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Tang Luu[a], Derk Voorintholt[b], Ellen Minkman[c], Thanh Binh Nguyen[d], Gvantsa Gverdtsiteli[e], Tran Che Linh[f] and Hong Quan Nguyen[a,g]

[a]Center of Water Management and Climate Change at the Institute of Environment and Natural Resources, Vietnam National University in Ho Chi Minh City, Ho Chi Minh City, Vietnam; [b]Water Systems and Global Change Group, Wageningen University, Wageningen, the Netherlands; [c]Faculty of Technology, Policy & Management, Delft University of Technology, Delft, the Netherlands; [d]Mekong Delta Development Research Institute, Can Tho University, Can Tho, Vietnam; [e]Department of Social Sciences and Business, Roskilde University, Roskilde, Denmark; [f]Department of Agriculture and Rural Development, An Giang Province, Vietnam; [g]Institute for Circular Economy Development, Vietnam National University in Ho Chi Minh City, Ho Chi Minh City, Vietnam

ABSTRACT

Based on a qualitative case study in An Giang province, Vietnam, we mapped the understanding of the 'Living with Floods' (LWF) concept and the implementation of three projects to explain the effectiveness of water governance in Vietnam. We have demonstrated how perceptions on the LWF concept differ per government level and the limits of water governance effectiveness. Diverging perceptions undermine the effectiveness of water governance. A framework and a list of indicators are proposed to measure the effectiveness of floodwater governance. Integrating local and social aspects in LWF policies and vertical coordination may help align short-term benefits with long-term adaptation.

KEYWORDS

Living with Floods; policy translation; OECD Principles on Water Governance; Mekong Delta; Vietnam

Introduction

The Vietnamese Mekong Delta (hereafter, Mekong Delta) plays a crucial role in the food security of Vietnam and the livelihood of approximately 17.3 million inhabitants (GSO, 2021). Yet, this security is being threatened by several uncertainties including upstream activities, climate change and internal development such as natural resources exploitation (Binh et al., 2021; IMHEN & UNDP, 2015). In response to climate change, the central government has adopted an adaptive, long-term approach for the development of the Mekong Delta by issuing several legal documents including a new Law on Planning and Resolution 120 (hereafter, R120) (Government of Vietnam, 2017) in 2017 (Minkman, 2021). This approach is referred to as 'Actively Living with Floods' (see the next section) and highlights the importance of accommodating flood events rather than avoiding floods at all costs.

CONTACT Ellen Minkman e.minkman@tudelft.nl

In recent years, the contribution of these policies for sustainable and climate-proof water management in the Mekong Delta is unclear. While the Vietnamese central government has already issued policies, the intended effects have not yet been demonstrated (National Assembly, 2020). Countries with top-down technocratic governance systems are often seen as more capable to set problem-focused policy targets and implement them with stiff measures. The concept of 'authoritarian environmentalism' implies that, in theory, authoritarian governments can yield faster and more precise responses to the environmental crisis compared with democracies (Gilley, 2012). However, in reality, policy implementation is fragmented and typically carried out by local or provincial authorities in states with strong top-down command structures and highly centralized bureaucracies, such as China and Vietnam. Previous studies have highlighted how the development and implementation of climate change adaptation policies are often limited due to social and institutional barriers in particular (Biesbroek et al., 2013). In this respect, the lack of policy coordination and coherence between national and local government levels can undermine the effectiveness of policy output (for an illustrative case study in the Mekong Delta, see also Minkman et al., forthcoming 2022).

Following the OECD Principles on Water Governance (OECD, 2015), effective water governance is defined here as having clear goals and targets at all levels of government and being implemented as intended by meeting expected targets (p. 5). We hypothesize that mismatches between central policymaking and policy local implementation are the result of ineffective governance. In this paper we evaluate the congruence of how policies are intended and understood at different levels of government in the case of flood management in Vietnam, by answering the research question: How can the coherence between policy intention and implementation of 'Actively Living with Flood' Approaches in Vietnam be explained through a water governance perspective? We focus on a particular concept within these policies: Living with Floods (LWF), which is a resilience approach to flood risk management, whereby the temporarily flooding of large areas is allowed while adaptive measures are taken to reduce the flood damage (Vis et al., 2003). LWF strategies may differ among regions as the natural environment, economy, people's living patterns and social structures vary (Dao & Kaoru, 2003). Nevertheless, LWF has been used to refer to policies and coping strategies in the Vietnamese Mekong Delta for the last two decades.

The remainder of the paper is structured as follows. In the next section, we conceptualize the policy implementation process as a process of sensemaking and outline how we used qualitative methods to map national-level policy intentions, local officials' perceptions and the implementation in three projects in An Giang province of Vietnam. We then present the results, which are discussed using the OECD Principles on Water Governance related to effectiveness in the discussion section. Finally, we share the main conclusions related to a discrepancy between short-term concerns in the delta.

Methodology

This section discusses the conceptualization and research methods.

Conceptualizing effective water governance

This contribution focuses on the governance of water, that is, 'the range of political, institutional and administrative rules [and] practices' through which decisions and implementation take shape (OECD, 2015, p. 5). According to Grigg (2011), water governance is typically multilevel, meaning there is a need for vertical coordination. Higher levels of government need to balance empowerment of lower levels (e.g., through capacity-building) with control and enforcement of decisions. At the same time, local incentives should become aligned with strategies that are coming from the top down. Those who implement them need to know what the policy is about, have the capacity to do so as well as the intention to do so (Edwards, 1980, cited in Mubarok et al., 2020, p. 34).

As we are interested in the mismatch between policy formulation and policy implementation, we focus on overcoming the 'objective gap', whereby different rationales create obstacles for policy coherence (OECD, 2011, p. 3). Policies drafted at one level and implemented at another (lower) level require policy coordination. Communication of the content and intended results of the policy are thus essential to effectively implement policies. Without it, information may be distorted, resulting in a limited understanding of the policy from local officials. Such an objective gap occurs when diverging or contradictory objectives between levels of government or among ministries compromise long-term targets for integrated water policy. Frequently, when priorities are formulated unclearly at the highest political level, conflicting interests in water uses, quality, energy efficiency and pricing policy prevent consensus on targets (p. 34). Especially for paradigm shifts – when radically different ideas enter the rhetoric of policies – change at the operational level is often much slower (Pahl-Wostl, 2017). The resulting impact may be that policy's objectives are not achieved.

In Vietnam, with a rather hierarchical governance system, decisions on national policies are generally made at the central government level (Karpouzoglou et al., 2019; World Bank, 2019). It is often argued that top-down approaches to environmental governance can guarantee that political decisions are followed at all administrative levels. The concept of 'authoritarian environmentalism' suggests that, in theory, top-down approaches to environmental governance can produce rapid and comprehensive responses to the environmental crisis (Gilley, 2012). Despite this, policy implementation may still face several barriers. Under the centralized policy process, policies made at national levels can be formulated in very broad terms, while policy planning can occur with limited input and participation from lower level governments (Ahlers & Shen, 2018; Minh et al., 2020; Schiappacasse et al., 2020). While local governments have a responsibility to meet national policy targets, they have limited opportunities to influence the initial decision-making. However, local leaders can determine how policies are executed and can bring in local concerns and preferences in policy implementation, which grants them great responsibility as well as influence on the final policy outputs (Eaton & Kostka, 2014). Vague or complex policy formulation, without effective coordination, can grant local leaders much space for manoeuvring (Marks, 2010). We refer to this as a process of policy translation.

Policy translation is the 'modification of policy ideas and creation of new meanings and designs in the process of cross-jurisdictional travel' (Mukhtarov, 2014, p. 6). This is a multi-step process with several iterations in which policies are created with a certain

meaning and intention, then disseminated by communicating about them and finally interpreted and modified to be applied at a different place (Minkman, 2021). The first step in the translation process is sensemaking, followed by iterative cycles of redesigning the policy so that it becomes implementable. Sensemaking – defined here as 'the process by which actors understand, translate and interpret issues or procedures that are new, different and unusual in order to comprehend their situation' (Mizrahi-Shtelman, 2021, p. 205) – is an internal and individual process. Local officials who receive information about the LWF policies will try to understand what the policy entails and link this to their existing knowledge. Individuals who receive the same information will understand it differently because they will selectively pay attention to elements in the information, based on their interests, disciplinary background, past experiences and concerns (Pahl-Wostl, 2017). This results in a version of the general policies that are tailored to specific local conditions. The process also helps the local actors recognize their feasibilities in the implementation of the policies.

