



Research

Enhancing the role of International NGOs in promoting the implementation of ecosystem-based adaptation policies: insights from an International Union for Conservation and Foundation of Netherlands Volunteers led project in the Vietnamese Mekong Delta

[Annisa Triyanti](#)¹ , [Carel Dieperink](#)^{1,2} , [Dries Hegger](#)¹ , [Trang T. Vu](#)³, [Thi Tang Luu](#)⁴ , [Duc Canh Nguyen](#)⁵ and [Hong Quan Nguyen](#)^{6,7} 

ABSTRACT. Several international non-governmental organizations (INGOs) function as boundary organizations and try to promote ecosystem-based adaptation (EbA) as a pivotal climate change adaptation strategy for coastal areas. This is being done in Vietnam. Few studies, however, have investigated how these INGOs operate, what challenges they face, and what conditions support them to successfully promote the implementation of EbA. To address this knowledge gap, the literature on international boundary work and boundary organizations was first reviewed, deriving four categories of conditions for a successful promotion of EbA: knowledge, networks, resources, and context. Next, we applied this framework in a case study of the International Union for Conservation (IUCN) and the Foundation of Netherlands Volunteers (SNV) led EbA project on the restoration and sustainable use of mangroves in two provinces, Ca Mau and Ben Tre, which are located in the Vietnamese Mekong Delta. We interviewed 25 key informants representing INGOs, Vietnamese governmental agencies, farmers, scientists, and market parties. Our case study not only revealed how most literature-based success conditions were met but also found some additional conditions. We found that INGOs will have a greater chance of successfully promoting the implementation of the EbA in cases in which they can act as a knowledge broker, have a strong international network, can supply enough resources, and use context-specific strategies. A supportive context appeared to be essential.

Key Words: *climate adaptation; ecosystem-based approaches; international non-governmental organizations; mangrove shrimp farming; Mekong Delta; Vietnam*

INTRODUCTION

In the Convention on Biological Diversity (CBD), the ecosystem approach is defined as a "strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way" (Secretariat CBD 2004). The concept of ecosystem-based adaptation (EbA) is in line with this, referring to "the use of biodiversity and ecosystem services to help people adapt to the adverse effects of climate change." The concept has proliferated rapidly, not only as such but also under other names, such as nature-based solutions (NbS; Cohen-Shacham et al. 2016, Kabisch et al. 2016, Depietri and McPhearson 2017, Dorst et al. 2019, Seddon et al. 2020).

The ecosystem-based adaptation is put forward as a no-regrets strategy that aims to reduce climate change-induced disaster risks and creates co-benefits by contributing to healthier ecosystems (Colls et al. 2009, Mercer et al. 2012, Munang et al. 2013). The success and sustainability of the EbA concept depend on how well it can be integrated into existing policies on climate change adaptation and disaster risk reduction (Huq et al. 2013, Wolf et al. 2021). It has been claimed that EbA cannot be implemented as a stand-alone approach. It is argued that hybrid approaches are needed that combine so-called "gray" and "green" solutions tailored to specific problems and available resources (Smajgl et al. 2015, Szabo et al. 2015, Takagi 2019, Busayo et al. 2022). In the implementation of EbA, several governmental and non-

governmental actors can play a role (Mercer et al. 2012, Cosens 2013) but oftentimes this role is found to be challenging (Triyanti et al. 2017).

International non-governmental organizations (INGOs) can act as boundary organizations, i.e., as formal institutions that link the scientific and non-scientific communities. Boundary organizations can be important in problem and (common) interest framing (see for example, Boezeman et al. 2013, Hoppe et al. 2013, Vink et al. 2013, Ha et al. 2018, Borie et al. 2020, Triyanti et al. 2020). They can facilitate multi-level collaborations between science and policy actors (academics, business, citizens, government authorities) to boost actions to initiate and/or support the implementation of EbA by providing financial and/or technical support (Ojea 2015, Milman and Jagannathan 2017). They can also advocate for the establishment of incentives, including policies that support the implementation and upscaling of EbA. International non-governmental organizations could especially be of added value in the Global South (Vignola et al. 2009, Kabisch et al. 2016, Bhattarai et al. 2021) because actors in more marginal areas are often in need of more specific technical guidance (Vignola et al. 2009).

