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From national policy to livelihood sustainability

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SPECIAL ISSUE ARTICLE

Land-use dynamics in the Mekong delta: From national policy to livelihood sustainability

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Abstract

The Vietnamese Mekong Delta (VMD) is one of the most examined deltas in the world given its dynamics, complexity, and vulnerability. In the past decades, the VMD has changed rapidly, especially the land use in relation with the socioeconomic development. National policy has profoundly influenced these changes and the changes have significantly affected local livelihoods. However, these changes are not well reported systematically. In this study, we investigate land-use changes based on institutional analyses across multiple scales, that is, from national, provincial, to local livelihood based on institutional and sustainability analysis. The results show a strong relationship between legal settings over the last 30 years on land use and livelihood transitions. In addition, the constraints of implementing national legal frameworks at provincial level in practice were identified including effects to local livelihoods. We offer some recommendations for sustainable livelihoods in the VMD, with a focus on increasing socioecological resilience.

KEYWORDS

agriculture development, land law, land-use change, sustainable livelihood, Vietnamese Mekong Delta

1 | INTRODUCTION

The Mekong delta is one of the most studied deltas in the world given its dynamics and complexity (Smajgl et al., 2015). In the past decades, the Mekong delta has changed rapidly together with the socioeconomic development of Vietnam (Käkönen, 2008; Smajgl et al., 2015). The economic development in the Vietnamese Mekong Delta (VMD) is intrinsically connected to the expansion/intensification of expansion of agriculture, mainly rice. From precolonial to postcolonial periods, food security (favoring rice production) was the driving motivation behind most of the technological, economic, and environmental changes. People's livelihoods have depended on rice from very early on in the Delta's settlement, initially taking advantage of natural conditions and eventually modifying the landscape through large-scale hydraulic infrastructure to enable rice cultivation in areas where it was not feasible before (Biggs, 2010; Brocheux, 1995; Can, Duong, Sanh, & Miller, 2007; Le, Bregt, van Halsema, Hellegers, & Nguyen, 2018; Taylor, 2014). In the first half of the 20th century, rice monoculture policy that relied on an unstable system of credit and debt caused peasant resentment and social unrest (Biggs, 2010; Brocheux, 1995; Kerkvliet, 2005). Infrastructural developments attempting to control environment and hydrological systems that have been applied as the dominant approach in water resources management in the VMD have also created new environmental problems and social conflicts and led to path dependencies challenging the capacity of local social-ecological system and livelihoods to adapt to changing environmental circumstances today (Biggs, Miller, & Hoanh, 2009; Brown, Tuan, Nhan, Dung, & Ward, 2018; Can et al., 2007; Hoanh et al., 2003; Käkönen, 2008; Le et al., 2018; Smajgl et al., 2015; D. D. Tran & Weger, 2017; T. Tran & James, 2017).

While environmental and socioeconomic impacts driven by the rapid land-use changes to support rice-based agricultural production in the VMD are evident; there lacks profound understanding of how these processes actually take place on the ground. Enhanced knowledge of the factors influencing local people's land-use decisions is therefore necessary (Le et al., 2018; Pokhrel et al., 2018). However, there are limited studies that examine interactions between societies and ecosystem systems, the evolution of local people's decision making and ways these processes may inform policy development (Drougou, Huynh, & Truong, 2017; Zheng et al., 2016). It is simultaneously recognized that there exists a knowledge gap of how rules is made at the constitutional level, how this influences practices at the operational level, and the impacts these practices have on land use and livelihoods in the VMD. Therefore, evaluating national policies and plans (van Staveren, van Tatenhove, & Warner, 2017) related to land-use change processes at the local level (H. Tran, Nguyen, & Kervyn, 2018) is critically important.

To address these issues, this study aims to examine the relationships between legal/institutional settings and the land-use dynamics over the last decades and their implications for livelihood sustainability in the VMD. We will investigate the following three main questions:

1. How have land Law and agriculture policies been formulated and exercised at the national level over the last decades?
2. How have the implementation and planning of land-use policies shaped land-use practices at the provincial level?
3. What are the implications of these processes for farmer livelihood sustainability?

2 | FRAMEWORK AND DATA COLLECTION

2.1 | Research framework

In this study, we adopted the Institution Analysis Development (IAD) framework (Ostrom, 2011). The IAD framework is a nested framework, stating that action areas are linked to higher levels of decision making and that institutional change is a continuous process of adjustment across nested levels of rules (Ostrom, 2005, 2011). Figure 1 shows the overall research framework. First, the institutional settings related to land Law and agriculture policies are reviewed. We will focus on land-use legislation at the (provincial) collective choice level and the constitutional level, and link this with actual land-use change in the Mekong Delta for two land-use sectors, that is, rice and shrimp production. Finally, we assess the sustainability of land use and water resources related policy based on three indicators linked to three case studies, that is, influence of national policy on land-use change; implementation and provincial level; and land-use change and livelihood sustainability.

2.2 | Data

2.2.1 | Collected data

We collected data for three main research components as shown in Figure 2. First, to analyze the institutional setting in Vietnam related to land-use policy, we used archived documents, for example, Laws, decrees, and resolutions issued by different levels of authority bodies, mainly from the central government database (<http://vanban.chinhphu.vn>). Second, we collected data for land-use change assessment from the Ministry of Agriculture and Rural Development and National General Statistics Office since 2000. Finally, we used the Vietnam Household Living Standard Survey (VHLSS) data with interview data (farmers and authority) as the primary data for assessing the implementation of land-use policy plans and livelihood sustainability of selected areas.

2.2.2 | Institutional settings in land law and agriculture: Related policy

In Vietnam, the Communist Party is the leading force responsible for the development of the country via Resolutions of the National (Executive) Party or Directives of the Party's Politburo. The National

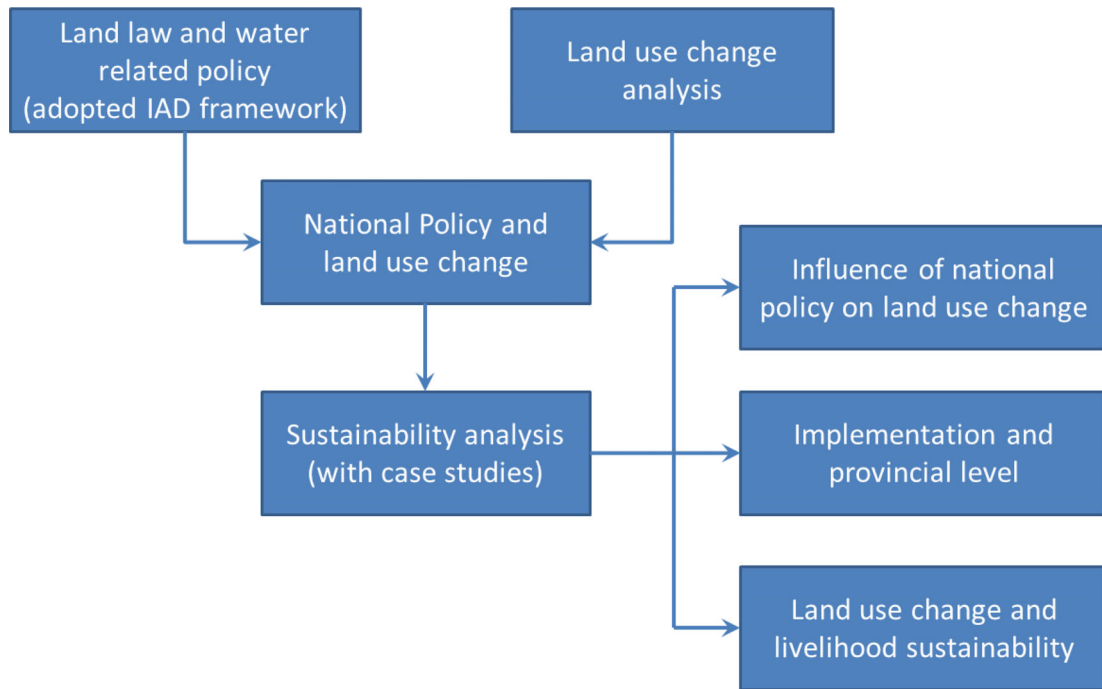


FIGURE 1 Research framework for the analysis of policy and land use change on livelihood sustainability in the Mekong Delta