Ultimately, such a contextualization may help or hamper the realization of policy goals specified by the central policies. Although translation may facilitate paradigm shifts by enabling people to internalize novel ideas, it could equally well inhibit change. Sensemaking may go hand in hand with a 'confirmation bias', whereby people prioritize information that confirms their beliefs rather than embracing contradicting evidence (Pahl-Wostl, 2017). Similarly, translation is primarily focused on fitting the 'new' policies within existing practices. Implementing new ideas and policies in existing practice thus requires finding a balance between change and continuation. On the other hand, national policy intentions may hinder local development (Chandler & Wang, 2009; Eaton & Kostka, 2014), as a lack of participation in policy-setting can bring forth policy outputs that are misaligned with local governments' incentives or that lack the sensitivity towards specific local problems, causing policy priorities to differ between the national and local levels (OECD, 2011, p. 34). While the central government may set long-term targets related to climate change mitigation or adaptation, local leaders are faced with immediate problems related to economic development (Marks, 2010). In addition, implementation may be delayed because of resistance from local communities and interest groups (Ahlers & Shen, 2018), and relatively less pressure from the international community (Qi et al., 2008). Local governments may give a different value to long-term climate change adaptation targets vis-à-vis short-term socio-economic development, in comparison with the national government. Therefore, local authorities can select certain aspects of policies that they deem more noteworthy while overlooking unpopular ones (Eaton & Kostka, 2014). Overall, policy incoherence – misalignment with local governments' aspirations – can undermine the achievement of national policies' targets.

Methods: literature review, document analysis and interviews

While sensemaking is an internal process, the outcome of the translation process can be explained by comparing the original policy intentions with those of the local officials as well as with the implementation in practice. We focus on the 'Living with Flood' (LWF), a common floodwater management strategy of national policymakers, local people and officials in Vietnam. We use five indictors to assess the effectiveness of water governance for LWF policies in the Mekong Delta. Most importantly, we will evaluate the degree to

which the objective gap persists. Moreover, we will evaluate the degree to which LWF governance adheres to the four OECD Principles on Water Governance related to effectiveness (OECD, 2015). The hydrological system rarely aligns with an administrative level and policies are often formulated at a certain administrative level and implemented in the other. As such, water should be managed at the appropriate scales with integrated basin governance systems (Principle 2) to avoid that an 'administrative gap', that is, a '[g]eographical "mismatch" between hydrological and administrative boundaries' (OECD, 2011, p. 32), causes ineffective, contradicting or even unsuitable policies for the hydrological system. Despite the rise of integrated water resource management, which calls for integration of water with other sectors such as navigation, cross-sectoral collaboration is limited and several government bodies are usually responsible for water management, with overlapping mandates and unclear division of tasks as a result (Medema et al., 2008). Effective water governance thus entails clear roles and responsibilities (Principle 1) as well as horizontal (across sectors) and vertical (across government levels) coordination to ensure coherent policies (Principle 3). Finally, effective water governance thus entails building capacity and competences among responsible authorities to develop and implement water policies (Principle 4). However, water governance remains ineffective when insufficient resources (funding and information) are provided and authorities have too limited scientific, technical, infrastructural or institutional capacity to design and implement water policies (OECD, 2011, pp. 3, 32). We follow the approach of Neto et al. (2018), who evaluate alignment, implementation, on-ground results and policy impacts for each Principle. We will only be able to evaluate alignment, implementation and results as impact is long-term and not yet observable (Figure 1).

We thus need to understand how LWF policies are coordinated, interpreted and implemented at the local level. We performed a literature review to systematically map the intention of the policymaker (i.e., the central government); held in-depth interviews to identify the perception of local officials in the Mekong Delta; and reviewed secondary data to evaluate which of the intentions have been realized in practice (i.e., in projects). We focused on local officials at the provincial, district and commune levels due to their crucial role in translating and implementing central-level policies in Vietnam and in mobilizing public support, making their intentions a critical factor for policy coherence. The analytical model is shown in Figure 2.

First, we performed a literature review on the LWF concept via a systematic search and snowball sampling. We searched for 'Living with Floods' and 'Actively Living with Floods' in the Wageningen University Library and Google Scholar.com and identified case-specific literature by adding 'Vietnam' and 'Mekong Delta'. Additional items were identified by reviewing the reference lists of these results. Next, we conducted 11 expert interviews in 2020 on challenges in floodwater management and the (Actively) LWF concept. Experts were recruited from the review items and via snowball sampling in the first author's network.

Second, interviews with local officials were held in mid-2021 following the guidelines on in-depth interviewing of Guion et al. (2011). Criteria for respondent selection include An Giang officials who have been working: (1) for local governments at three levels (provincial, district and communal); (2) in the relevant sectors to water management, climate change adaptation or agriculture; and (3) or participating in development projects in the relevant sectors. Respondents were selected with support from an official from An Giang's Department of Agriculture and Rural Development (DARD).

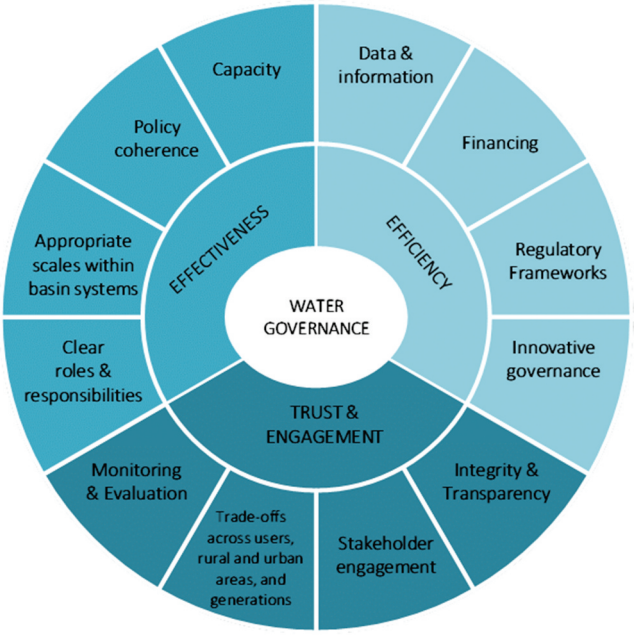

Figure 1. OECD Principles on Water Governance.
Source: OECD (2015, p. 4).

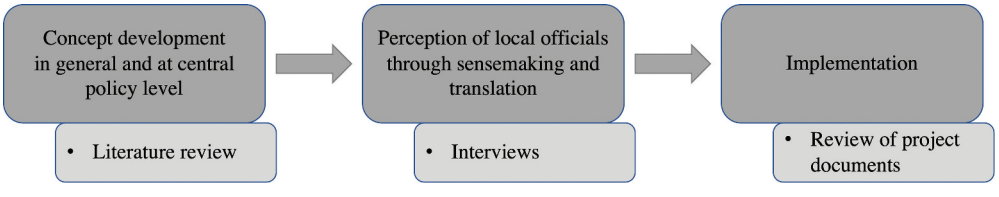

Figure 2. Analytical model showing the methods used to collect information about the different phases.

Originally, the targeted respondents were divided equally between different levels and sectors. Due to travelling restriction, only 21 respondents (Table 1) were interviewed online; each lasted 30–60 min. Selected topics on water management-related issues, agricultural development and policy implementation on (Actively) LWF were discussed, depending on the respondents' positions and responsibilities (see Appendix B).

Third, we identified six projects related to LWF that took place in An Giang province since 2002 through collaboration between the Government of Vietnam (GoV) and various other parties (Table 2). We then selected three of them: Experiment Flood-based Livelihood Models to Support Water Retention Strategy in the Upper of the Mekong Delta (EFLM); Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project (MD-ICRSL) – Sub-component 2 (short name: World Bank 9 (WB9)); and North Vam Nao Water Control Project (NVN) as case studies based on document accessibility and timeframes.

Table 1. Interviewed officials at different levels.

	Provincial (P)		District (D)				Commune (C)				
	An Phu		Tri Ton				Tinh Bien				
Level	DARD	DONRE	An Phu	Tri Ton	Chau Phu	Phu Huu	Vinh Loc	Ta Đanh	Van Giao	Vinh Trung	Nui Voi
Number	6	2	2	1	1	1	2	1	1	2	2
Total	8		4			9					

Note: Official interviews are coded according to their level and order of interviewing, for example, P1 = provincial level, interviewed first.

Table 2. List of projects related to LWF.