Most EbA studies still focus on the debate related to the approach's effectiveness in addressing certain biophysical boundaries, e.g., to what extent EbA can cope with future threats

¹Environmental Governance, Copernicus Institute of Sustainable Development, Faculty of Geosciences, Utrecht University, The Netherlands, ²The Netherlands Institute of Ecology (NIOO), Wageningen, The Netherlands, ³Department of Physical Geography, Faculty of Geosciences, Utrecht University, ⁴The University of Potsdam, Germany, ⁵Research Institute for Water and Environmental Management, Vietnam Union of Science and Technology Associations, ⁶Institute for Circular Economy Development, Vietnam National University, Ho Chi Minh City, ⁷Center of Water Management and Climate Change, Institute for Environment and Resources (IER), Vietnam National University, Ho Chi Minh City

such as sea-level rise or help reduce the risk of specific disasters (Kathiresan and Rajendran 2005, Hale et al. 2009, Alongi 2015, Sierra-Correa and Kintz 2015). However, the implementation of EbA approaches including the boundary role played by INGOs and the conditions that impact their likelihood of successfully promoting EbA is understudied. Furthermore, most studies on EbA have been carried out in the Global North (e.g., Wamsler et al. 2014, Brink et al. 2016, Clark et al. 2016, Sudmeier-Rieux et al. 2021).

We aim to address this knowledge gap by providing insights into how and under what conditions INGOs can successfully promote the implementation of EbA policies in the Vietnamese Mekong Delta. To do this, we first developed a framework to assess successful EbA based on the boundary work and boundary organizations concepts. We then applied this framework to two in-depth case studies on the elaboration of the Mangroves and Market (MAM) project in the provinces Ca Mau and Ben Tre. The MAM project was initiated by the International Union for Conservation (IUCN) and the Foundation of Netherlands Volunteers (SNV). Finally, we drew lessons on the findings on successful implementation of EbA and its implications for social-ecological resilience.

TOWARD CONDITIONS FOR SUCCESSFUL EBA PROMOTION: AN ANALYTICAL FRAMEWORK

Boundary work refers to practices that create interplays between science, policy, and implementation (Miller 2001, Hoppe et al. 2013). Boundary work related to EbA promotion has succeeded when local actors incorporate knowledge about the pros and cons of EbA in societal decision-making processes, ideally leading to EbA being implemented in synergy with important societal and economic activities. This is in line with the EbA goals, i.e., to obtain co-benefits, including conserving ecosystems and harnessing ecosystem services to adapt to climate change and its impacts, and improving the community's livelihood (Huq et al. 2013). To define factors that may explain successful boundary work done by INGOs in the Global South, we first reviewed relevant journal papers found by a Scopus search using (combinations of) keywords such as international organizations, boundary organizations, delta governance, ecosystem-based approaches, and Vietnamese Mekong Delta. The literature revealed that organizations can do boundary work in different ways, depending on their focus. Some focus on output, others focus more on impacts (Moss et al. 2009, van Enst et al. 2018). In addition, the literature revealed some factors related to the role played by INGOs in the Global South.

Several publications mentioned factors that may help explain the influence of boundary work done in the Global South. In her case study of enabling factors for science-policy interface in South Africa, Koch (2018) found three factors related to the policy domain that seem decisive for boundary work's effectiveness: (1) supportive legislation that constitutes a crucial source of legitimacy for boundary work; (2) the availability of an absorptive administration that is receptive to expertise; and (3) the existence of a strong science community producing policy-relevant knowledge dealing with the country's specific problems. Without such conducive conditions, the author implied boundary work in the sector would not have had as much impact (Koch 2018). A study conducted on Vietnam's national Reducing Emissions from Deforestation and Forest (REDD+) policy decision making

found that actors' participation in the REDD+ policy arena increased when they could recognize and exploit the spaces for their involvement present within the political opportunity structure (Pham et al. 2014). Similar conclusions were drawn by Ayana et al. (2018) in a study of the influence of environmental NGOs (ENGOS) in Ethiopia, a semi-authoritarian state, and by Hadden and Bush (2021) regarding global ENGOS influence on political and ecological outcomes. The latter study found that ENGOS' initiatives should first be backed up by the dominant management regime. In addition, ENGOS need to build trust from the government through sharing best practices and must have access to financial resources and networks. Finally, a study on policy translations in the water sector conducted by Mukhtarov (2014) provided insights into the extent policy ideas travel, as well as the importance of political contingencies and context factors in the receiving nations. The author argued that the travel of policy ideas is influenced by the characteristics of the idea, path dependency, the ideology of the country where the policy idea is introduced, and the size and efficiency of its bureaucracy.

From the literature review, we identified various conditions that might help assure INGOs succeed in promoting the implementation of EbA policies. In Table 1, they are grouped into four categories named knowledge, network, resources, and context.

METHODS

To provide more in-depth knowledge on the conditions under which INGOs can successfully promote the implementation of EbA policies in the Vietnamese Mekong Delta (VMD), we applied our framework to two case studies of the Mangroves and Markets (MAM) project. The MAM project focused explicitly on EbA and was thus expected to be a rich and useful case.

The MAM project was implemented by the IUCN in partnership with Mangroves for the Future (MFF) and the SNV Netherlands Development Organization and funded by the International Climate Initiative (IKI) of the German Ministry for Nature and the Environment (BMU). The project was implemented in the VMD in two phases. Phase I (MAM I) ran between 2016 and 2020 and took place in Ca Mau province (and in Surat Thani province, Thailand). MAM I's objective was to promote EbA and mitigation by providing economic incentives for restoration and sustainable use of mangroves.