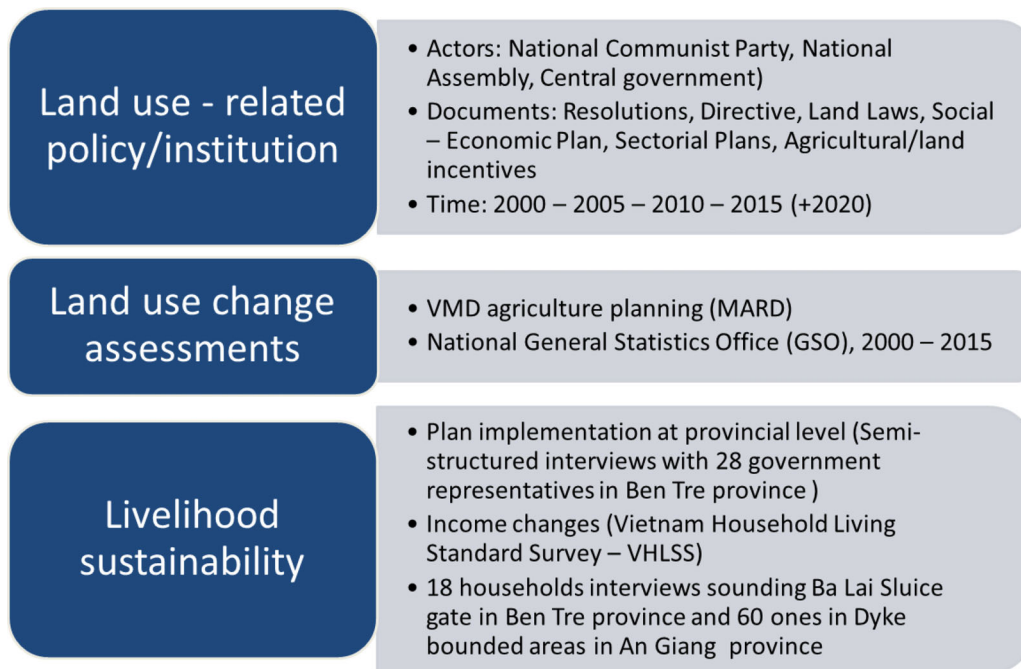


FIGURE 2 Collected data for three main study components

Assembly institutionalizes the directions via Laws and Resolutions, while the central government (represented by the Prime Minister) is responsible for developing guidelines and instructions via Resolutions, Decisions, Decree (instructions for Law implementations) with support from Ministries (NA, 2014). The Central Party and National Assembly evaluate and supervise the performance of the central government, for example, via assessing the implementation of resolutions.

Local provinces follow instructions from the central government for implementing the national policy. Figure 3 illustrates the linkages between legislation development at the national level and implementation at the provincial level.

To analyze the existing legislation, the legal documents were collected and classified into three periods; before 2000, 2001–2010, and 2011–present as these periods coincided with national agenda (every

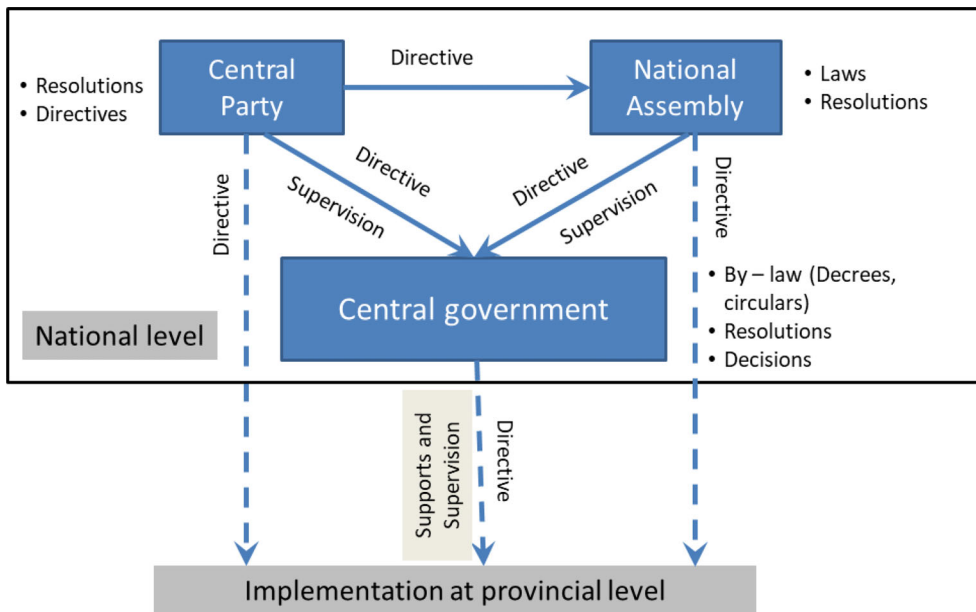


FIGURE 3 Linkages between legislation development at the national level and implementation at the provincial level

five, ten years) as well as covering sufficiently the changes in the VMD. Detailed evolutions of the legal documents are presented in Appendix.

2.3 | Study areas

The VMD spans 39,700 square km and is home to nearly 18 million people. Close to two-thirds of the Delta's land area are devoted to agricultural purposes, and nearly 70% of people work in agriculture, forestry, or fisheries (Le et al., 2018; Vormoor, 2010). For this case study, we selected two provinces in the VMD, namely, An Giang and Ben Tre province (Figure 4) to assess livelihood resilience of local farmers. These two provinces were chosen because land-use realities in these areas are heavily affected by the national policies, characterized by two distinct ecosystems zones. An Giang Province is located in the upper west region of the VMD, annually prone to annual flooding. Meanwhile, Ben Tre province is located downstream in the coastal part, frequently susceptible to saline intrusion.

3 | RESULTS

3.1 | National legal settings on land use: Related to the VMD

3.1.1 | Land-law evolution and land-use planning policy in Vietnam

Land-use legislation and planning changed significantly over the last decades after the Vietnam War. This started with the agricultural economic reform policies Directive 100 and Resolution in the 1980 that expanded the implementation of the "package-contract" scheme in which all means of production (land and equipment) were handed

back to farmers instead of cooperatives (Pingali & Vo-Tong, 1992; Rozelle & Swinnen, 2004). The Land Law in 1993 institutionalized previous policy initiatives and offered farmers long-term agricultural land assignments (20 years) through land certificates that enabled farmers to cultivate, trade, transfer, rent, or inherit the land use rights (Son & Tuan, 2013). This Law allowed farmers to receive the profit from agricultural production on their land and then created the motivation for them to work harder and more efficiently. As a result, it significantly contributed to the rapid agricultural and rural development of Vietnam during 1990–2000, including becoming a top agricultural exporter (Deininger & Jin, 2008; Do & Iyer, 2008; Kompas, Che, Nguyen, & Nguyen, 2012). Although the Law significantly increased farming households productivity, it did not establish the necessary conditions for a land market to develop in Vietnam (Son & Tuan, 2013). With the aim to promote the land market while maintaining land equality, the Land Law was amended in 2003 to set-up of a land price framework and to regulate land use and to maximize quotas of land area. The Law was recently amended in 2013, increasing the land use and area limits and establishing a negotiation mechanism for land acquisition to encourage the establishment of large-scale farms or material zones. It also increased land-use rights for foreign investors. The Land Law of 2013 classifies the land as either agricultural land, nonagricultural land, or unused land, which forms the basis for land-use designation and planning. By Law, land users are not allowed to change the land-use classification without approval of the Ministry of Natural Resource and Environment and the Department of Natural Resource and Environment of provincial government. However, in practice, market-driven incentives lead to farmers breaking these land-use regulations (Marsh, Gordon, Mac, & Pham, 2007).

Besides the Land Law, the Central Government and National Assembly are implementing the Directives and Resolutions of the National Central Party (and Party's Politburo). Following this, a number of government initiatives have been enforced on the ground that

