraulic bureaucracy commands large armies of *corvée* laborers for building and maintaining irrigation works as the economic basis of society. At the same time the further expansion of hydraulic infrastructure for pushing agricultural production and rural development legitimised and justified the appearance and consolidation of the bureaucratic polity of hydraulic management under the socialist regime.

Over the last 2 decades, mechanisation in hydraulic construction and growing state investment steadily displaced labour force and the whole delta developed further into a modern hydraulic society

with a higher level of mechanisation in both hydraulic management and agricultural production. This was the time when a new crucial strategic group appeared in the water sector of the delta: hydraulic construction companies. Following the Soviet model of a command economy, hydraulic construction and other hydraulic services were first established and integrated into the bureaucracy itself. In the Leninist state of those days it hardly made a difference whether one worked in a state-owned company (economy) or the bureaucracy (politics and administration) of the sector.

Another great change appeared with *Đổi mới*, which formally brought about sharp division between state management and hydraulic construction business, in particular in the Mekong delta, where socialist policies were never fully enforced due to farmer's and local authorities' resistance against Hanoi. Compared to North and Central Vietnam, the level of bureaucratisation of hydraulic management remained relatively low in the southern delta, which can be explained by the low number of state-owned hydraulic work management and exploitation companies. Today most state-owned hydraulic companies have been equitised and tendering procedures have become the predominant mechanism for regulating the bidding for projects in an almost free market of hydraulic construction. This liberalisation policy has led to rigorous competition and diversified the landscape of hydraulic construction business so that recently many private small-scale businesses such as cooperative and family-run businesses have appeared. These smaller scale businesses however, now struggle for access to government resources, including growing ODA inflow.

Nevertheless, changes have only occurred on the surface. A deeper look into the actual structures of business and state management shows that it is merely the institutional arrangements that have been altered, while the individuals engaged in the sector are still the same. In essence, this means old wine in new bottles. Like ever before, management in large-scale hydraulic construction business, now partly equitised, as well as high-ranking positions in hydraulic management state organisations are still dominated by Northern Vietnamese, who were sent to the South just after reunification and continue to consolidate their power until today.

At a lower level of the hydraulic bureaucracy in the delta, that is dominated by local people, some have taken advantage of sector liberalisation and started to become engaged in hydraulic construction business. These people are using their long-standing experience, local knowledge and wide personal contacts, such as kinship and friendship ties, to increase their control over the use of government funds while keeping others out of the business.

Furthermore, equitisation of state-owned enterprises has opened up opportunities for many directors of state-owned hydraulic construction companies as well as bureaucrats of state agencies to get access to the new resources set free by the institutional transition to a market economy. In this context, directors of state-owned hydraulic construction companies have developed into private entrepreneurs, while keeping their privileged contacts with the state bureaucracy, which controls resource flows. On the other hand, cadres of the hydraulic bureaucracy have increasingly got involved in the private sector. Both tendencies indicate a move of the sector from state socialism (state monopoly) to bureaucratic capitalism (private sector development), with the strong involvement of current and former state officials in private business activities. The strong interlinkages between both strategic groups, namely the hydraulic bureaucracy and entrepreneurship, have become a significant feature in the making of the delta's "modern hydraulic society".

We assume that this probably has far-reaching consequences for policy making at various administrative scales of water resources management. When government resources are captured in line with the preferences of certain groups and their informal networks, these groups may have an interest in influencing policy making to benefit them and their allies. Though to achieve their personal objectives this system is highly efficient, it might cause irrational outcomes concerning the use of public funds and ecological consequences. Further liberalisation towards market mechanisms accompanied by, at least, stable investment inflows to keep the hydraulic machinery of the delta running properly and adapt it to future climate change impacts, will provide a lucrative field of resources to the alliance of

the hydraulic bureaucracy and business appropriating government funds and ODA for their collective benefit.

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