The MAM II (2016–2020) was a follow-up project evaluating the scalability of the MAM I approaches and results. In this phase, SNV was the main implementing agency. The specific targets of MAM II were to train 5000 shrimp farmer households in applying integrated mangrove-shrimp aquaculture farming practices, to persuade processing companies to provide incentives for integrated mangrove-shrimp farming, and to achieve the incorporation of payment for forest ecosystem services (PES) for sustainable mangrove-shrimp aquaculture into the national and provincial development plans in Ca Mau, Ben Tre, and Tra Vinh provinces by 2020 (<https://www.snv.org/project/mam-ii-scaling-ecosystem-based-adaptation-mekong-delta>).

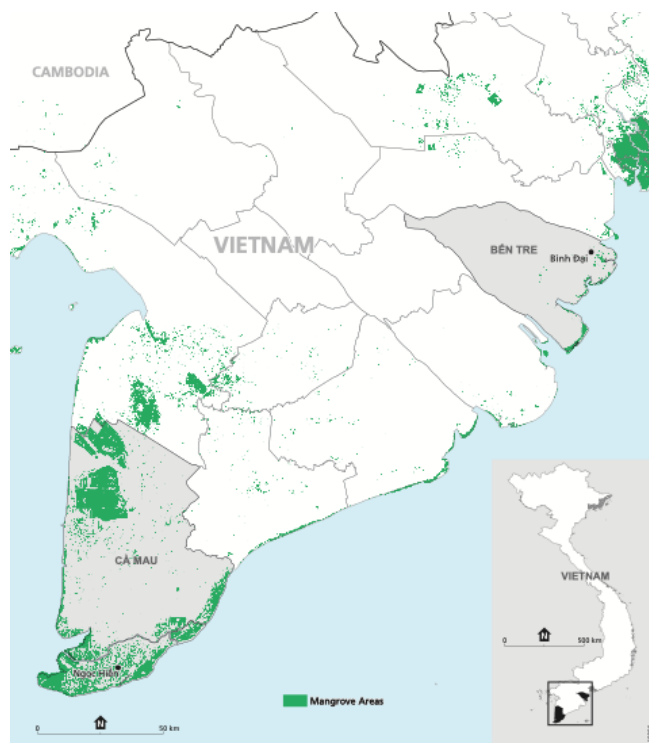
The mangroves in Ca Mau and Ben Tre (see Fig. 1) are under severe pressure from upstream damming, erosion, and habitat squeeze (Son et al. 2014, Anthony et al. 2015, Phan et al. 2015, Veettil et al. 2019, Liu et al. 2020). The consequences of mangrove degradation will be the loss of protective regulatory and livelihood

Table 1. Twelve conditions that enhance the likelihood international non-governmental organizations (INGOs) will succeed in implementing ecosystem-based adaptation (EbA).

Category	Conditions	References
Knowledge	INGOs have access to relevant knowledge INGOs can provide salient, credible, and legitimate knowledge	(Cash et al. 2003, Hadden and Bush 2021)
Network	INGOs can use scientific arguments to position their project INGOs have access to finances and contacts through cross-sectoral and transnational collaborations INGOs can build a coalition with like-minded actors (e.g., World Bank) INGOs can nurture the relationship with scientific institutions INGOs can forge alliances with key decision makers INGOs manage to recognize and exploit the spaces for their involvement within the political opportunity structure	(Pham et al. 2014, Ayana et al. 2018, Koch 2018)
Resources	INGOs can invest sufficient financial and human resources for the implementation of a new policy and push for its adoption	(Ayana et al. 2018, Hadden and Bush 2021)
Context	INGOs employ strategies that fit with the specific context of the receiving nations A receptive institutional/legal framework is in place The administration is acceptive to INGOs' proposals	(Mukhtarov 2014) (Pham et al. 2014, Ayana et al. 2018, Koch 2018)

provisioning services (Huu Nguyen et al. 2016), making coastal communities more vulnerable to climate change and disasters. The loss of mangroves effectively entails a reduction of the number of options for inhabitants' livelihoods. They will have fewer possibilities to earn a living from coastal, as opposed to land-based, activities as well as fewer possibilities to address the problem of groundwater use and the rate of land subsidence (Garschagen et al. 2012, Ha et al. 2012, Nguyen et al. 2020, Betcherman et al. 2021).

Fig. 1. The location of the Ca Mau (Ngoc Hien) and Ben Tre (Binh Dai) provinces in the Vietnamese Mekong Delta. Source of data: JAXA.