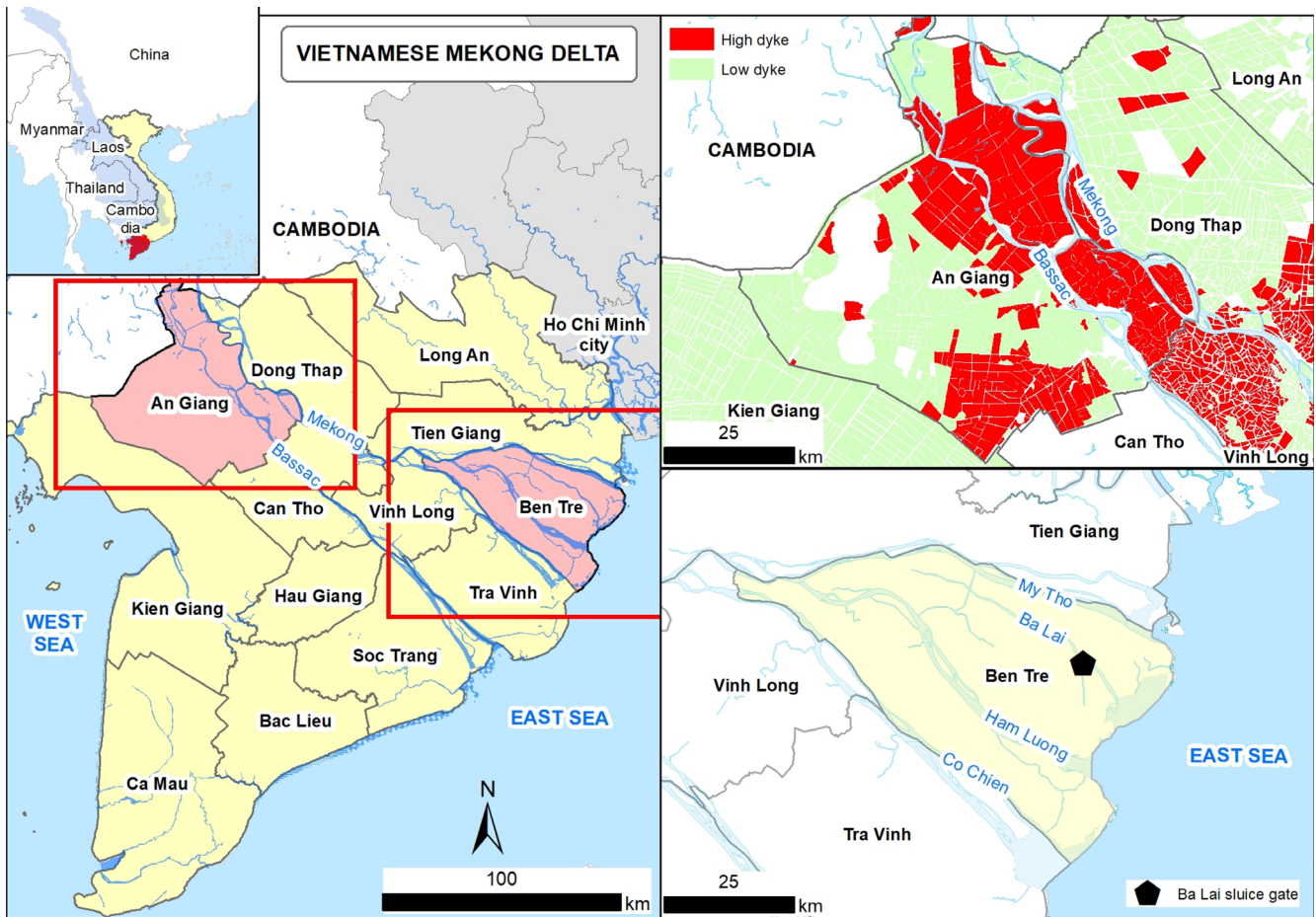


FIGURE 4 The Mekong Delta and case studies area in An Giang and Ben Tre provinces, showing the 2013 dike system in An Giang (upper right) and the Ba Lai sluice gate in Ben Tre

aim to improve the capacity of rural societies in the face of increasingly complex socioeconomic and environmental challenges for Vietnam in general and the VMD in particular. For example, in 2008, the Party issued Resolution 26-NQ/TW on Agriculture, Farmer and Rural Area (*Tam Nông*) that promotes an inclusive and sustainable agriculture for rural development. Based on this resolution, the National Assembly in 2013 approved the National Target Program on New Rural Development (*Chương trình Nông thôn mới*) to improve the livelihoods of farmers and the living conditions in rural areas. This program has been implemented based on a shared contribution between the government and local communities with a considerable focus on rural infrastructure (road, market, school, irrigation). The Party also issued policy guidelines for economic development in the VMD such as Resolution 21 (2001–2010 period) (TW, 2003), and Conclusion 28 (2011–2020 period) (TW, 2012). The national government has followed to develop policies related to land use such as changes in agricultural production structures (PM, 2000, 2013b, 2017), rice land preservation in properly allocating land for rice cultivation to ensure national food security (PM, 2009b, 2012, 2015), and the establishment of large agricultural material zones to promote cooperation, production and consumption in the agricultural sector (PM, 2013a, 2018).

Most notably, the government in 2013 issued Decision 899 as a national program to transform Vietnam's agriculture toward high-value commodities and sustainable development and recently Resolution 120 on sustainable development and climate-resiliency of the VMD to cope with water related natural disasters such as storms, droughts, floods, together with sea level rise and saline intrusion (PM, 2013b, 2017).

3.1.2 | Impacts of water resources policies on land-use change

To enable agricultural and land-use reforms, water control infrastructures have been constructed extensively over the years across the Mekong Delta to manage water resources for agricultural land-use activities (Xuan & Matsui, 1998). They have significantly shaped the land use in the Delta (Le et al., 2018). In the upstream delta, decision making in water resources management promoting rice-based intensification led to the extensive construction of canals, sluice gates, and dikes in the floodplains of Long Xuyen Quadrangle (LXQ) and Plain of Reeds (PoR), which enabled agricultural

production on the acid sulfate soils and protected agricultural areas against flooding (Le et al., 2018). Two important water-control systems—South Vam Nao (1996–2002) and North Vam Nao (2002–2012) in An Giang, a province of the upper LXQ floodplain, were developed extensively across the floodplains after the national innovation reform policy in 1986 and Decision 99 issued in 1996 (Biggs, 2010; Dumaresq, Howie, & Nguyen, 2016; Garschagen, Revilla-Diez, Nhan, & Kraas, 2012; Käkönen, 2008). In the downstream delta, the development of several sea dikes and sluice gates such as the Quan Lo-Phung Hiep (1992–2001), South Mang Thit (1993–2004), O Mon-Xa No (1992–2012), and Ba Lai (2000–2002) enabled the cultivation of fresh and brackish aqua-agricultural farming systems (Hoanh, Diana, & Tuan, 2010; Hoanh et al., 2003; Le et al., 2018; Toan, 2014). These infrastructures have prevented salinity intrusions and have transformed saline-affected zones into freshwater areas (Le et al., 2018). The government has issued several other water resource related decisions to cope with hydrological dynamics and socioeconomic developments (including the impacts of climate change) for the coming years (PM, 1999, 2006; TW, 2012). In general, the structural interventions associated with intensive agricultural activities have not only changed the hydrological regimes across the delta but also have negatively affected its biodiversity and ecosystem functioning locally such as reducing the number of several unique species (i.e., floating rice, wild fishes, and coastal mangrove forest).

3.2 | Influence of national policies on land-use change in VMD

The early 2000s showed decreasing trends in all types of land use, except for aquaculture (Figure 5 [left]). Specifically, the aquaculture area increased sharply from 230 thousand ha to 502 thousand ha

from 2000 to 2010; the area for rice decreased from 2,092 thousand ha to 1908 thousand ha and slightly onwards, while other—non-aqua-culture—land uses remained stable. Additional land-use changes after 2010 are highlighted in Figure 5 (right). Although Winter-Spring rice area decreased slightly by approximately 2,000 ha, seasonal and Summer-Autumn and Autumn-Winter rice increased sharply by about 8,000 and 353,000 ha, respectively. The areas of fresh and saline aquaculture also increased by 14,000 ha. Agriculture in the VMD was transformed one more time in accordance with the sustainability and diversity policies in agriculture since the 2000s and the stimulated exportation policies since 2007.

Table 1 presents the evolution of the main reform policies with actual land-use changes of the rice and shrimp farming practices. Both land-use practices evolved at approximately the same time with important socioeconomic events and policy changes. At the end of the Vietnam War in the 1970s, rice and shrimp farming were mostly based on traditional practices - seasonal rice and extensive shrimp farming (Biggs et al., 2009; T. P. H. Tran, 2012). The urgency of recovering from the War encouraged the government to increase land productivity for food security, nevertheless, with limited and mostly unsatisfactory results leading to the economic reform policies in the 1980s (Hoanh et al., 2010). These policies resulted in significant increases of rice farming in the coastal area and mangrove forests, which were destroyed for shrimp farming. In the 1990s, the government prioritized economic development policies with the reallocation of agricultural land for farmers leading to a period of rice intensification in which the rice farming transformed from single to two- and three-season rice harvesting, using high-yielding varieties and modern practices (Phong, 2010; T. P. H. Tran, 2012; MDP, 2013). The aquaculture farming area (mostly for shrimp cultivation) also rapidly increased by 15% during 1995–1999 and 34% in 2000 as a result of the aquaculture boom in the coastal areas (Le et al., 2018).