No	Project	Implementing agency	Partners	Period	Locations (provinces)
1	Experiment Flood-based Livelihood Models to Support Water Retention Strategy in the Upper of the Mekong Delta (EFLM)	An Giang province	Private sector (Coca-Cola), international organization (IUCN)	2018–20	An Giang, Long An, Dong Thap (Tinh Bien and Tri Ton districts)
2	Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project (MD-ICRSL) – Sub-component 2 (WB9)	Ministry of Agriculture and Rural Development	International Financial Institution (World Bank)	2017–22	11 provinces in the Mekong Delta including An Giang
3	Integrated coastal management programme (ICMP)		German and Australian governments	2011–15	An Giang, Soc Trang, Bac Lieu, Ca Mau, and Kien Giang
4	Mekong Climate Resilience Programme (MCRP) phases 1 and 2		German government	2016–24	Hanoi and eight provinces in the Mekong Delta, including An Giang
5	Development of Amphibious Homes for Marginalized and Vulnerable Populations in Vietnam		Global Resilient Partnership, University of Waterloo	2016–19	An Giang and Long An
6	North Vam Nao Water Control Project (NVN)	Ministry of Agriculture and Rural Development	Australian government	2002–07	An Giang (Phu Tan and Tan Chau district)

Sources: Interview expert P1 and review of other documents: ICMP project (GIZ, 2018) and WB9 project (MARD, 2016).

The interviews were coded in Atlas.ti and NVivo.x64 software using the terms given in the second section as sensitizing concepts. Next, we interpreted the implementation of the policies. The effects and measurable impact of LWF policies may become observable in the long-term only. We thus focus on policy outputs,[1] that is, tangible results of applying certain policy instruments and evaluated to what extent they have been applied as planned.

Results

The results of the desk study and interviews on the historical development and dynamic meaning of LWF have been presented above. Here, we present how local governments in An Giang understand LWF and how the LWF intentions play out in project implementation.

Living with Floods (LWF)

The main findings are presented here, while Appendix A presents an extensive version of the literature review on the historical development of the concept and realized floodwater management policies.

LWF has dominated flood management in the Mekong Delta for several decades, while its meaning changed over time, reflecting recent (inter)national paradigm shifts in water management (Figure 3). Altogether, four different periods of floodwater management policies can be identified in the literature. Interestingly, most experts do not distinguish between the different periods of LWF. However, some experts perceive the traditional LWF to be the 'true' LWF strategy because it did not involve high dykes (experts 1, 2, 10 and 11). Before 1975, floods were considered a vital natural phenomenon and people in the delta adjusted their lifestyle to the yearly rising waters. After 1975, the water management paradigm shifted to floods as a threat, while agricultural production goals prevailed. Floodwater management focused on flood control measures to minimize the flood risk (Cuny, 1991; Kundzewicz & Takeuchi, 1998), neglecting the social and environmental importance of flooding. This resulted in increased vulnerability and negative long-term effects (Vis et al., 2003). Traditional LWF as a policy strategy was advocated by delta scientists who rejected the engineering-based flood control paradigm of 'Northern' irrigation engineers and called for a return to traditional flood-based agriculture (Biggs, 2010; Marchand et al., 2014; Van Staveren et al., 2018). After the 2000 flood event, traditional LWF as a policy strategy was launched, aiming to reduce the risk for flood disasters while simultaneously retaining flood benefits. LWF strategies require an integrated approach and include structural and non-structural measures to reduce the flood risk, while accepting occasional flooding of the land (Cuny, 1991; Kundzewicz & Takeuchi, 1998; Vis et al., 2003). In practice, though, many high dykes have been constructed during the first decade of this century. In 2017, Actively LWF was introduced through Resolution 120 (Government of Vietnam, 2017), following a bottom-up advocacy by provincial party leaders (Tran & James, 2017; Triet et al., 2017). All experts agreed that delta inhabitants should benefit from (Actively) LWF by, for example, practising flood-based livelihoods. Multiple experts mentioned 'letting the flood in' through the controlled flooding of farmland as a good (Actively) LWF practice (experts 1–3, 6, 8 and 11). Finally, expert interviews highlighted that that the current LWF practice is challenged by uncertainty in the flood occurrence caused by upstream

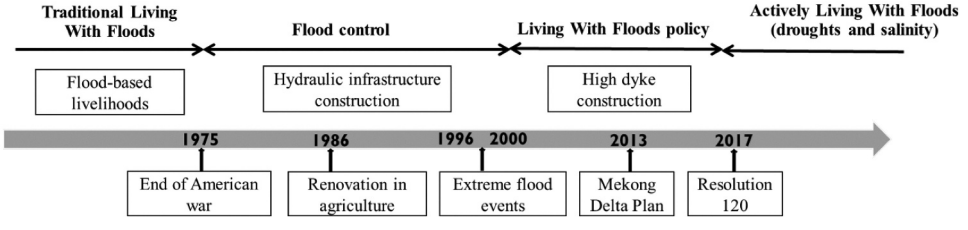

Figure 3. Historical development of the Living with Flood (LWF) concept, alongside key policy shifts. Source: Adapted from Luu et al. (2022).

hydropower dams and land use changes (experts 1, 2, 5–7 and 10). These experts advocate a holistic water management approach to address floods, droughts and salinity in an integrated manner, which may result in yet another evolution of the LWF concept.

Local officials' understanding of LWF

LWF in general

Officials at three levels pointed to similar challenges and benefits of flooding and flood-based agriculture. They considered it a key feature of LWF to make use of the flood benefits in the same way as local people have been doing. Besides the common-known benefits such as providing sediment and flood-based livelihoods, flooding was perceived to reserve invaluable genetic resources, maintain a good ecosystem, provide natural spawning areas for fish and replenish groundwater. Commune officials placed themselves as local farmers and perceived flooding as an 'old friend' that returned every year at a certain time. District and provincial officials meanwhile placed themselves in the position of being responsible for local people who, in their opinions, had to follow the natural rules.

Respondents also highlighted changes in flooding patterns recently. Floods had a shorter duration, lower peak and were more unpredictable. Provincial officials were more aware of the reasons:

> flood is less recently due to less rain upstream, dam building, and upstream countries divert too much water for production. [. . .] Now water level is low, almost no flood, short time, comes quickly and recedes quickly, shorter duration. These signs are very clear these days. (P21)

Local knowledge about flooding was still usable but needed to be supplemented with advanced weather forecasts, dyke development, livelihood transformation and a stable market to deal with the uncertainties and extremes. Interestingly, flood was also considered as a warning sign for the so-called levee effect in the Mekong Delta (Luu et al., 2022):

> big flood would warn local people to prepare better such as retrofitting their houses. [. . .] In case they increase their agricultural areas too much then if big floods happen, it will damage a lot. (D11)

Key elements of contemporary LWF policies

Four elements of the current LWF policies were specifically highlighted in the interviews: flood-based livelihood models, dyke construction, supportive policies and water retention.

First, new challenges such as unpredictable flooding required new strategies for flood-based livelihoods. While big flooding was perceived as obvious drawbacks, including inaccessibility to essential facilities such as schools and electrical supply, small flooding reduced sediment, crops' yield, fish and increased fertilizer cost. Poor and landless farmers had to temporarily migrate in search of jobs elsewhere which, in return, causing a lack of labour. In addition, the unstable market of new introduced LWF models drove farmers back to rice or spontaneously transformed to fruit gardens and vegetables: 'Areas

where rice is no longer productive and flood water can no longer inundate the field, we have to move to a higher economic value crop like vegetables or fruit trees' (P15) – leading to the 'levee effect':

> it is very difficult to return the high-dyke area with triple rice back to the double rice because we already invested so much in to the high-dyke area. [. . .] We can develop the models in the double or single rice crop areas which are small and fragmented nowadays. (P15)

Second, insufficient policies to promote flood-based products were considered to add up to the challenges:

> it is difficult to access policies in getting the certificates, high fee. Input cost for organic farming is high leading to high price of the products so difficult to sell. (P19)

A special policy was suggested by provincial officials to compensate for farmers who saved their land to store floodwater during the rainy season, otherwise:

> An Giang can follow administratively, but it won't have the consensus from local people. (P15)

Third, a demand for dyke development was instead suggested by many officials since farmers had more choices and could change livelihoods easily. If economic benefit from flood-based livelihoods was lower than triple rice, it would be difficult to persuade farmers to live with flood. Dykes further provided better transportation for businesses and experts to bring in science and technology, therefore, considered a necessary condition to experiment and transform into potential high economic models.

Fourth, the role of water retention in An Giang was clearly recognized at the provincial level:

> the river flows from An Giang to the lower part of the Delta. So, storing and regulating floodwater of An Giang is very important in accumulating water and increasing the soil quality, which is very important for the Mekong Delta. (P19)

Only few commune and district officials mentioned the benefits of doing so in a subtle and general way:

> high dyke if developed in large scale will prevent the flow of floodwater which can create strong current leading to land slide and difficulties for local people. (C10)

Overall, respondents further expect that LWF became more important in the future since it enables the development of nature-based crops, reduces the fertilizers and pesticides used, thereby increases the values of products for export to markets, for example, Europe, where consumers prefer clean and organic products. In order to implement LWF policies, local officials are in need of livelihood models that are suitable for the new situation with and without flooding, stable markets for input and output, and special supportive policies for adaptation to changes in flood characteristics.