Ca Mau and Ben Tre provinces are already threatened by sea-level rise and land subsidence (Nguyen and Parnell 2019). The latter is caused by excessive abstractions of groundwater for agriculture (Minderhoud et al. 2019). The combination of sea-level rise and land subsidence aggravates salt intrusion (Smajgl et al. 2015). Meanwhile, the sediment budget of the VMD has decreased due to mining and upstream hydro damming (see Dunn et al. 2019, Nhan and Cao 2019). Overall flood risks in Ca Mau and Ben Tre will increase because the delta is much lower than initially perceived (Minderhoud et al. 2019).

To get an understanding of the development of the MAM project, the role of the INGOs involved, and the relevance of our 12 success conditions, we analyzed documents related to the MAM project and interviewed 25 key informants (see Table 2). The documents were made available by the IUCN and SNV or found on the Internet. We also reviewed literature on mangrove systems in Ca Mau, Ben Tre, and the VMD, and the role of EbA in Vietnamese policy making for the VMD. In the analysis, we triangulated the data found in the document analysis and literature review with the interview data.

Our purposively chosen interviewees included government officials, local community representatives, farmers, and scientific and market experts. They were aware of or affiliated with the MAM project's planning and implementation or interacted directly with the INGO staff. All interviewees were prepared to share their insights about the role of INGOs in promoting EbA. The interviews took place between October 2020 and June 2021, during the COVID-19 pandemic. Local interviews were conducted face-to-face in Vietnamese by the Vietnamese co-authors. The INGO international staff were interviewed online by the first author in English. Interviewees were asked about their role, how the project was organized, the problems, their motivation for involvement, specific contributions, interaction strategies, lessons learned, future concerns, and the perception of the role of the INGOs (see Appendix 1). The interview questions were based on the analytical framework (see Table 1). In both the Vietnamese and English interviews, the interviewers noted down the answers. The English interviews, however, were also recorded. The analytical framework was used for coding the answers, but some inductive coding also took place.

Table 2. List of interviews in the Ca Mau and Ben Tre provinces.

Actor group	Interviewees	Location	Method	In-text code
INGOs	IUCN Indo-Burma deputy head	Ho Chi Minh City	Online and face-to-face	I1
	IUCN MAM-project staff member	Ben Tre	Online	I2
	SNV MAM-project staff member	Ca Mau	Online and face-to-face	S1
Government	Forest management board member, Department of Agricultural and Rural Development (DARD)	Ca Mau	Face-to face	FMBC
	Division of Climate Change, Department of Natural Resources and Environment (DONRE)	Ca Mau	Face-to-face	DOC
	Forest protection management unit, DARD	Ca Mau	Face-to-face	PFC1, PFC2
	Forest management board member, Department of Agricultural and Rural Development (DARD)	Ben Tre	Face-to-face	FMBB1, FMBB2
	Division of Fisheries, DARD	Ca Mau	Face-to-face	FDC
Farmers	Local farmers' representatives	Ca Mau	Face-to-face	LFC1, LFC2, LFC3, LFC4, LFC5, LFC6, LFC7, LFC8, LFC9, LFC10
	Local farmers' representatives	Ben Tre	Face-to-face	LFB1, LFB2, LFB3
Scientists	Scientific expert consultant on mangrove-based aquaculture	Ca Mau and Ben Tre	Online	SE1
	Representative of the Minh Phu Seafood Company	Ca Mau	Online and face-to-face	MPI

RESULTS

The implementation of the MAM project

The MAM project is considered successful because it has achieved its initial goals and purpose to promote EbA and obtain co-benefits by providing economic incentives for restoration and sustainable use of mangroves. The IUCN did the preparatory work for the project. It identified pilot areas in Vietnam and Thailand, drafted EbA business plans, and completed cooperation agreements with the regions. The project supported Ca Mau province toward implementing its 2030 vision of an “organic coast,” a holistic approach for the conservation of mangrove forests with ecologically friendly certified shrimp production. IUCN’s regional social assessment of the Mekong Delta, completed in January 2016, showed that after organic certification, Ca Mau shrimp farms could increase their profits by 20–26%. Contracts were signed between 741 shrimp farmers and Minh Phu, the leading shrimp exporter. A draft proposal for aquaculture-related payment for ecosystem services (PES) was submitted to the Vietnamese Prime Minister. In June 2016, the World Bank approved the project “Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods” (MD-ICRSL; <https://projects.worldbank.org/en/projects-operations/project-detail/P153544>), which seeks to replicate and scale up the mangrove-shrimp farming approach in Ca Mau (<https://www.international-climate-initiative.com/en/project/promoting-ecosystem-based-adaptation-through-mangrove-restoration-and-sustainable-use-in-thailand-and-vietnam-12-ii-091-asia-a-eba-mangrove-restoration/>).

Insights from the project, especially regarding the PES, were fed into national and provincial laws, regional learning, and the global dialogue on reducing emissions from deforestation and forest degradation (REDD+).

Relevance and assessment of the success conditions

Most of the conditions for a successful promotion of EbA specified in Table 1 have been (partially) met in the implementation of the MAM project in our case study areas (see Table 3). Analysis revealed additional factors also affected the MAM project’s implementation.