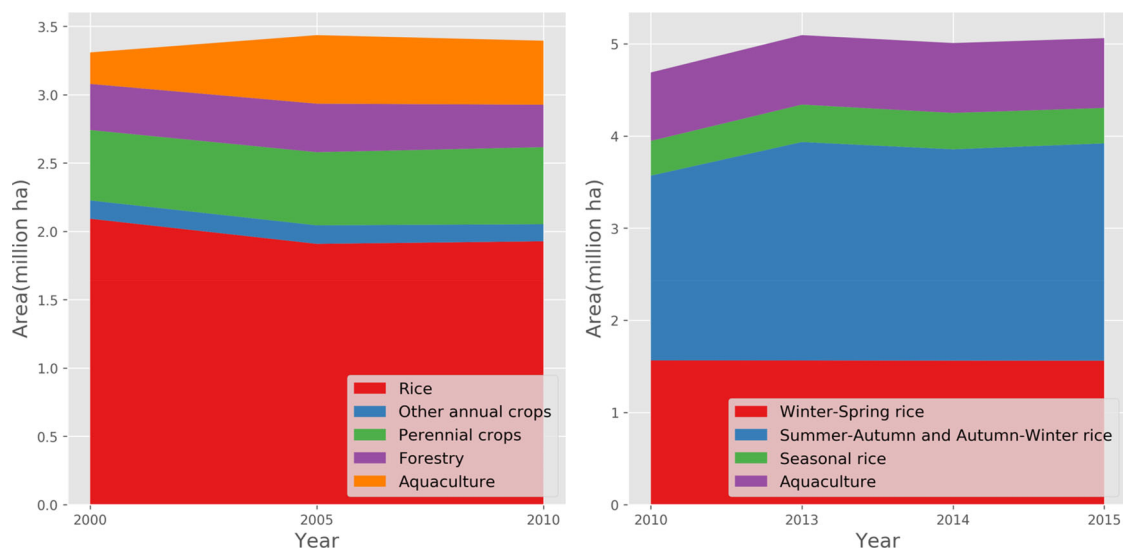


FIGURE 5 Trends and shares of main agricultural land-use types from 2000 to 2010 (on the left) and from 2010 to 2015 (on the right) of the VMD

TABLE 1 Evolutions of selective livelihoods (rice, shrimp) in accordance with the government policies following timeline

Events and legal documents ^a	Years	Rice	Shrimp
American war	1970s	Rice expansion	Extensive system
End of the American war	1975	<ul style="list-style-type: none"> Planted area increased 24%; 	<ul style="list-style-type: none"> Traditional model;
Economic reforms policies	1980s	<ul style="list-style-type: none"> Seasonal rice area decreased 28%; 	<ul style="list-style-type: none"> Using wild seeds;
Directive 100-CT/TW	1981	<ul style="list-style-type: none"> Farming at coastal area increased significantly; 	<ul style="list-style-type: none"> Mangrove forests were destroyed for shrimp farming;
Resolution 10-NQ/TW	1988		
Economic development policies	1990s	Rice intensification	Improved extensive system
Land Law 1993	1993	<ul style="list-style-type: none"> Agricultural land reallocation for farmers; 	<ul style="list-style-type: none"> Artificial shrimp larva production;
Decision 99-TTg	1996	<ul style="list-style-type: none"> Rice farming transformation from single- to two-season and three-season; 	<ul style="list-style-type: none"> International markets' demand increased;
Decision 144/1999/QD-TTg	1999	<ul style="list-style-type: none"> Using high yielding rice, modern seed-fertilizer technology, and agrochemicals; 	<ul style="list-style-type: none"> Mangrove forest recovery; Shrimp farming area increased sharply;
Sustainability and diversity policies	2000s	Farming diversification	Intensive system
Resolution 09/2000/NQ-CP	2000	<ul style="list-style-type: none"> Total area for rice decreased 8%; 	<ul style="list-style-type: none"> Aquaculture product increase 3.6 times in 2007 compared to 2000;
Decree 68/2001/ND-CP	2001	<ul style="list-style-type: none"> Area for one-season rice decreased sharply; 	<ul style="list-style-type: none"> Stocking density was high; No water exchanged; paddlewheels, commercial feeds, medicines, and chemicals were used;
Land Law 13/2003/QH11; Resolution 21-NQ/TW	2003	<ul style="list-style-type: none"> Area for three-season rice increased drastically (129%); 	<ul style="list-style-type: none"> Farming system was bloomed at coastal provinces;
Decision 84/2006	2006	<ul style="list-style-type: none"> Area for two-season rice increased slightly; 	<ul style="list-style-type: none"> Farming area increased 34%;
Stimulating exportation policies	2007		<ul style="list-style-type: none"> Mangrove forest replantation and harvest;
Resolution 26-NQ/TW	2008	<ul style="list-style-type: none"> Development of irrigation and flood control systems; 	<ul style="list-style-type: none"> Applying innovative technologies and management;
Decree 69/2009/ND-CP	2009	<ul style="list-style-type: none"> Mono-cultural rice farming model was transformed into integrated models; 	
Land Law 2013; Conclusion 28-KL/TW; Decision 1397/QD-TTg	2012	<ul style="list-style-type: none"> Area for three-season rice increased slightly but less than two-season rice; 	
Decision 899/2013/QD-CP	2013	<ul style="list-style-type: none"> Area for single season rice continues to decrease; 	
Decree 43/2014/ND-CP	2014	<ul style="list-style-type: none"> Planted area is increased slightly; 	
Decision 593/2016/QD-TTg	2016		
Decree 01/2017/ND-CP; Resolution 120/NQ-CP	2017		

^aReferences of the legal documents: Central Party (TW, 1981, 1988, 2003, 2008, 2012); National Assembly (NA, 1993, 2003, 2013); Prime Minister (PM, 1996, 1999, 2000, 2001, 2006, 2009a, 2013b, 2014, 2016, 2017). Main ideas of the legal document are presented in Table A1, appendix.

3.3 | Implementation of national policy at the provincial level

Implementation of the national Land-Use Plan at the provincial level in Vietnam depends on both hierarchical (vertical) and sectoral (horizontal) aspects (Korbee, Nguyen, Hermans, & Ho, 2019). The Department of Environment and Natural Resources of the provincial government—as responsible actor for the implementation—depends on both the requirements set at the national level (through the National Land-Use Plan) as well as on requirements set by other sectors (through the provincial Socio-Economic Plan). This system results in some governance challenges. First, due to the hierarchical governmental structure, all provinces develop their land-use plans, which results in a plethora of plans (Seijger et al., 2016; van Staveren et al., 2017). These plans show inconsistencies and a lack of coordination, especially at the horizontal level (among provinces) (T. Tran, Pittock, & Tuan, 2019). Moving forward, the Prime Minister issued Decision 593 in 2016 (PM, 2016), which aims to improve the institutional

capacity in cooperation (as known as inter-provincial linkages) at the provincial level. Some innovative governance models, which also include land-use design and planning, have been created in the VMD. A second governance challenge results from the Vietnamese focus on planning, rather than implementation (Korbee et al., 2019). Lacking of budget is one of critical constrains in implementation. Available governmental budgets are often not sufficient to execute implementation tasks as a large portion of the budget depend on unsecured sources.

The translation of national rules and regulations into the local, operational level is hampered by the strong institutional power of top-down planning and policy implementation. For this system to function, local land use and socioeconomic conditions, have to be communicated to and integrated in national plans and policies. However, through “weak” institutional powers of the local government, these local government authorities often lack institutional power to address requirements of local communities and farmers (T. Tran & Rodela, 2019). Hence, crucial information is not transferred bottom-up. As a

result, national plans and policies have included unfit requirements, such as land-use quotas, for the local setting.

3.4 | Relationship of land-use changes/reforms and farmer livelihood sustainability

3.4.1 | Farmers' income and sustainability

Overall, farmer income in the VMD has increased for all land uses due to the effective implementation of national policies and inherent land-use changes. The income of rural households has improved over time (from 45 million VND in 2002 to 87 million VND (~3,373 US Dollar) in 2016 (Figure 6). Nevertheless, this paper finds that there remain numerous challenges facing sustainable livelihoods. For the most part, the contribution of agriculture to the total income of rural households decreased during the 2002–2016 period. Specifically, the income growth rate of households depending purely on agriculture has been lower than that of diversified livelihood households, especially those who have been diverting their income to non-farm activities. The income growth rate of this group was 6.84% per year during the period of 2002–2016, compared to that of the mono agriculture-based livelihood which was only 3%. This fact implies that under the current environmental conditions in the VMD, it is challenging to establish professional and specialized farmers who work solely in the agricultural sector.