Diverging perspectives

Next to the similarities outlined above, there were some remarkable differences between the understanding and valuation of LWF by local officials. This seems to vary with their managing levels, sectors, and projects they involved. The general management sector seemed to support the LWF approach, store and keep flood water for the benefits of the

whole delta (P1), while the aquaculture sector emphasized the need for sector development and focused on development policies for high-dyke areas (P17 and P20). Besides, officials from the different dyke systems thought differently. The mixed dyke areas preferred low dykes with annual flood released to make use of flood benefits for the long term, while the low dykes preferred high dykes which made life more convenient. Especially, officials who were involved in different projects expressed a different understanding. For example, the lotus model increased groundwater storage according to an official involve in the WB9 (C3) while it increased the storage of surface water for the dry season, as stated by an official participated in the EFLM (C6).

Divergences in project implementation

Under different LWF policies, the project implementation shows an evolution over time through the investment, intended objectives, actual implementation and actual outcomes (Table 3). NVN was under the favour of the Rice First policy (Tran & Tuan, 2020), meanwhile, WB9 and EFLM were implemented in the context of the R120 (DARD An Giang, 2018a). Aiming for economic improvement of local communities, NVN assists effective water management that brings social, environmental and economic benefits, while WB9 and EFLM enhance the adaptive capacity by livelihood transformation (DARD An Giang, 2018b). Though under the favour of different policies and timeframe, NVN and WB9 have relatively similar investment scale and intended objectives. Both have total investment of about US$30 million sponsored by foreign donors in collaboration with the GoV. They emphasize flood water management in general. By contrast,

Table 3. Description of selected projects.

Project	Policy	Time frame	Investment (US$ millions)	Intended objectives	Actual implementation	Actual outcomes
NVN	Rice first	2001–07	Total: 26.27 AusAID: 14.43 Government of Vietnam (GoV): 11.84	Effective water management: socially and environmentally sustainable and benefits the local economy	Control flooding high dyke development triple rice	100 km high dyke, 16 major sluices; rapid increase in rice production and areas; decrease of wild fish and soil quality; higher lost for the poor
WB9	R120	2017–22	Total: 29.6 World Bank: 23.3 An Giang: 6.1 Private sector: 0.1	Increase the adaptive capacity and flood management. Increase income for local people by livelihood transformation	Control flooding; low-dyke development; double rice and other livelihoods	50.167 km low dyke, 15 sluices; diversified livelihood models; move from rice to vegetables or fruits; reduce water and chemicals used
EFLM	R120	2018–20	Total: 0.1 Coca-Cola through IUCN: 0.041 Farmers: 0.059	Store water through livelihood transformation for climate change adaptation; increase income for local people	Increase flood water storage; reduce the dependence on rice monoculture; develop naturally fed rice–lotus–fish model combined with tourism	Rice–lotus–fish model in about 150 ha; store about 1.4 million m^3 floodwater; economic gain from lotus in 2018, economic lost in 2019 and 2020

though under the same policy favour with WB9, EFLM has a much smaller scale investment sponsored by a private company combined with contribution of local farmers (DARD An Giang, 2018b).

A participatory approach was applied in three projects, though it seems that provincial officials are able to mobilize public opinions to facilitate project implementation. In NVN, concerns over potential losses of wild fish and soil fertility were first ignored in the early stage due to the presence of provincial officials surfaced again during district workshops in 2004, then addressed thereafter (Wyatt, 2006).

NVN and WB9 surprisingly take the same general approach of controlling flooding by dyke systems to improve rice production. However, the specific level of infrastructural development has changed from high dyke in the NVN to low dyke in the WB9. The two projects develop dyke systems and sluices as actual outcomes; while NVN built a 100 km high dyke with 16 sluices (Tran et al., 2020), WB9 targets a 50 km low dyke with 15 sluices (MARD, 2016). Furthermore, NVN aims to support for triple rice only while WB9 also enables other types of livelihoods beside double rice. Therefore, only triple rice with different rotating crop schedules has been developed in the NVN area while WB9 region experiments with different livelihood transformation such as rotation between rice, lotus, and aquaculture, transformation from rice to fruits or vegetables, and advanced techniques to reduce the chemicals and water were used (MARD, 2020) to meet the requirements of sponsors. By contrast, the EFLM aims to increase the capacity of floodwater storage, reduce the dependence on the monoculture such as rice crop, and develop naturally fed and diversified livelihoods that combine between rice–lotus–fish with tourism (DARD An Giang, 2018b).

The actual outcomes of WB9 are still in progress, therefore the social and environmental impacts have not yet been revealed. A list of indicators to measure the impacts of this project in the future is proposed in the discussion section. The EFLM is reported to increase the flood water storage of 1.4 million m^3 in the last three years while the economic benefit of the lotus model has been decreased from gaining in 2018 (DARD An Giang, 2018a) to losing in 2019 (DARD An Giang, 2019) and 2020 (DARD An Giang, 2020). Further impacts of these two projects are to come in the next years. By contrast, since the completion in 2007, NVN has displayed controversial consequences: it has contributed to a sharp increase in rice production (Nguyen et al., 2022), while recently revealing environmental and social impacts, for example, decreasing wild fish stock and soil quality, and higher loss for the poor (Tran & James, 2017); stagnancy within the high dyke and agrochemical overuse resulted in water pollution and sediment reduction (Tran & Tuan, 2020).

Discussion

We have mapped policymakers' intentions, implementors' perceptions and realized projects. Here we reflect on governance effectiveness, on the 'mismatches', and present a framework to measure the effectiveness of LWF policies in the Vietnamese Mekong Delta.

Evaluating effectiveness

First, we observe that governance of LWF policies is not yet meeting the OECD Principles on Water Governance. Only Principle 2 (manage at the appropriate scale) thus seems to be met as current (Actively) LWF policies are aimed at the right scale, namely the basin level. However, local officials had little input in the policy content. Respondents and policy documents highlight an absence of coordination mechanisms and therewith unclear roles and responsibilities. As such, the current realization of LWF governance does not adhere to Principle 3 (policy coherence) and Principle 1 (clear roles and responsibilities). The results highlight the inability of local officials to implement LWF policies (Principle 4: capacity) (OECD, 2015). We can explain this ineffective governance by the existence of mismatches between policy intention (materialized in policy documents) and perception (materialized in concrete projects) and see the consequence reflected in practice.

Explaining mismatches

The central policies, for example, R120 (Government of Vietnam, 2017), aim for the whole delta (though abstract and general), while officials struggle to understand the system of the Mekong Delta area and their perceptions mostly focus on their own sectors and local issues, and projects therefore still focus on the issues at the local level and create immediate effects to meet the project goals. Although the central government aims for horizontal coordination between provinces, this has not yet been established (Minkman et al., forthcoming 2022). The results show how the different translations of the LWF between and even within provinces challenge horizontal collaboration. The role that provincial officials see for An Giang province in water storage is illustrative: this idea is not developed further because it is unclear whose responsibility this is. Similarly, it is unclear who should lead the adjustments required for nature-based solutions. District-level officials point to the responsibilities of individual farmers to retrofit their house and agricultural plot to make it 'flood proof'. The present-day LWF policies thus seem like a return to the initial practice of LWF, but they add the uncertainty of the floods.

The LWF concept is detailed in a series of translation steps, whereby there is a potential for 'mismatches' in each interaction between governance levels: from central- to provincial-level projects and from provincial-level projects to district and commune-level practice. With each step, information is lost and added; and the approach becomes less abstract and more concrete. The results showed that the understanding of LWF is the result of a trade-off between the benefits and challenges of flooding and/or flood-based agriculture. How this trade-off is made depends on previous experiences with flooding, as is illustrated by the difference between areas with low and mixed dyke systems. Those in low dyke areas rely on floods and are thus get hit harder by the negative effects of the unpredictable nature of the floods while at the same time longing for the benefits of high dykes, such as increased accessibility of remote areas. Those in mixed systems have 'the best of both worlds' and thus can reap the benefits of flooding. It thus seems that positive experiences with flooding lead to an understanding of LWF that is more aligned with the content of policies issued by the central government. As was specified previously, translation may facilitate policy coherence (and therewith effective water governance)

when it results in detailed policies that are tailored to local conditions but in line with the original policy's intentions and local capacities to implement the policy. The results show that the degree to which this is achieved varies between communities and projects, which seems to be caused by different local conditions.

The North Vam Nao project is a typical project of the 'engineering' approach, while newer projects are exemplary for the new, inclusive paradigm. Of these projects, NVN seems to be successful in matching the rice intensification objective of LWF policies, but not the social and environmental objectives. EFLM cannot meet the intended economic benefit, but seems to achieve some environmental goals such as storing more flood water. However, environmental and social impacts of the EFLM, WB9 and even the NVN will only really manifest in the future and even then will the impact assessment be subject to interpretations of various actors, depending on their own understanding and agenda.