Knowledge-related conditions

Access to knowledge: This condition was met because both IUCN and SNV had access to knowledge relevant for the implementation of the MAM project. Interviewees highlighted the availability of relevant knowledge on mangrove-based aquaculture, sustainable shrimp cultivation techniques, ecological certification, and marketing skills (I1, I2, S1, LFC1–10, FMBC, PFC1, PFC2, DOC, FDC, SE1; Table 2). Hired scientific experts and consultants developed and implemented this knowledge, including the mangrove shrimp cultivation technique derived from previous projects, e.g., through the project funded by the Australian Centre for International Agricultural Research (ACIAR) conducted from 1996–1998 (I1, S1, SE1; see more information about the ACIAR-funded project “Mixed shrimp farming-mangrove forestry models in the Mekong Delta,” <https://enaca.org/?id=572>).

To ensure product sustainability, both INGOs had immediate access to knowledge providers for ecological certification and market strategies, involving Naturland certification company, the Vietnamese Fisheries Department, and the Minh Phu seafood company, especially in the case of Ca Mau. Local authorities also coordinated with experts by organizing events for idea formulation, discussing statistics, and evaluation (FMBC, PFC1, PFC2, DOC).

Salient, credible, and legitimate knowledge: This condition was also met. Interviewees confirmed that IUCN and SNV provided salient knowledge aligned with environmental conservation, livelihood improvement, and economic goals outlined in Resolution 120 and the Vietnam Mekong Delta Plan (I1, S1, FMBC, PFC1, PFC2, DOC, FDC, SE1). The credibility of the knowledge at stake might have been compromised to some extent due to the more limited use and valuation of Indigenous knowledge on regional conditions and historical experiences of local communities in shrimp farming (FMBC). Our interview with the scientific expert confirmed that local knowledge needs scientific validation and alignment to balance mangrove shrimp aquaculture productivity and mangrove conservation (SE1). Nevertheless, the legitimacy of the knowledge appeared to be high

Table 3. Presence of the conditions for successful promotion of ecosystem-based adaptation (EbA) by international non-governmental organizations (INGOs) in the Mangroves and Markets (MAM) project.

Category	Conditions	Results
Knowledge	INGOs have access to relevant knowledge	+
	INGOs can provide salient, credible, and legitimate knowledge	+
	INGOs can use scientific arguments to position their project	-+
Network	INGOs have access to finances and contacts through cross-sectoral and transnational collaborations	-+
	INGOs can build a coalition with like-minded actors	+
	INGOs can nurture the relationship with scientific institutions	+
Resources	INGOs manage to recognize and exploit the spaces for their involvement within the political opportunity structure	+
	INGOs can invest sufficient financial and human resources for the implementation of a new policy and push for its adoption	+
Context	INGOs employ strategies that fit with the specific context of the receiving nations	+
	A receptive institutional/legal framework is in place	-+
	The administration is acceptive	+

+ condition met.

-+ condition partially met.

because INGOs had provided technical support and had co-produced knowledge and raised awareness with knowledge institutions and the farmers' community on the importance of mangrove reforestation for climate adaptation and mitigation (FMBC, PFC1, PFC2). Furthermore, our interviews with the Department of Natural Resources and Environment (DONRE) revealed agreement on the salience of knowledge. Credibility was also achieved due to the active role played by the government, DONRE and Vietnam Department of Agriculture and Rural Development (DARD) officials, and farmers acting as intermediaries for awareness raising and knowledge propaganda (DOC).

Scientific arguments to position the project: The project partially met the condition of using scientific arguments. The INGO officers emphasized that scientific knowledge and arguments played a core role (I1, S1, SE1), and there was very active involvement by internal and external experts (SE1). Government officials believed that the 70% increase in shrimp productivity (LFC5) resulted from good scientific knowledge development and use (FMBC, PFC1, PFC2). However, the local farmers in Ben Tre disputed this number and expressed dissatisfaction with the low shrimp production. This was due to the use of ineffective techniques. Scientific experts, however, attributed it to a lack of market incentives to engage farmers and local authorities and leadership issues (LFB1-3, SE1). The local authorities, INGO officers, and scientific experts agreed that in the future it will be challenging for INGOs to use scientific arguments due to the biophysical, socioeconomic, market, and political uncertainties of the systems, as well as in the emerging sustainability issues (I1, SI, SE1).

Network-related conditions

Access to finance and contacts through cross-sectoral and transnational collaborations: This condition was partially met because the implementing organization developed the project's internal scope, with influence from the funding agencies (German Federal Ministry for Economic Cooperation and Development and IKI) and national and regional governments (I1, S1). This funding support and collaboration with governments served as a strong foundation for the project, allowing it to connect with

predecessor projects, e.g., the 1996–1998 Australian ACIAR project focusing on biophysical assessment and development of the mangrove-shrimp aquaculture technique, (SE1) and spin-off initiatives such as the World Bank MD-ICRSL project (S1). However, the interviews with INGO officers (I1, S1) show that it remains challenging to ensure long-term sustainable financing for EbA projects.