Compared with the national level, the farmer's income growth in the VMD seems to be meager. This practically indicates unsustainable livelihoods of the delta's inhabitants. First, the livelihoods of a large proportion of households in the VMD still depend on agricultural related activities, which are highly exposed to climate change impacts such as sea level rise and increasing saline intrusion (Smajgl et al., 2015) and natural disasters like drought/flood, storm surge (United Nation Environment Programme in Viet Nam & Vietnam Institute of Meteorology, Hydrology and Climate Change, 2015). Second, the low education level of the rural population reduces their capacity in dealing with challenges posed by climate

and social changes. According to VHLSS (2014), less than 15% of the rural labor finished secondary school or further education and more than 90% have not received any professional training. In addition, infrastructures to support agricultural production at the household level are limited. Apart from the high investment in irrigation (93% rice-growing land of active irrigation supply), investment allocated to other infrastructure components such as in-field roads and household assets are insufficient. For example, only around 30% of in-field roads in the VMD are concreted and less than 10% of households own a boat. Furthermore, credit access is limited and agricultural household saving to further invest in agricultural production for income improvement is too small (approximately 27 million VND per year per household).

3.4.2 | Impacts of national agrarian policies on livelihoods in An Giang and Ben Tre province

An Giang province has undergone various periods of agricultural transformations, but the period from 1975 onward marked a remarkable shift from the cultivation of long-growth duration traditional rice to high-yielding rice varieties under dike protection (D. D. Tran & Weger, 2017). The intensification of rice-based farming systems under high-dike protection, however, has made livelihoods of most rice farmers in An Giang unsustainable (D. D. Tran, van Halsema, Hellegers, Ludwig, & Seijger, 2018). As an economic aspect, the profits of intensified rice production are meager compared to other cash crops such as corn and vegetables (D. D. Tran, van Halsema, Hellegers, Ludwig, & Wyatt, 2018). After a few years, the total yields from three rice crops annually within high-dike areas were lower than those from two rice crops cultivated outside dikes due to decreased soil fertility (Howie, 2011; Käkönen, 2008). Moreover, D. D. Tran, van Halsema, Hellegers, Ludwig, and Seijger (2018), D. D. Tran, van Halsema, Hellegers, Ludwig, & Wyatt (2018) found that the total annual profit of triple-rice production is decreasing by 45% over the years of cultivation in some areas within the high-dike compartments. In some areas protected by high dikes for over 15 years, the total annual

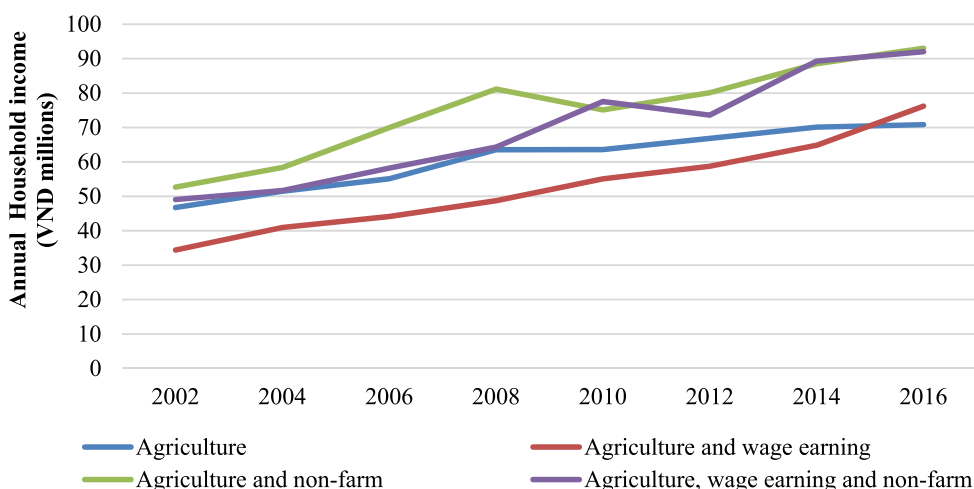


FIGURE 6 Change in income of different farmer's livelihood strategies (VND million per household, 1 VND million ~ 43 US Dollar) (price of 2010) (Sources: Calculated from VHLSS data of 2002–2016)

profits are lower than those under low-dike protection, owing to increased input costs of 58 to 91% of agro-chemicals. In an environmental term, the quality of land and water inside the areas protected by high dikes has been reduced after the long-term cultivation without fertile sediment deposition from floodwaters. Due to the intensive use of fertilizers and pesticides, land degradation has been exacerbated in many high-dike areas. As a social aspect, the extensive construction of high-dikes based on rice-first policies has strongly reduced job opportunities of poor or landless farmers (T. Tran & James, 2017), whose livelihoods depend heavily on the common pool resources (i.e., sediment and wild fish) (Käkönen, 2008). Despite the benefits of high-dike protecting human life and property from flood damage, the dike-based land-use policies that spurred triple-rice production have caused negative long-term impacts over years on the sustainability of rice farmer's livelihoods (Chapman, Darby, Hong, Tompkins, & Van, 2016; D. D. Tran, van Halsema, Hellegers, Ludwig, & Wyatt, 2018).

Ben Tre province is another example representing a closed relationship between national policies and local agricultural land-use dynamics. The central government has promulgated various land use and water resources policies over the last four decades in order to reclaim acid sulfate soils and transform coastal lands from brackish to freshwater, based on shrimp and rice cropping patterns (Le et al., 2018; Renaud, Le, Lindener, Guong, & Sebesvari, 2014). Ba Lai Dam-Sluice, which was constructed in 2000 with the national government investment and put into operations in 2002, is the most massive salinity control project of the province (Le et al., 2018). The Ba Lai dam aims to prevent saline intrusion further inland and to ensure the supply of freshwater for farmers who cultivate freshwater-based crops such as rice, coconuts, and other fruits. However, after more than 15 years of operation, the effectiveness of the dam in irrigation water supply and improvement of local economic conditions has received critical debates. Evidence suggests that the dam resulted in adverse environmental impacts on the local ecosystems from intensive shrimp farming systems, which need brackish and saline water resources for production (Hoang, Kubo, Hoang, & Tanji, 2009). Local farmers have tried to extract saltwater for shrimp farms from shallow aquifers. Specifically, there are more than 1,153 saltwater wells used for the extraction of saltwater for aquaculture in the freshwater area of the Ba Lai dam (Ngo, Nguyen, Vanreusel, & Ngo, 2017; D. Nguyen, 2015). Emerging conflicts due to the demand for freshwater and that for saltwater between agriculture and aquaculture farmers have led to widespread socioeconomic damage (Ngo et al., 2017; Tuong & Bouman, 2003). Lessons learned from the Ba Lai case study showed that without local insights and understanding of the social aspects such as cultural and household traditions, land-use change policy may severely influence the living conditions of local people as well as the environment. Conflicts among stakeholders, who require either freshwater or saltwater for their livelihoods, have led to widespread socioeconomic damage. If these issues continue to persist, eventually severe conflicts will occur not only in local communities along the Ba Lai River but also in other areas in the VMD.

4 | DISCUSSIONS

4.1 | Application of IAD framework

The IAD framework is widely recognized and applied to study the interrelations between the social-institutional context and the ecological system, most notably the management of common pool resources (Ostrom, 2011). Its applications range from fisheries (Rudd, 2004), forestry (Andersson, 2006), soil and water conservation (Nigussie et al., 2018), as well as combined approaches, such as the water-energy-food nexus (Villamayor-Tomas, Grundmann, Epstein, Evans, & Kimmich, 2015), translation and implementation of national and local land-use plans and policies (Clement & Amezaga, 2008; Koontz, 2005). Clement and Amezaga (2008) in a study of reforestation policies and land-use change in Vietnam stress the importance of linking an institutional approach with a historical perspective. We have selected the IAD on all three levels, pointing to a mismatch between the practices of farmers at the operational level, and the rules and regulations (constitutional rules) made at the national level. Over the last 30 years, a large number of new policies aiming to influence land use in the VMD have been developed and adopted. However, developments in the region have not followed this. In practice, local government authorities regard "implementation" as the translation of national plans into provincial and district level plans (as top-down), with minor focus on the actual changes in practice (Korbee et al., 2019). As a result, plans when being "translated" to a local level, do not take into account of the local setting, making them difficult to implement. It is therefore recommended that more operational spaces should be provided and the institutional power of local government authorities strengthened (i.e., allowing bottom-up land-use planning).