Impact of mismatches on water management

Surprisingly, the mismatches observed are relatively similar over time, even when the LWF concept evolved further. For example, the engineering approach still prevails at the local level, despite negative experiences with it and a focus on nature-based solutions in central government policies. Similarly, over time the most dominant and powerful implementing actors (in this case provincial officials) were able to mobilize public opinions for an implementation of sponsored projects that differ from the sponsors' intention. They seem to (try to) insert (or negotiate) their own interests into these projects to reach a win–win situation for both sides: the sponsor gets an implemented project, while local actors benefit from the added aspects in their interests. Evidence for this is shown in the WB9 project. The core of the project is still infrastructure development (low dyke), but local actors add soft measures (livelihoods transformation) to align with donor terminology and requirements. One interviewee explains that: 'donors have their own requirements and we fulfil their requirements by what we have at the moment' (P12). Another district interviewee add that they actually wanted high dyke, but could only find support for realizing a low dyke; so, this is all they can get at the moment. This shows how implementing LWF policies is a balancing act that requires the art of negotiating between donors and developing subjects.

A framework to evaluate water governance for LWF in the Mekong Delta

Therefore, water governance effectiveness should be considered a dynamic process rather than a static situation. The OECD Principles can be used to explain how mismatches occur between – as was observed in this study – policies, projects and practice (which were discussed in depth in the results section and to which we would like to refer to here as the '3Ps'), which then via a feedback loop of previous lessons learned and new threats and uncertainties result in updating the policies. This process is illustrated in Figure 4 for the transition from 'rice first' policies to policies advocating nature-based solutions.

The 3Ps framework should be supported by a list of indicators to measure the effectiveness of policy coherence and water governance. Two indicators are proposed include: (1) the level of actor's consensus; and (2) the level of target realization. Each indicator is supported by a number of sub-indicators (Table 4).

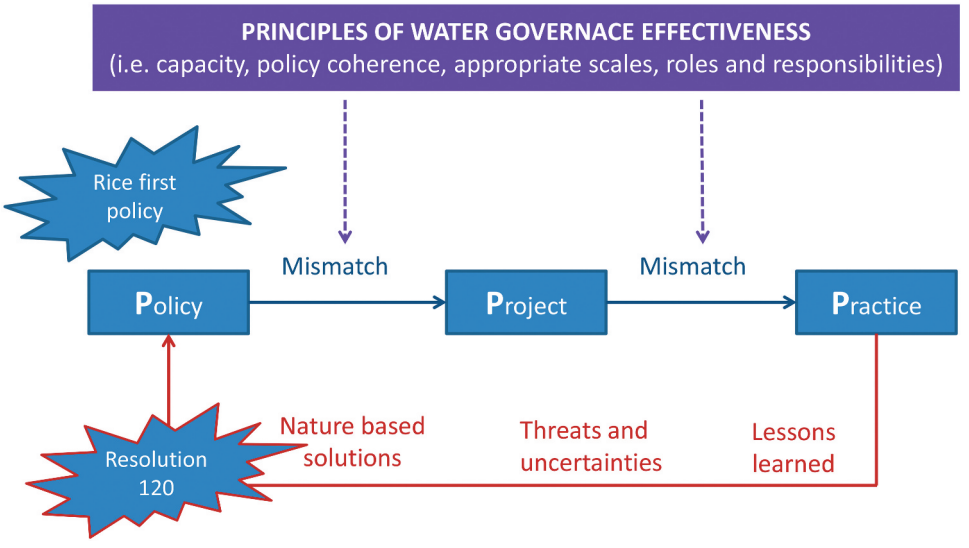

Figure 4. 3Ps proposed conceptual framework based on the results of this study.

Table 4. Indicators used to measure the effectiveness of floodwater management policies.

A	**The level of actor's consensus**
A1	Similarities of the perceptions
A2	Divergences of the perceptions
B	**The level of target realization**
B1	The added volume of floodwater stored in the floodplain
B2	The level of livelihood diversification and nature-based
B2.1	*The number of households with different types of livelihoods*
B2.2	*The number of flood-based crops*
B2.3	*The level of reduction of fertilizers and pesticides used*
B2.4	*The level of increase of products' value*
B3	The area of the implemented project
B4	The population of the implemented project
B5	The level of awareness on the role of 'living with floods' approach

As mentioned above, the divergences in the actor's perception could potentially cause the mismatches between policy formulation and implementation. Understanding the level consensus, that is, similarities and divergences of the perceptions, could potentially reveal the mismatches and therewith policy coherence effectiveness. However, existing frameworks are often too generic or tailored to a specific context. Several scholars (Behn, 2003; Franco & Tarquino, 2017; Wilson & Buller, 2001) suggested that indicators should depend on specific policies and their goals. We therefore propose to evaluate the effectiveness of water governance for LWF policies by measuring the level of target realization, that is, the extent to which policy's targets are realized, with the targets are the features of LWF itself, for example, the actual added volume of floodwater compared with the targeted volume. The assessment of the indicators goes beyond the scope of this study. Therefore, we suggest future research to assign the suitable values for the indicators' assessment such as low, medium or high values.

Conclusions

The (mis)match between policy intentions and implementation of (Actively) LWF policies in the Vietnamese Mekong Delta were evaluated. We conclude that (Actively) LWF policies are not sorting the intended impact yet. The results show that the LWF concept has returned to its roots over time. It moved from management based on the natural flood rhythm to an infrastructure-focused engineering approach, resulting in the high-dyke system. Currently, the opposite is observable, as nature-based solutions, integrated approaches and 'soft' measures are prevailed above hard infrastructure development. The effectiveness of water governance on LWF relies on how different actors (i.e., farmers, government staff and experts) perceive the policy and transfer it to implementation. Their perceptions have clearly changed over time, caused by changing policies as well as by lessons learned 'the hard way' by experiencing water-related threats and uncertainties. Moreover, the governance of LWF does not adhere to the requirements for effectiveness as specified in the OECD Principles on Water Governance (OECD, 2015). Our study shows how this can be explained by a significant objective gap between central and local levels that is relatively stable over time. Based on this, we draw two key conclusions that may help improve policymaking and effective policies across levels of government in Vietnam.

Diverging local translations of a shared concept (such as LWF) weakens the adaptive capacity of climate policies. While local perceptions are understandable given diverging responsibilities, priorities and experiences, this could potentially cause conflicts in separate sectoral development activities and fragmented or even counterproductive implementation. The relative importance of social and institutional barriers in climate change adaptation was noted previously (Biesbroek et al., 2013) and an approach towards sustainable agriculture in the Mekong Delta should thus not only be optimized for economical and biophysical aspects. For LWF to become an attractive alternative for residents of areas with a low-dyke system, it needs to provide a worthy alternative to the benefits of infrastructure-based options. While integrating such different perspectives has proven to be challenging (Khirfan et al., 2013), this is becoming increasingly important in the Mekong Delta now that increasing uncertainty around flood patterns reduces the potential benefits of flood-based agriculture.

Surprisingly, a more far-reaching hierarchical governance mode is needed. Based on the OECD Principles on Water Governance (OECD, 2015), vertical coordination from the central government seems essential in ensuring effective translation and implementation of LWF. Although the governance system of Vietnam is already qualified as hierarchical, we did not observe the 'fast' and precise response expected from an authoritarian country (Gilley, 2012) with high urgency to act due to climate-induced threats. Instead, local officials have a large impact on how projects are implemented and therewith on how farmers are 'living with floods' in practice. This study further indicates that perceptions can be guided as not only experiences, but also training (both education and professional training) influenced the perception of local officials. There was a clear difference between sectors (which is based on education) and between officials who received professional training on LWF from international organizations. This confirm the notion that the translation of such 'soft' policy objects – where norms and concepts rather than concrete policy instruments are transferred (Stone, 2010) – depends on the interaction between actors (Khirfan et al., 2013) and that ambiguity of the policy concept allowed for different translations that serve different interests (Minkman et al., 2018).

Based on the OECD Principles on Water Governance (OECD, 2015), vertical coordination from the central government seems essential in ensuring effective implementation of LWF. The mismatches identified could be seen as the manifestation of tension between different interests and values. A question that remains unanswered is whether greater perceived policy legitimacy at the local level could help bridge the divide between national and local levels. In any case, active management of the translation of the LWF concept from central level to farm level helps prevent it from being 'lost in translation' in the transition to sustainable agriculture in the Mekong Delta.