Coalition with like-minded actors: This condition was met. The INGOs realized the need for follow-up projects to maintain commitment for the promotion of EbA (I1, S1). They also realized the current funding system for such projects is uncertain. To tackle this issue, the INGOs cross-fertilized with other ongoing and future projects covering similar objectives from other development partners with a long-term presence in Vietnam, committed to achieving climate resilience, e.g., UN-REDD, FAO, and the World Bank MD-ICRSL project (I1, S1; <https://www.international-climate-initiative.com/en/iki-media/news/coastal-transformation-in-the-mekong-delta/>).

Nurture the relationship with scientific institutions: This condition was met because the MAM project proved to be effective in nurturing relationships with scientific institutions, as shown by the early involvement of scientific institutions in developing the project (SE1). Scientific knowledge used in the MAM project was built on predecessor projects funded by ACIAR (SE1). This included knowledge on shrimp seeding ratios and the use of probiotics to boost the availability of natural food for shrimps. Scientific institutions engaged in knowledge developing and in training and awareness-raising programs. They engaged directly with the community and officers on the ground (I1, S1, SE1).

Forge alliances with key decision makers: This condition was met. The IUCN and SNV engaged strategically with government actors involved in formulating EbA policies such as the forest management board, DARD, and MARD (Ministry of Agriculture and Rural Development, Vietnam) as well as experts involved in drafting the first National Decree 99/2010/NĐ-CP on PES (I1, S1). This has allowed them to contribute to policy opportunities for scaling up (I1-I2, S1, FMBC). Eventually, this

enabled them to draw on the results of the MAM project when drafting PES regulations. Vietnam's Ministry of Agriculture and Rural Development used the results, experience, and recommendations from the pilot project in Ca Mau province to establish the Forestry Decree 156/2018/NĐ-CP entitled "Detailing the Implementation of the Forestry Law," promulgated on 01/01/2019. The decree has enabled mangrove polyculture to be mainstreamed in national regulations, to be implemented at the provincial level as an EbA strategy, and was the foundation for a direct PES scheme for integrated mangrove aquaculture at national level (<https://www.international-climate-initiative.com/en/project/promoting-ecosystem-based-adaptation-through-mangrove-restoration-and-sustainable-use-in-thailand-and-vietnam-12-ii-091-asia-a-eba-mangrove-restoration/>).

Recognize and exploit the spaces for INGO involvement within the political opportunity structure: This condition was met because the IUCN and SNV acknowledged the importance of involving key governmental authorities to ensure successful implementation. Strategic alliances with political actors (i.e., DARD and DONRE) played a crucial role in shaping the required policy agenda and setting priorities, especially in Ca Mau (I1, S1). Provincial people's committees were also included because they formally approve within their jurisdictions (FMBC, PFC1, PFC2). Governments acted as a bridge between donor agencies, implementing organizations, and the people, thereby generating ideas to support experts and organizations (FMBC). Moreover, the involvement of the Minh Phu was a pivotal factor for getting access to the global market. The absence of an established marketing system would have hindered the MAM project, preventing both farmers and the SNV from offering local incentives to conserve mangroves (I1, S1; I1, S1, FMBC, PFC1, PFC2).

Resource-related conditions

Invest sufficient financial and human resources for the implementation of a new policy and to push for its adoption: This condition was met due to availability of sufficient funding. The IUCN and SNV were able to cover all costs of the project (FMBC, PFC1, PFC2). However, concerns emerged about the lack of technical capacity, e.g., on how to farm shrimp sustainably while conserving the mangroves (I1, FMBC1-2) and lack of the managerial capacity of government officials and farmers (PFC1-2). To address these issues, both INGOs connected with the scientific institutions and experts to help develop guidelines for the local government staff, and they organized training courses for several agencies. As a result, the project has contributed to the government's professional expertise, including a better application of information technology (FMBC). This motivated local government staff because it helped them to update the knowledge needed to advise policy makers (FMBC; PFC1, PFC2). Farmers were motivated to change their shrimp farming practices because they received training on shrimp farming techniques, e.g., how to solve frequent unexplained massive shrimp die-off and on using probiotics to improve efficiency and productivity (LFC1-10, SE1). Farmers also received financial support and improved sanitation facilities (including septic toilets), which is a requirement for getting an ecological certification (S1, FMBC, FC1, PFC2). The MAM project staff played a pivotal role in reviewing the provincial regulation (111/PPC/2016) on payments for ecosystem services (PES) and in

promoting the adoption of the government decree on PES (156/2018; I1, I1, S1, FMBC). Overall, the MAM project staff demonstrated robust leadership and capacity in coordinating and implementing initiatives (FDC, FMBC, PFC1, PFC2). Despite the positive outcomes, future challenges loom because the global market for shrimp agriculture is growing. If Vietnam wants to grow its market share, the current land cover ratio for mangroves and aquaculture (60:40) may be jeopardized, and it is feared that the community will revert to unsustainable practices. Additional incentives will be needed. Supporting farmers' associations can enhance awareness, mainstream scientific knowledge, and safeguard farmers' rights (SE1).