4.2 | Operational choice of VMD farmers

In general, land policies and land-use plans aim to help Vietnam achieve multiple targets: forming the land market in the VMD, promoting the land accumulation, increasing the efficiency of land use, and ensuring food security and maintaining equality (Smajgl et al., 2015; Son & Tuan, 2013). Nevertheless, their impacts on the land-use performance in the rural delta are rather complicated, and in many cases, conflicts with policy targets. The institutional complexity can be illustrated in various aspects. First, although farmers obtain land use right over time that can help them use land more flexibly and productively to meet the market demand, the food security target based on rice land preservation in some extent restricts farmers from increasing the land-use efficiency (Giesecke, Tran, Corong, & Jaffee, 2013; Khoi & Linh, 2018). While horticulture farmers can easily convert their land-use purpose to other crops if their land is not located in rice land designated areas, rice farmers are not allowed to do so if they are planting in designated rice land. Instead, rice growers have to ask district authorities to approve such conversion, which normally require a long and complicated administrative process. Land-use plans are often developed using top-down approaches in absence of scientific-based

foundations and market analyses, and thus they are usually not suitable to real-life context and market demand (Anderson & Davidsen, 2011). Consequently, in reality, farmers usually spontaneously change their land use to other purposes (e.g., from rice to fruit gardening or even aquaculture) following market signals where minimum infrastructure conditions (particularly irrigation) are needed (Giesecke et al., 2013). In many places, local authorities have ignored these spontaneous changes and still counted these converted areas as rice land in their official reporting system to avoid on the violation of the rice land preservation policy (Son & Tuan, 2013). Second, the regulation of land area limits does not ensure equality; rather it restrains the land accumulation process (Son & Tuan, 2013). To go around the Law, in many places farmers who have excessive agricultural land area still accumulate additional land by registering smaller pieces under the names of different people. This practice significantly increases transaction costs of land accumulation. Third, the land price frame for transaction set by local authorities is not appropriate making it difficult for land acquisitions and transactions. The land price-setting framework is made by a top-down process without scientific base and community consultation. In practice, the price of agricultural land set by the government is normally lower than market price from 10 to 100 times. Consequently, land acquisitions or procurement causes some difficulties for both buyers and sellers in terms of achieving a mutually agreed price. It is because the buyers often refer to the governmental price, while the sellers desire to use shadow market price. Fourth, land consolidation and accumulation via farmer-farmer cooperation and farmer-enterprise linkages have shown some initial positive results but still are not stable and durable (Marsh et al., 2007). The lack of a comprehensive policy framework to establish effective cooperatives, agricultural value chains, and contract farming mechanisms prevents farmers from working together or cooperate with enterprises to establishing large-scale production zones.

4.3 | Implications of land-use policy on inequality

Land accumulation can be considered as a critical enabling factor for agriculture development in the VMD (Deininger & Jin, 2008; Martin & van de Walle, 2008). However, statistical analysis from VHLSS shows that the land accumulation process in the delta has disproportional effects on different farmer groups that is, while farmers with large farm sizes can manage to get more land, smallholders face difficulties in maintaining their annual croplands. This finding is in line with H. Q. Tran (2018) showing that farmers in the three highest landholding categories in the VMD have a better access to machinery, inputs, and credit and therefore enjoy much higher profits compared to land-poor households. This also corroborates the results of previous studies about land inequalities in the VMD (Akram-Lodhi, 2005; Akram-Lodhi, 2010).

Adaptation to hydro-ecological characteristics of different regions in the VMD in land-use planning is another aspect to be considered in land-use planning. Although these policies have contributed to increasing annual rice production in the delta, the

reduction in flood retention capacity of the floodplains has driven local farmers and government to adapt their farming activities to current floodwater dynamics and changing climate (Käkönen, 2008; Thao, 2012; D. D. Tran, van Halsema, Hellegers, Ludwig, & Seijger, 2018; T. Tran & James, 2017). Thus, the original land-use plan for this area, for example, triple rice production, should be shifted toward more diversified crop or flood-based crop patterns. This allows floodwaters to enter fields to both replenish soils and nutrients and reduce land degradation over cultivation years (Chapman et al., 2016)

4.4 | Resilience and sustainable livelihood

Land-use policy has changed socioecological resilience as well as the sustainability of farmer livelihood in the VMD over the last decades. The changes mainly happened in the upper floodplains and coastal areas where the livelihoods are profoundly impacted by water-control interventions (e.g., dikes for flood protection and sluice gates for preventing salinity intrusion). However, these systems caused reduced resilience in water and land of the areas in many ways. For example, land degradation has increased over the years due to the overuse of fertilizer and pesticide from rice-based agricultural intensifications in the areas with high-dike protection (Chapman et al., 2016; D. D. Tran, van Halsema, Hellegers, Ludwig, & Wyatt, 2018). To improve the resilience of agricultural activities in these areas, nature-based water-controlled structure is a good option by actively restoring flood-based ecosystems in the areas (International Union for Conservation of Nature, 2017). V. K. Nguyen (2014) indicated that flood-based farming systems such as floating gardens and floating rice cultivation are valid measures in the low dike and no-dike areas floodplains in the flood season, which helps to exploit ecological benefits from floods. These measures were also recommended by other studies of D. D. Tran and Weger (2017) and Chapman et al. (2016). Another example can be found in the coastal areas where shrimp farms have started to thrive from the end of the 1990s following a supporting policy of the government issued on an increasing national and exporting demands (Lebel et al., 2002). This enabled extensive diversification of shrimp farming activities in the VMD, which includes three main types of (a) intensive, (b) extensive, and (c) integrated shrimp farming systems (Joffre, 2015). While intensive shrimp farming showed certain limitations in livelihood sustainability (e.g., reducing mangrove areas, and surface water pollution), extensive shrimp farming adopted by farmers, with less financial capital and knowledge. A special type of extensive shrimp farming is integrated shrimp farming practices, for example, the rice-shrimp and mangrove-shrimp models. These two models are of special interest thanks to its substantial contributions to risk reduction and enhanced resilience for coastal farmers and environmental sustainability of shrimp farming in the VMD although the farmers need to consider the limiting factors such as extra work, limited shrimp harvest, and market (Bush et al., 2010; T. T. P. Ha, van Dijk, Bosma, & Sinh, 2013; T. T. Ha, van Dijk, & Bush, 2012; Joffre, 2015).

5 | CONCLUSIONS AND WAYS FORWARD

In this paper, we aim to understand the relationships between legal/institutional settings and the land-use dynamics over the last decades and their potential implications on livelihood sustainability in the VMD. We focused on three main aspects: (a) formulation and implementation of land Law and agriculture policies in the past decades in Vietnam; (b) impacts of the law and these policies on land-use practices at the provincial level in the VMD; and (c) implications of these processes for local farmer livelihood sustainability. The applied IAD framework shows that the implementation of different legal/institutional policies from central/regional to local governments has had profound effects on livelihood transitions given the practical demands and legislative influences. Our findings describe the complexity of Laws and policies (e.g., rice production, flood protection) that is strongly related to the agricultural transition in the VMD. It also showed the gap between the national policy and implementation at the provincial level. The implemented policy and institutional settings were not able to take full account of ecosystem services and their linkages and positive/adverse impacts to local livelihoods. Our study revealed the holistic requirements in land-use planning for the VMD, suggesting the integration between top-down and bottom-up approach. In this light, the provincial government should play a more important role in linking national policy to the actual livelihoods and demands of farmers. It is equally important that better insights into the changes and the complexity of various social-ecological systems in the VMD are required before (hard) solutions and relevant policies implemented.

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APPENDIX

TABLE A1 Evolutions of national legislation in relation to land use change of Mekong delta

Agency	Before 2000	2000–2010	2011–present
Central Communist Party	<ul style="list-style-type: none"> • Directive 100-CT/TW on modifying the contract mechanism in agricultural cooperatives (1981) <ul style="list-style-type: none"> ◦ Implementation of the "package-contract" scheme to co-operative • Directive 23-CT/TW on leadership of hunger elimination and poverty reduction (1997) <ul style="list-style-type: none"> ◦ Emphasis on the need of avoiding landless households • Resolution 10-NQ/TW on reforming agriculture management (1988) <ul style="list-style-type: none"> ◦ Implementation of the "package-contract" scheme to household level ◦ Land use right to farmer of 15 years • Resolution 5-NQ/HNTW on continuing the reform of rural socioeconomic condition (1993) <ul style="list-style-type: none"> ◦ Renovation and development of rural economics ◦ Long-term land-use right to farmer • Resolution 06-NQ/TW on some issues related to agricultural and rural development (1998) 	<ul style="list-style-type: none"> • Resolution 14-NQ/TW on promoting private sector economy (2002) <ul style="list-style-type: none"> ◦ Allowance of households/enterprises who have land-use certificates to perform land transactions (mortgage, joint-venture) • Resolution 15-NQ/TW on promoting industrializing and modernizing agricultural and rural sector 2001–2010 (2002) <ul style="list-style-type: none"> ◦ Promotion of land consolidation (<i>don dien, doi thua</i>), ◦ Promotion of large agricultural production zones ◦ Facilitation of land-use right transactions • Resolution 21-NQ/TW on orientation, duty, solution for economic development and national defence in Mekong River Delta 2001–2010 (2003) <ul style="list-style-type: none"> ◦ Strategic development guideline for Mekong River Delta ◦ Promotion of establishing large material areas ◦ Reservation of rice land for food security 	<ul style="list-style-type: none"> • Conclusion 22-KL/TW (2012) the implementation of Resolution 26-NQ-TW (2003) on continuing the reform of land policy and legislation for promoting industrialization and modernization (2012) <ul style="list-style-type: none"> ◦ Emphasis on revising Land law 2003 ◦ Emphasis on the role of the State regarding land-use designation and planning ◦ Promotion of land rental market ◦ Extension of land use term • Conclusion 28-KL/TW on the implementation of Resolution 21-NQ/ TW (2003) on orientation, duty, solution for economic development and national defence in Mekong River Delta 2001–2010 (2012) <ul style="list-style-type: none"> ◦ Solutions for socio–Economic development of the Mekong delta until 2020 ◦ Completion of dyke, sluice gate system to cope with climate change, upstream development • Resolution 13-NQ/TW on establishing comprehensive infrastructure to facilitate Vietnam to