We highlighted the role of translation in explaining misaligned or faulty implementation. However, other factors play a role as well. A detailed, comprehensive analysis goes beyond the scope of our paper, but future research may consider the role of including 'hot' terms in project proposals to increase their eligibility for funding. Also, future research could further develop and apply the list of indicators proposed in this study.

We end this contribution with the observation that the international development agenda is recently filled with 'living with nature' approaches. While this might be a proper approach for the long term, it is important to understand and incorporate the concerns of those it directly affects. Our findings, based on local officials' perceptions, highlight the need to align communication strategies and policy objectives with local interests, to ensure the support and commitment of the local actors who are to implement these approaches. In the case of LWF, social aspects should receive equal consideration with biophysical requirements for the approach to enable short-term farm-level adaptation to the imperatives of long-term system change.

Note

1. Policy outcomes are the tangible results of actions taken to realize a policy decision, for example, the number of farmers who have received training about other livelihood models or the number of low-dyke systems created. Policy outcomes (or effects) are the societal consequences of implementing a policy, that is, a more sustainable agriculture system.

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Author contributions

This work was conceived by TL; conceptualized by EM with support from TL, DV, NTB, GG and NHQ; and supervised by TL, NTB and NHQ. TL and DV developed the methodology; collected the data with support from TCL and NHQ; and formally analysed the data, which was validated by TL, EM, TCL and NHQ. TL, DV and EM wrote the original draft with support from GG and NTB. Visualization was done by TL, DV, EM and NTB. TL secured funding and administered the project with support from NHQ. All authors reviewed and edited the draft.

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ORCID

Tang Luu http://orcid.org/0000-0001-7760-1400
Ellen Minkman http://orcid.org/0000-0002-8543-3029
Hong Quan Nguyen http://orcid.org/0000-0001-7685-8191

References

Ahlers, A. L., & Shen, Y. (2018). Breathe easy? Local nuances of authoritarian environmentalism in China's battle against air pollution. *The China Quarterly*, *234*, 299–319. https://doi.org/10.1017/S0305741017001370

Behn, R. D. (2003). Why measure performance? Different purposes require different measures. *Public Administration Review*, *63*(5), 586–606. https://doi.org/10.1111/1540-6210.00322

Biesbroek, G. R., Klostermann, J. E., Termeer, C. J., & Kabat, P. (2013). On the nature of barriers to climate change adaptation. *Regional Environmental Change*, *13*(5), 1119–1129. https://doi.org/10.1007/s10113-013-0421-y

Biggs, D. A. (2010). *Quagmire. Nation-building and nature in the Mekong delta*. University of Washington Press.

Binh, N. T., Tien, L. V. T., Minh, N. A., Minh, N. N., & Trung, N. H. (2021). Drivers of agricultural transformation in the coastal areas of the Vietnamese Mekong delta. *Environmental Science and Policy*, *122*(2021), 49–58. https://doi.org/10.1016/j.envsci.2021.04.010

Chandler, W., & Wang, Y. (2009). *Memo to Copenhagen: Commentary is Misinformed – China's Commitment is Significant*. http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=24275

Cuny, F. C. (1991). Living with Floods: Alternatives for riverine flood mitigation. *Land Use Policy*, *8*(4), 331–342. https://doi.org/10.1016/0264-8377(91)90023-C

Dao, P. T. A., & Kaoru, T. (2003). *Flood control-environmental and socio-economic issues: case study of a diversion area in Vietnam*. Proceedings of symposium HS02b held during IUGG2003 at Sapporo, July 2003, 123–129. International Association of Hydrological Sciences Publication . https://iahs.info/uploads/dms/12697.22-123-130-HS2b-40-Phan-Thi-Anh-Dao.pdf

DARD (Department of Agriculture and Rural Development) An Giang. (2018a). Agreement between DARD An Giang and Coca-Cola. Unpublished internal institution document.

DARD (Department of Agriculture and Rural Development) An Giang. (2018b). Periodic report: Results of the Coca-Cola – IUCN project on livelihoods based on floating season in 2018. Unpublished internal institution document.

DARD (Department of Agriculture and Rural Development) An Giang. (2019). Periodic report: Results of the Coca-Cola – IUCN project on livelihoods based on floating season in 2019. Unpublished internal institution document.

DARD (Department of Agriculture and Rural Development) An Giang. (2020). Periodic report: Results of the Coca-Cola – IUCN project on livelihoods based on floating season in 2020. Unpublished internal institution document.

Eaton, S., & Kostka, G. (2014). Authoritarian environmentalism undermined? Local leaders' time horizons and environmental policy implementation in China. *The China Quarterly*, *218*, 359–380. https://doi.org/10.1017/S0305741014000356

Franco, V. V., & Tarquino, I. R., 2017. Towards a water governance index (WGI) for Andean micro-watersheds using pressure-state-response indicators and fuzzy logic system. Study case in Colombia. In *Proceedings of the XVI World Water Congress*. Integrated Water Resources Association (IWRA).

Gilley, B. (2012). Authoritarian environmentalism and China's response to climate change. *Environmental Politics*, *21*(2), 287–307. https://doi.org/10.1080/09644016.2012.651904

GIZ. (2018). *From innovation to transformation. The integrated coastal management programme*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Government of Vietnam. (2017). *Resolution No. 120/NQ-CP*.

Grigg, N. S. (2011). Water governance: From ideals to effective strategies. *Water International*, *36* (7), 799–811. https://doi.org/10.1080/02508060.2011.617671

GSO. (2021). *Statistical yearbook 2020*. General Statistics Office. Statistical Publishing House.

Guion, L. A., Diehl, D. C., & McDonald, D. (2011). Conducting an in-depth interview. *EDIS*, *2011* (8), 1–3. https://doi.org/10.32473/edis-fy393-2011

IMHEN & UNDP. (2015). *Vietnam special report on managing the risks of extreme events and disasters to advance climate change adaptation*. Vietnam Publishing House of Natural Resources, Environment and Cartography.

Karpouzoglou, T., Tri, V. P. D., Ahmed, F., Warner, J., Hoang, L., Binh, N. T., & Dewulf, A. (2019). Unearthing the ripple effects of power and resilience in large river deltas. *Environmental Science and Policy*, *98*(2019), 1–10. https://doi.org/10.1016/j.envsci.2019.04.011

Khirfan, L., Momani, B., & Jaffer, Z. (2013). Whose authority? Exporting Canadian urban planning expertise to Jordan and Abu Dhabi. *Geoforum*, *50*, 1–9. https://doi.org/10.1016/j.geoforum.2013.07.007

Kundzewicz, Z. W., & Takeuchi, K. (1998). Flood protection and management: Quo vadimus? *Hydrological Sciences Journal*, *44*(3), 417–432. https://doi.org/10.1080/02626669909492237

Luu, T., Verhallen, M., Tran, D. D., Sea, W. B., Nguyen, T. B., & Nguyen, H. Q. (2022). Statistically examining the connection between dike development and human perceptions in the floodplains' socio-hydrology system of Vietnamese Mekong Delta. *Science of the Total Environment*, *810*, 152207. https://doi.org/10.1016/j.scitotenv.2021.152207

Marchand, M., Pham, D. Q., & Le, T. (2014). Mekong delta: Living with water, but for how long? *Built Environment*, *40*(2), 230–243. https://doi.org/10.2148/benv.40.2.230

MARD (Ministry of Agriculture and Rural Development). (2016). *Regional environmental impact assessment on Mekong Delta integrated climate resilience and sustainable livelihood project*.

MARD (Ministry of Agriculture and Rural Development). (2020). *Decision 1693/QD-BNN-HTQT on the approval of feasibility report for the project 'Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project (MD-ICRSL)'*. Funded by the World Bank, 24.

Marks, D. (2010). China's climate change policy process: Improved but still weak and fragmented. *Journal of Contemporary China*, *19*(67), 971–986. https://doi.org/10.1080/10670564.2010.508596

Medema, W., McIntosh, B. S., & Jeffrey, P. J. (2008). From premise to practice: A critical assessment of integrated water resources management and adaptive management approaches in the water sector. *Ecology and Society*, *13*(2), 29. https://doi.org/10.5751/ES-02611-130229

Minh, N. N., Phuong, N. T. B., Tri, V. P. D., Vu, P. H., Binh, N. T., Vu, P. T., & Trung, N. H. (2020). An understanding of water governance systems in responding to extreme droughts in the Vietnamese Mekong Delta. *International Journal of Water Resources Development*, *37*(2), 256–277. https://doi.org/10.1080/07900627.2020.1753500

Minkman, E. (2021). *Building bridges policy transfer and translation of the Dutch delta approach in South and Southeast Asia* [PhD]. Erasmus University of Rotterdam.