Context-related conditions

Employ strategies that fit with the specific context of the receiving nation: This condition was met because the INGO officers interviewed argued that the strategies developed were grounded in the existing problem definitions of the people in the studied areas (I1, S1). For a long time, shrimp aquaculture has been the source of livelihood for people in the southern part of VMD. Since the 1990s, aquaculture practices have become increasingly unsustainable and have resulted in a decline of the mangrove ecosystem (Ha et al. 2012). A vicious cycle resulted, as mangrove destruction disrupted ecosystem chains, which reduced the ecosystem's ability to provide nutrients to support shrimp aquaculture, causing a reduction in the productivity of shrimp aquaculture in 1994–1996. In 1997, Typhoon Linda hit the southern coast of Vietnam (I1, S1). This combination of events was a wake-up call for both the government and the community to implement EbA. Therefore, MAM's main goal was to enhance the capacity to initiate sustainable, ecosystem-based livelihoods and to protect the coastal communities from climate change and its (disastrous) impacts (I1, S1).

The strategy devised by the MAM project directly addressed the above-mentioned problems. Project participants provided technical expertise on sustainable, integrated mangrove fisheries, seeding, certification, sanitation facilities, and on facilitating links to markets for sustainable incentives (I1, I2, SI). They involved the government actors early in the project and offered them formal project positions and roles (mostly advisory; I1, S1). During the project, government officers frequently discussed issues and plans, and the community was engaged by mobilizing farmers on the ground (LFC5; FMBC, PFC1, PFC2). Meanwhile, they strategically engaged with Minh Phu Seafood and shared basic knowledge on implementing mangrove shrimp aquaculture methods and ecological certification. Minh Phu Seafood had access to the global market and was selected as the main implementation partner of the MAM project (S1). For the promotion of EbA on a larger scale, the project members developed a strategy for lobbying and advocating for the change of the legal regime and the adoption of PES regulations (I1, S1). Overall, the MAM project acquired legitimacy because there was general awareness and consensus about the urgency of the problem it addressed.

Receptive institutional/legal framework in place: This condition was partially met because the governance system was very supportive. Since the 1990s, the Vietnamese government has been increasingly interested in using EbA (MEA 2005, Brondizio et al. 2019). Both provincial and local governments had an overlapping

agenda to promote EbA's dual functions (i.e., livelihood improvement and mangrove conservation; I1, S1, FMBC, PFC1, PFC2). Corresponding institutional structures were in place, including the DARD (the forest management board/units, the fisheries division) and DONRE, who functioned as main counterparts in the MAM project. These partners joined forces to co-define the problem, goal, as well as salient and legitimate solutions. In addition to a receptive institutional framework, the legal framework was also in place. Policies relevant to EbA include the Decree 156/2018/NĐ-CP, which obliges farmers to maintain the 60:40 ratio for mangrove forests combined with aquaculture (I1), National Target Plan for the response to climate change, National and Provincial REDD+ action plans (NRAPs and PRAPs), the National Strategy on Climate Change (McElwee et al. 2020), and various PES-related decrees, including the national PES policy Decree 99/2010/NĐ-CP and new Forestry Decree 156/2018/ND-CP (McElwee et al. 2020). These policies smoothed the implementation of the MAM project. However, there was also concern about the financial system in Vietnam, which does not enable the development of dual-function solutions but tends to favor economic development projects (I1).

Acceptive administration: This condition was also met because governmental authorities were open to the mainstreaming of EbA approaches into their policies. The MAM project benefitted from the fact that mangrove restoration had long been on the political agenda in Vietnam (see de Graaf and Xuan 1998, Hai et al. 2020). During the Vietnam war, the use of chemical warfare (i.e., herbicides and defoliant) severely damaged the mangroves in the Mekong Delta. Attempts to restore mangroves in the delta after the war (1975–1980), including in Ca Mau and Ben Tre provinces, failed due to inadequate silvicultural techniques. From 1981–1990, the Vietnamese government started to fund new projects. Since 1990, international organizations have been initiating and funding large- and small-scale rehabilitation projects too. According to Hai et al. (2020), by 2020, state-funded projects had restored 48,096 hectares of mangroves, and projects funded by international organizations had restored 43,750 hectares of mangroves. The government has issued regulations to preserve and manage mangroves with a land tenure policy (Ha et al. 2014). Interviews with INGO staff and provincial government officials in Ca Mau revealed they were satisfied with the joint effort to achieve their shared agenda of awareness-raising and balancing conservation, livelihood, and climate change adaptation. In addition, governments were happy with the overall change to more bottom-up, sustainable, and profitable aquaculture practices. The market, represented by Minh Phu Seafood, has also become more strongly linked to farmers (S1, MP1), which is a key factor for boosting productivity and providing benefits to the market.