(Continues)

TABLE A1 (Continued)

Agency	Before 2000	2000–2010	2011–present
	<ul style="list-style-type: none"> ○ Emphasis on harmonizing land accumulation and land equality of smallholders ○ Attention on landless household issues in Mekong River Delta 	<ul style="list-style-type: none"> • Resolution 26-NQ/TW on continuing the reform of land policy and legislation for promoting industrialization and modernization (2003) <ul style="list-style-type: none"> ○ Target of issuing a new land law in 2003 ○ Target of completing land use designation and planning at national, provincial, district, commune levels at the end of 2005 ○ Strictly protection of rice land for food security Promotion of land accumulation and land use right transactions • Resolution 26-NQ/TW on Agriculture, Farmer and Rural Area (<i>Tam Nong</i>) (2008) <ul style="list-style-type: none"> ○ Protection of rice land for food security ○ Ensured irrigation system for 100% area of two-rice-crop area ○ Focus on rural infrastructure Emphasizing on revising of Land law 2003 	<p>become a fundamentally industrialized country in 2020 (2012)</p> <ul style="list-style-type: none"> ○ Focus on infrastructure in Mekong River Delta to adapt with climate change ○ Improvement of river transport in Tien and Hau Rivers • Resolution 24-NQ-TW on active adaptation to climate change, consolidation of natural resources and environmental protection (2013) <ul style="list-style-type: none"> ○ Reservation of space for flood release in Mekong River Delta ○ Design plan for flood control in Mekong River Delta • Resolution 05-NQ/TW on some main policy guidelines to promote structural transformation, improve growth quality, labour productivity, competitiveness of the economy (2016) <ul style="list-style-type: none"> ○ Promotion of land market, land accumulation • Resolution 06-NQ/TW on implementing international economic integration, maintaining socio-political stability (2016) <ul style="list-style-type: none"> ○ Promotion of land accumulation ○ Establishment of large production zones based on the farmer organization–Business linkage • Resolution 10-NQ/TW on developing private economy to become an importance force of the market oriented socialist economy (2017) <ul style="list-style-type: none"> ○ Promote land rental market, land accumulation ○ Protection of land use right ○ Consolidation of infrastructure for modern and high-value agricultural production • Resolution 11-NQ/TW on completing the institutional framework of a market oriented socialist economy (2017) <ul style="list-style-type: none"> ○ Consolidate the comprehensive legislation for land market development (land use right, pricing framework, management, contract, investment, trade, bidding, tax) ○ Establishment of institutions to perform land market
National Assembly (NA)	<p>Laws</p> <ul style="list-style-type: none"> • Land law 1987 <ul style="list-style-type: none"> ○ The first land law of Vietnam ○ No regulation on land use for households 	<p>Laws</p> <ul style="list-style-type: none"> • Amended Land law 2001 <ul style="list-style-type: none"> ○ The role of the National Assembly on approving the land-use designation and planning at national level; 	<p>Laws</p> <ul style="list-style-type: none"> • Cooperative Law 23/2012/QH13 (2012) <ul style="list-style-type: none"> ○ Land-use right of cooperative (rent, mortgage)

(Continues)

TABLE A1 (Continued)

Agency	Before 2000	2000–2010	2011–present
	<ul style="list-style-type: none"> ○ No regulation on land-use designation and zoning • Land law 1993 ○ Regulation on land-use designation and planning for the first time ○ Land-use right to farmer of 20–50 years • Law on land-use right transfer tax (1994) • Law on land use tax (1993) • Cooperative Law (1996) <ul style="list-style-type: none"> ○ General regulation on land-use right of cooperative • Amended Land law 1998 <ul style="list-style-type: none"> ○ No change in regulation on land-use designation and planning <p>Resolutions</p> <ul style="list-style-type: none"> • Resolution 01/1997/QH9 on approving National land-use plan in the 1996–2000 period <ul style="list-style-type: none"> ○ National agricultural land area of 8.99 million ha (4.23 million ha for rice) 	<ul style="list-style-type: none"> ○ The term of 10 year for land-use designation and 5 years for land use planning • Land Law 13/2003/QH11 <ul style="list-style-type: none"> ○ Extension of the content of land-use designation and planning, requirement of more scientific-based foundation, ○ The term of 5 years land-use planning at national and local levels • Cooperative Law 18/2003/QH11 (2003) <ul style="list-style-type: none"> ○ Allowance members to use land-use right as contribution for cooperatives • Law on dyke and drainage 79/2006/QH11 (2006) <ul style="list-style-type: none"> ○ Land-use designation and planning for dyke and drainage construction <p>Resolutions</p> <ul style="list-style-type: none"> • Resolution 29/2004/QH11 on approving National land use designation toward 2010, land use plan toward 2005 (2004) <ul style="list-style-type: none"> ○ Agriculture land area of 9.36 million ha (3.85 million ha of rice land) in 2010 • Resolution 63/2009/NQ-CP by the Government on ensuring national food security 	<ul style="list-style-type: none"> ○ Water resources law 17/2012/QH13 (2012) ○ Requirement of harmonizing water resources planning and land-use planning ○ Responsibility of groundwater users • Land Law 45/2013/QH13 (2013) <ul style="list-style-type: none"> ○ The rule of harmonizing land use designation and planning at different levels ○ The term of 5 years land-use planning at national and provincial levels, and 1 year at district level ○ Requirement of detailed scientific-based foundation • Law on Science and Technology 29/2013/QH13 (2013) <ul style="list-style-type: none"> ○ Land-use designation and planning for high-tech agricultural zones • Construction law 50/2014/QH13 (2014) <ul style="list-style-type: none"> ○ Land use designation and planning for regional development, rural area development and rural residential areas • Investment law 67/2014/QH13 (2014) <ul style="list-style-type: none"> ○ Mechanism and procedure to rent land for investment • Designation Law 21/2017/QH14 (2017) <ul style="list-style-type: none"> ○ Five levels of designation: national (national, marine, land use, sector), regional, provincial, special economic-administrative unit, urban–rural ○ Time line: national level vision from 30 to 50 years • Forestry law 16/2017/QH14 (2017) <ul style="list-style-type: none"> ○ Forestry land use right and responsibility ○ Land use designation and planning for forest development ○ Condition and procedure to change from forest land category to agricultural land category • Fishery law 18/2017/QH14 (2017) <ul style="list-style-type: none"> ○ Fishery land use right and responsibility ○ Land use designation and planning for aquaculture development • Irrigation law 08/2017/HQ14 (2017) <ul style="list-style-type: none"> ○ Right and responsibility of irrigation users

(Continues)

TABLE A1 (Continued)