Minkman E., Nguyen, H.Q., Luu, T.H., Dang, K.K, Nguyen, S.L, Du, H., Huizer, T., & Rijke, J. de. (forthcoming 2022). *From national vision to implementation: Governance challenges in sustainable agriculture transitions in the Vietnamese Mekong Delta region*. Regional Environmental Change.

Minkman, E., Van Buuren, M. W., & Bekkers, V. (2018). Policy transfer routes: An evidence-based conceptual model to explain policy adoption. *Policy Studies*, *39*(2), 222–250. https://doi.org/10.1080/01442872.2018.1451503

Mizrahi-Shtelman, R. (2021). Role identity and sensemaking as institutional mechanisms for policy translation: The case of school principals and education reforms in Israel. *Leadership and Policy in Schools*, *20*(2), 203–2221. https://doi.org/10.1080/15700763.2019.1638422

Mukhtarov, F. (2014). Rethinking the travel of ideas: Policy translation in the water sector. *Policy & Politics*, *42*(1), 71–88. https://doi.org/10.1332/030557312X655459

National Assembly. (2020, October 13). *National Assembly Pham Tat Thang inquired Minister of Agriculture and Rural Development Nguyen Xuan Cuong about the implementation progress of Resolution 120*. http://quochoi.vn/UserControls/Publishing/News/BinhLuan/pFormPrint.aspx?UrlListProcess=/content/tintuc/Lists/News&ItemID=45397

Neto, S., Camkin, J., Fenemor, A., Tan, P.-L., Baptista, J. M., Ribeiro, M., Schulze, R., Stuart-Hill, S., Spray, C., & Elfithri, R. (2018). OECD Principles on Water Governance in practice: An assessment of existing frameworks in Europe, Asia-Pacific, Africa and South America. *Water International*, *43*(1), 60–89. https://doi.org/10.1080/02508060.2018.1402650

Nguyen, T. B., Tien, L. V. T., Tang, L. T., Tu, N. M., Dung, T. D., & Quan, N. H. (under review 2022). *Innovative water management practices for agricultural development and resilience enhancement in the Vietnamese Mekong delta floodplains*, 1–38. Agricultural Water Management.

OECD. (2011). *Water governance in OECD countries: A multi-level approach*.

OECD. (2015). *OECD Principles on Water Governance*. Centre for Entrepreneurship, SMEs, Regions and Cities, Organisation for Economic Co-operation and Development.

Pahl-Wostl, C. (2017). An evolutionary perspective on water governance: From understanding to transformation. *Water Resource Management*, *31*(10), 2917–2932. https://doi.org/10.1007/s11269-017-1727-1

Qi, Y., Ma, L., Zhang, H., & Li, H. (2008). Translating a global issue into local priority: China's local government response to climate change. *Journal of Environment and Development*, *17*(4), 379–400. https://doi.org/10.1177/1070496508326123

Schiappacasse, P., Müller, B., Linh, L. T., & Wirth, P. (2020). Construction aggregates and environmental policy integration in a one-party state: The case of Hoa Binh, Vietnam. *Sustainability*, *12*(17), 6890. https://doi.org/10.3390/su12176890

Stone, D. (2010). Private philanthropy or policy transfer? The transnational norms of the Open Society Institute. *Policy & Politics*, *38*(2), 269–287. https://doi.org/10.1332/030557309X458416

Tran, T., & James, H. (2017). Transformation of household livelihoods in adapting to the impacts of flood control schemes in the Vietnamese Mekong Delta. *Water Resources and Rural Development*, *9*, 67–80. https://doi.org/10.1016/j.wrr.2017.04.002

Tran, T. A., Pittock, J., & Tran, D. D. (2020). Adaptive flood governance in the Vietnamese Mekong delta: A policy innovation of the North Vam Nao scheme, An Giang Province. *Environmental Science & Policy*, *108*, 45–55. https://doi.org/10.1016/j.envsci.2020.03.004

Tran, T. A., & Tuan, L. A. (2020). Policy transfer into flood management in the Vietnamese Mekong Delta: A North Vam Nao study. *International Journal of Water Resources Development*, *36*(1), 106–126. https://doi.org/10.1080/07900627.2019.1568862

Triet, N. V. K., Dung, N. V., Fujii, H., Kummu, M., Merz, B., & Apel, H. (2017). Has dyke development in the Vietnamese Mekong Delta shifted flood hazard downstream?. *Hydrology and Earth System Sciences*, *21*(8), 3991–4010. https://doi.org/10.5194/hess-21-3991-2017

Van Staveren, M. F., Van Tatenhove, J. P. M., & Warner, J. F. (2018). The Tenth Dragon: Controlled seasonal flooding in long-term policy plans for the Vietnamese Mekong Delta. *Journal of Environmental Policy and Planning*, *20*(3), 267–281. https://doi.org/10.1080/1523908X.2017.1348287

Vis, M., Klijn, F., De Bruijn, K., & Van Buuren, M. (2003). Resilience strategies for flood risk management in the Netherlands. *International Journal of River Basin Management*, *1*(1), 33–40. https://doi.org/10.1080/15715124.2003.9635190

Wilson, G. A., & Buller, H. (2001). The use of socio-economic and environmental indicators in assessing the effectiveness of EU agri-environmental policy. *European Environmental*, *11*(6), 297–313. https://doi.org/10.1002/eet.273

World Bank. (2019). *Vietnam: Toward a safe, clean, and resilient water system*.

Wyatt, A. (2006). Water Governance in Context: Lessons for Development Assistance: Working Paper #5.

Appendix A: Extensive literature review of the Living with Flood concept in Vietnam

This section presents a literature review on the development and use of the Living with Flood (LWF) concept in the Vietnamese context. The different periods are described and subsequently specified in Table A1. For the literature review on the general LWF concept, see the main paper.

Local perspectives

Before 1975, the inhabitants of the Mekong Delta were practising so-called traditional living with floods (Dang & Pham, 2003; Pham, 2011; Tran, 2019). The people living in the delta adapted their livelihoods and living patterns to the yearly rising water. Local people such as fishers and farmers had to continuously adapt their livelihoods to the changing natural conditions in the delta (Ehlert, 2012). During the flood season, people could collect aquatic resources, captured fish and grow floating rice (Käkönen, 2008, Tran, 2019). However, during this time the inhabitants of the delta were prone to the impacts of extreme flood events (Pham, 2011). Hence, traditionally people in the delta deployed a water-centred living strategy whereby the floods were at the core of the social-cultural dynamics in the Delta (Ehlert, 2012).

LWF policies

After the war ended in 1975, the Vietnamese government invested in the infrastructural development of the Mekong Delta to realize its agricultural potential (Evers & Benedikter, 2009). An important aspect hereof was the construction of waterways, low dykes and irrigation systems to reduce flood impacts and enable the cultivation of a second rice crop before the flood season (Evers & Benedikter, 2009; Pham, 2011). During the 1980s and 1990s, the agricultural production of the delta grew rapidly, specifically the rice production (Käkönen, 2008). Especially after the introduction of the 1986 *Doi Moi* land reform policy, which provided more incentives for farmers to grow rice (Käkönen, 2008; Miller, 2006). The new hydraulic systems in the delta were influenced by the previous Americans' plan to 'close-off' the delta and the flood control systems that had been implemented in the northern Red River Delta (Benedikter, 2014). The infrastructural and agricultural developments during this post-war period are characterized by a neglect of the natural system dynamics of the Mekong Delta (Käkönen, 2008; Miller, 2006; Tran, 2019).

In 2000 an extreme flood event took place in the delta, causing severe damage (Liao, 2019). These events triggered a change in the floodwater management strategy by the Vietnamese government (Dang & Pham). Where former developments were based on the principles of human control over nature, now the official paradigm shifted to floods as a combination of a risk and a provider of important resources (Ehlert, 2012). Subsequently, the LWF policy as disaster risk management strategy was launched (Ehlert, 2012). This new LWF policy included plans for the construction of embanked residential clusters and a resettlement programme (Danh & Mushtaq, 2011). Important parts of this LWF policy are the government's Decision No. 99 in 1996 and Decision No. 173 in 2001 (Chu et al., 2014; Danh & Mushtaq, 2011). On the one hand, the government promoted a LWF lifestyle, encouraging people to live on the water or move to higher grounds during the flood season (Chu et al., 2014). On the other hand, large investments were made to protect the inhabitants of the delta and facilitate the growth of a third rice crop (Tran, 2019). Thus, large-scale dyke construction in the Mekong Delta accelerated under the LWF policies during the first decade of this century (Chu et al., 2014; Tran, 2019; Triet et al., 2017).

Actively living with flood policies

Since the second decade of this century, there is an increasing awareness for the negative side-effects of the high dyke construction. For example, there is no fertile sediment deposition in the fields, farmers have reduced possibilities to collect aquatic resources and high dykes create higher peak discharges in the downstream areas (Chapman et al., 2016; Hoa et al., 2008; Käkönen, 2008; Tran et al., 2019). In 2013, the Vietnamese and Dutch governments published the Mekong Delta Plan (MDP), describing a long-term

Table A1. Characterization of different Living with Floods (LWF) paradigms based on the literature review.

	General	Vietnamese context			
Aspect	LWF concept	Traditional LWF	Flood control period	LWF policies	Actively LWF policies
Period		Before 1975	1975–2000	2000–17	Since 2017
Philosophy	Occasional flooding of land is allowed while flood impacts are reduced	Adapting to and living with nature	Controlling nature	Reducing disaster risk while obtaining flood benefits	Social development and nature-based adaptation to climate change
General perception on flood	Floods as natural phenomena with a vital natural function	Floods as essential natural phenomena for life in the delta; flood as yearly rising water season	Floods are a danger; neglect of environmental importance of floods	Floods can be dangerous but also provide valuable resources; infrastructure must be development to reduce flood risk	Floods as basis for environmental sound and sustainable development (Resolution 120)
Livelihoods	Flood resilient livelihoods	Flood-based livelihoods	Expansion and intensification of rice production	Triple rice cropping in high dyke areas	Livelihood diversification
Infrastructure	Protection of vital infrastructure; no large-scale infrastructure to keep the floods out all the time	Limited infrastructural development; clearing land through construction of canals	Increase in infrastructure development: canals and low dykes; 'closing-off' the delta	High dyke construction	Water retention in reservoirs and wetlands; preserve space for flood drainage; construction of flood control gates (Resolution 120)

vision for the sustainable development of the delta. The MDP highlights the important of flood-based livelihoods and livelihood diversification in the Upper delta (MDP, 2013). In 2017, the Vietnamese government issued Resolution 120, which announces a shift from the former LWF approach to a new Actively Living With Floods, Brackish and Saltwater approach for the entire delta (Government of Vietnam, 2017). Moreover, Resolution 120 emphasizes the need for nature-based adaptation and forbids 'violent' interferences in nature (Government of Vietnam, 2017). In a speech at the Mekong Delta Conference in 2019, the World Bank country director Mr Ousmane Dione discussed the implementation of Resolution 120. Dione stated that Actively Living With Floods should mean that floods, droughts and salinity are accepted and natural river flows and floodplain functions are ensured (Ousmane Dione, 2019). Concluding, the newly proposed Actively Living With Floods strategy is a reaction to the environmental and social complexity of the delta and rejects the high dyke construction that took place during the former LWF policy.

References for Appendix A

Benedikter, S. (2014). The Vietnamese hydrocracy and the Mekong Delta: water resources development from state socialism to bureaucratic capitalism (Vol. 25). LIT Verlag Münster.

Chapman, A. D., Darby, S. E., Hồng, H. M., Tompkins, E. L., & Van, T. P. (2016). Adaptation and development trade-offs: fluvial sediment deposition and the sustainability of rice-cropping in An Giang Province, Mekong Delta. Climatic change, 137(3–4), 593–608.

Chu, T. H., D. Suhardiman and A.T. Le (2014) Irrigation development in the Vietnamese Mekong Delta: Towards polycentric water governance? International Journal of Water Governance 2(2): 61–82.

Dang, Q. T., & Pham, T. H. (2003). Living with Floods in the Mekong River Delta of Vietnam. Department of Dike Management, Flood and Storm Control, Ministry of Agriculture and Rural Development, Hanoi, Socialist Republic of Vietnam.

Danh, V. T., & Mushtaq, S. (2011). Living with Floods: an evaluation of the resettlement program of the Mekong Delta of Vietnam. In *Environmental change and agricultural sustainability in the Mekong Delta* (pp. 181–204): Springer.

Evers, H.-D., & Benedikter, S. (2009). Hydraulic Bureaucracy in a Modern Hydraulic Society-Strategic Group Formation in the Mekong Delta, Vietnam. *Water Alternatives, 2*(3).

Ehlert, J. (2012). *Beautiful floods: Environmental knowledge and agrarian change in the Mekong Delta, Vietnam* (Vol. 19). LIT Verlag Münster.

Government of Vietnam (2017). *Resolution No. 120/NQ-CP*. Hanoi, Vietnam: Government of Vietnam.

Hoa, L. T. V., Shigeko, H., Nhan, N. H., & Cong, T. T. (2008). Infrastructure effects on floods in the Mekong River Delta in Vietnam. *Hydrological Processes: An International Journal, 22*(9), 1359–1372.

Käkönen, M. (2008). Mekong Delta at the crossroads: more control or adaptation? *AMBIO: A Journal of the Human Environment, 37*(3), 205–213.

Liao, K. H. (2019). Living with Floods: Ecological Wisdom in the Vietnamese Mekong Delta. In *Ecological Wisdom* (pp. 195–215). Springer, Singapore.

Mekong Delta Plan. (2013). Mekong Delta Plan-Long-term vision and strategy for a safe, prosperous and sustainable delta. Prepared under the Strategic Partnership Arrangement on Climate Change Adaptation and Water Management between the Netherlands and Vietnam. Hanoi and Amersfoort.

Miller, F. (2006). Seeing 'Water Blindness': Water control in agricultural intensification and environmental change in the Mekong Delta, Vietnam. In *Environment, Development and Change in Rural Asia-Pacific* (pp. 200–221): Routledge.

Ousmane Dione. (2019, 19 June). Joint statement [Speech]. Mekong Delta Conference, Ho Chi Minh City, Vietnam. https://www.worldbank.org/en/news/speech/2019/06/19/mekong-delta-conference

Pham, C. H. (2011). Planning and implementation of the Dike systems in the Mekong delta, Vietnam. PhD thesis. Faculty of Mathematics and Natural Sciences, Rheinischen Friedrich-Wilhelms, University of Bonn, Bonn.

Tran, D. D., van Halsema, G., Hellegers, P. J., Hoang, L. P., & Ludwig, F. (2019). Long-term sustainability of the Vietnamese Mekong Delta in question: An economic assessment of water management alternatives. *Agricultural water management, 223*

Tran, T. A. (2019). From free to forced adaptation: A political ecology of the 'state–society–flood' nexus in the Vietnamese Mekong Delta. *Asia Pacific Viewpoint*.

Triet, N. V. K., Dung, N. V., Fujii, H., Kummu, M., Merz, B., and Apel, H. (2017) Has dike development in the Vietnamese Mekong Delta shifted flood hazard downstream?, Hydrol. Earth Syst. Sci., 21, 3991–4010, https://doi.org/10.5194/hess-21-3991-2017, 2017.

Appendix B: In-depth interview questionnaire for local officials

Respondent's general information

Full name:	Code:
Contact:	Position in the organization:
Organization:	Tasks:

(A) General understanding on water management and agricultural sector

A1. What are the entities that in charge of water management and agricultural sector?
A2. What are the challenges in floodwater management and agricultural transformation?
A3. What are the opportunities?

(B) General understanding on the adaptation approach

B1. How can we overcome the challenges and take up the opportunities?

(C) General understanding on the concept "living with floods"

C1. In your opinion, what are the elements of living with flood?
C2. How do you think about the level of importance of this approach in the Vietnamese Mekong Delta?
C3. Factors that structure the way local people think about flooding?
C4. How do you think about the role of the knowledge of local people on "living with flood"?
C5. Can you give some examples of living with flood practice of local households?
C6. Do you think local people would want to continue living with floods?

(D) Understanding on the application of the concept "living with floods" in the province

(D1) Knowledge on living with flood measures in general

D1.1. What are living with flood measures from the central government that have been implementing in your province?
D1.2. How do you think about the effectiveness of these measures?
D1.3. Lessons learned? What can be improved from these examples?

(D2) Knowledge on the relevant policies

D2.4. What are policy documents that mention about "living with flood" issued by the central government? Issued by An Giang province?

(D3) Knowledge on the relevant projects

D3.5. What are projects that related to "living with flood" in your province? What are indicators that you think a project is for the purpose living with floods?
D3.6. E.g., North Vam Nao, amphibious housing model, IUCN project, etc.
D3.7. Main goals of these projects?D3.8. What are the projects that you involve in? Your roles?
D3.9. Effects of these projects? Lessons learned?

(D4) Enablers and obstacles of the implementation of the approach

D4.10. What are the enablers and obstacles on the implementation of the concept living with flood in general?

(D5) Provision of the application of the concept and the approach in the future

D5.11. How can we achieve living with flood?
D5.12. What are the mechanisms to keep these innovations/results going on?D5.13. What would be the policy recommendations?
D5.14. Would you like to participate into a sharing session of the findings of this research?
D5.15. Anything else you want to share?