Agency	Before 2000	2000–2010	2011–present
			<ul style="list-style-type: none"> ○ Land use designation and planning for irrigation development <p>Resolutions</p> <ul style="list-style-type: none"> ● Resolution 17/2011/QH13 on approving National land use designation toward 2020, land use plan for the 2011–2015 period (2011) <ul style="list-style-type: none"> ○ Agriculture production land area of 26.7 million ha (3.8 million of rice land) in 2020 and 25.5 million ha (3.9 million ha of rice land) in 2011–2015 ● Resolution 100/2015/QH13 on approving the budget for National Target Programs in 2016–2020 (2015) <ul style="list-style-type: none"> ○ Target of 2020:50% of communes achieve the standard of New Rural Commune ○ Central budget: VND 63,000 billion ● Resolution 134/2016/QH13 on Adjustment of National land use designation toward 2020, and land use plan in the 2016–2020 period (2016) <ul style="list-style-type: none"> ○ Adjustment of agriculture production land area of 27.1 million ha (3.76 million ha of rice land) in 2020 ● Resolution 32/2016/QH14 on harmonizing the National Target Program on New Rural Development with the Agricultural Restructuring Program (2016)
<p>Central Government</p>	<p>Decisions</p> <ul style="list-style-type: none"> ● Decree 12/CP on restructuring state farms (1993) ● Contract to member of national farm ● Decision 99-TTg on long-term orientation and 5-year plan 1996–2000 for irrigation, transport and rural development in Mekong River Delta (1996) <ul style="list-style-type: none"> ○ Long-term and 5 years plan (1996–2000) of water resources, transport, rural construction of Mekong delta ○ Water for irrigation of 2 million hectares ○ 3 focal programs for Plain of Reeds, Long Xuyen Quadrangle, Western of Hau river ○ Provision of fresh water to Ca Mau peninsula, Go Cong, South Mang Thit ● Decision 159/1997/QĐ-TTg on urgent construction of some 	<p>Resolutions</p> <ul style="list-style-type: none"> ● Resolution 09/2000/NQ-CP on some solutions and policies to change economic structure and agricultural product consumption (2000) <ul style="list-style-type: none"> ○ Agriculture product ○ Extension of market ● Resolution 24/NQ-CP on action program of the government to implement Resolution 26 on Agriculture, Farmer and Rural Areas (2008) <ul style="list-style-type: none"> ○ Recognition of the National Target Program on New Rural Development as a key task in the 2010–2015 period <p>Decisions</p> <ul style="list-style-type: none"> ● Decision 173/2001/QĐ-TTg on socioeconomic in Mekong River Delta in the period of 2001–2005 (2001) 	<p>Decrees</p> <ul style="list-style-type: none"> ● Decree 42/2012/ND-CP by the Government on managing, using rice land <ul style="list-style-type: none"> ○ Subsidy provision to rice farmers of VND 500,000 per ha of rice ● Decree 43/2014/ND-CP on implementing Land law 2013 (2014) <ul style="list-style-type: none"> ○ Detailed procedure of land use designation and planning with specific time line. ● Decree 36/2015/ND-CP by the Government on managing, using rice land (replacing Decree 42/2012/ND-CP) <ul style="list-style-type: none"> ○ Allowance of flexible use of rice land ○ Subsidy provision to localities who plant rice of VND 1 million per ha of rice ● Decree 01/2017/ND-CP amending Decree 43/2014/ND-CP on implementing Land law 2013 (2017)

(Continues)

TABLE A1 (Continued)

Agency	Before 2000	2000–2010	2011–present
	<p>irrigation, transportation works, and residential zones in deep flood Mekong Delta in 1997 (1997)</p> <p>Master Plans</p> <ul style="list-style-type: none"> • Decision 01/1998/QD-TTg on approving the Socio-economic master plan in Mekong River Delta in the period 1998–2010 (1998) <ul style="list-style-type: none"> ◦ Focus on intensive rice production ◦ Promotion of fishing and aquaculture • Decision 144/1999/QD-TTg (1999) on approving Master plan for control and usage of flood water from 1999–2010 (1999) <ul style="list-style-type: none"> ◦ Flood Control of deep flooded area in Mekong River Delta 	<ul style="list-style-type: none"> • Decision 491/QD-TTg on issuing national criteria for new rural development (2009) • Decision 800/QD-TTg on approving the National Target Program on New Rural Development <p>Decrees</p> <ul style="list-style-type: none"> • Decree 181/2004/ND-CP, Decree 17/2006/ND-CP on implementing the Land law 2003 • Decree 188/2004/ND-CP on land price valuation and frame • Decree 197/2004/ND-CP, Decree 69/2009/ND-CP on compensation and resettlement for land acquisition • Decree 198/2004/ND-CP, Decree 142/2005/ND-CP, Decree 120/2010/ND-CP, Decree 121/2010/ND-CP on land use fee • Decree 84/2007/ND-CP, Decree 88/2009/ND-CP on land use certificate issuance, land use conflict resolution <p>Master plans</p> <ul style="list-style-type: none"> • Decision 84/2006 on adjusting the Master Plan for Irrigation in Mekong River Delta in the period of 2006–2010 and vision to 2020 • Decision 1581/QD-TTg on approving Master Plan for Construction in Mekong River Delta toward 2020 and vision to 2050 (2009) • Decision 2065/QD-TTg on approving the Master Plan for water release in focal economic zones of Mekong River Delta (2010) 	<ul style="list-style-type: none"> ◦ Regulate land-use planning for the National Target Program on New Rural Development <ul style="list-style-type: none"> • Decree 89/2018/ND-CP on promoting cooperation, linkage in agricultural production and trade <ul style="list-style-type: none"> ◦ Promotion of complete value chain development to establish large production zones <p>Resolutions</p> <ul style="list-style-type: none"> • Resolution 120/NQ-CP Sustainable development Mekong delta (2017) <ul style="list-style-type: none"> ◦ Vision, objective, rule and pathway to support Mekong River Delta adapt effectively and efficiently to climate change and upstream development activities ◦ Three keys commercialize products: Aquaculture, horticulture, rice ◦ Three main programs: Sustainable agricultural transformation program, effective management of water resources and re-planning of Mekong River Delta <p>Decisions</p> <ul style="list-style-type: none"> • Decision 2270 on Plan to implement the Conclusion 28-KL/TW on the implementation of Resolution 21-NQ/TW (2003) on orientation, duty, solution for economic development and national defence in Mekong River Delta 2001–2010 (2013) <ul style="list-style-type: none"> ◦ Focus on infrastructure development and climate change adaptation in Mekong River Delta • Decision 62/2013/ND-CP on promoting production-processing-marketing linkages in large-field farming projects (2013) <ul style="list-style-type: none"> ◦ Provision of financial support to promote farmers working collectively to establish large rice farms • Decision 899/2013/QD-CP on National Agricultural Restructuring Program <ul style="list-style-type: none"> ◦ Provision of guideline for restructuring the agricultural development strategy at national and local level toward a sustainable and high-value agriculture • Decision 1980/QD-TTg on issuing national criteria for new rural development for the 2016–2020 period

(Continues)

TABLE A1 (Continued)

Agency	Before 2000	2000–2010	2011–present
			<ul style="list-style-type: none"> • Decision 1600/QD-TTg on approving the National Target Program on New Rural Development (2016–2020) (2016) <ul style="list-style-type: none"> ◦ Target of 2020:50% of communes achieve the standard of New Rural Commune • Decision 593/2016/QD-TTg on piloting the inter-provincial linkage institution in Mekong River Delta (2016) <ul style="list-style-type: none"> ◦ Encouragement of pilot institutional and governance models to link among provinces for better land use designation and planning • Decision 1769/QD-TTg to adjust Decision 1600/QD-TTg on approving National Target Program on New Rural Development (2016–2020) (2017) • Decision 414/QD-TTg to implement Resolution 32/2016/QH14 on harmonizing the National Target Program on New Rural Development with the Agricultural Restructuring Program (2017) <p>Master plans</p> <ul style="list-style-type: none"> • Decision 8054/QD-BCT by Ministry of Industry and Trade on approving the Master Plan for Electricity Development in Mekong River Delta toward 2020 and vision to 2025 (2012) • Decision 1397/QD-TTg on approving Master Plan for Irrigation Management in Mekong delta in the 2012–2020 period and vision toward 2050 (2012) • Decision 11/QD-TTg on approving Master Plan for Transportation in Mekong River Delta toward 2020 and vision to 2030 (2012) • Decision 939/QD-TTg by Prime Minister on approving the socio-economic master plan of Mekong River Delta toward 2020 (2013) <ul style="list-style-type: none"> ◦ Vision: a focal and highly commercialized agricultural and aquaculture production region of Vietnam ◦ Key products: Rice, aquaculture ◦ Transportation based on good condition of irrigation, dyke, river and road system • Decision 639/QD-BNN-KH by Ministry of Agricultural and Rural Development on approving the Master Plan for agriculture and rural

(Continues)

TABLE A1 (Continued)

Agency	Before 2000	2000–2010	2011–present
			<p>areas in Mekong River Delta toward 2020 and vision to 2030 (2014)</p> <ul style="list-style-type: none"> • Decision 245/QD-TTg by Prime Minister on approving the Master Plan for focal economic zones in Mekong River Delta (2014) <ul style="list-style-type: none"> ◦ Selection of Can Tho, Ca Mau, An Giang, Kien Giang as focal economic zones of Mekong River Delta • Decision 2227/QD-TTg by Prime Minister on approving the Master plan for Tourism in Mekong River Delta toward 2020 and the vision to 2030 (2016) • Decision 68/TTg by Prime Minister on adjusting Master plan for Construction in Mekong River Delta (2018)