Additional conditions found

In addition to scrutinizing our theoretically derived conditions, the research identified three inductively derived conditions (see Table 4).

First, we found one additional knowledge-related condition. The likelihood that INGOs would succeed in promoting EbA would be higher if they could be reflexive in considering knowledge on changes/dynamics of the biophysical, social, economic, legal, and

Table 4. Additional conditions favorable for a successful promotion of ecosystem-based adaptation (EbA) by international non-governmental organizations (INGOs) found in the Mangroves and Market (MAM) project.

Category	Additional conditions found	Results
Knowledge	INGOs can be reflexive in terms of considering knowledge on changes/dynamics	-+
	INGOs can nurture leadership	-+
Resources	INGOs can find sustainable resources for longitudinal/transformational projects	-+

+ condition met.
 -+ condition partially met.

political systems. This condition, however, was only partly met. The interviewees and scientific experts working on the project (I1, S1, SE1) specifically mentioned this issue as a future concern. Until the finalization of the project, it remained unclear whether knowledge about the future of the mangrove areas was sufficient to enable the formulation of future strategies to promote EbA. It was, for example, unclear how future biophysical boundary conditions would be influenced by (the combination of) a depleting sediment budget, land subsidence, and sea-level rise. It was also unclear whether mangrove-based aquaculture would continue providing socioeconomic benefits in the longer term, and whether its implementation would receive continuing policy support.

Apart from this, we found two additional resource-related conditions that are currently only partially met. The INGOs will be more likely to successfully promote EbA if they can nurture leadership and can find sustainable resources for longitudinal/transformational projects. In Ben Tre, the MAM-project was less successful. A lack of financial incentives from the MAM project discouraged local actors from taking on a leadership role and sustaining the project's implementation (SE1). Furthermore, the uncertainty of long-term funding schemes for the continuation of this project or development of longitudinal/transformational projects was found to be an overall barrier to an INGOs successful promotion of EbA in the future.

DISCUSSION

The findings yield three lessons on the role of INGOs in promoting EbA, pertaining to whether, how, and under what conditions INGOs can contribute to promoting EbA in the Global South. To answer these questions, we developed a list of conditions derived from the international boundary organizations' literature and applied them in a case study of the MAM project in the provinces Ca Mau and Ben Tre. Regarding the first question (whether), we argue that the overall MAM project was successful because it achieved its goal. Regarding the "how" question, most of the success conditions were wholly or partially met. Regarding the third question (under what conditions), we argue that the INGOs embraced their role as international knowledge brokers. They were key actors in the international network and thus able to mobilize the network to supply resources for the further promotion of EbA using context-specific strategies. Identifying key networks and stakeholders and using political structure

opened the way for the IUCN and SNV to increase their credibility and mobilize resources. Based on our empirical analysis, we argue that there are interlinkages between our (four categories of) conditions and that some factors are causally related. This suggests that some success conditions are more critical than others. In the case of Vietnam, the effective collaboration between INGOs and the Vietnamese government was crucial to promoting EbA in VMD. Apart from this, our case study revealed that our initial framework could be supplemented by three additional conditions.

Our research has contributed to the existing body of literature on boundary organizations by developing a framework for assessing under which conditions INGOs can succeed in their boundary work. This body of literature used to have a very theoretical and normative focus, paying less attention to how boundary organizations function empirically. Furthermore, few of the conducted studies deal with the role of INGOs in the Global South. We clearly show that theoretical insights from the literature on boundary organizations are relevant for understanding the implementation of EbA. By applying the framework, we have provided more in-depth insights into the relevance of the conditions in the Global South. Our second key contribution is to the more general literature on EbA (Mercer et al. 2012, Cosens 2013, Munang et al. 2013, Sierra-Correa and Kintz 2015, Triyanti et al. 2017). Our study stresses that knowledge brokering is essential in the promotion of EbA.

Upon broader reflection, we have brought attention to the conditions that increase the likelihood of success in implementing EbA by INGOs. We assumed that this success would yield positive higher-order effects in terms of social-ecological resilience (see for example, Akamani 2016). Our findings reveal that the MAM project has facilitated the coexistence of mangrove production and other functions, such as shrimp aquaculture, which potentially enhance the resilience of the social-ecological systems in Ca Mau and Ben Tre. Whether the successful implementation of EbA led by INGOs produces these anticipated effects needs more study. Walker et al.'s (2004) and Folke et al.'s (2010) widely recognized distinction between the resilience, adaptability, and transformability of social-ecological systems could provide a starting point for such a further exploration, but requires a contextualized operationalization, which is, however, beyond the scope of this paper. More in-depth research is necessary, with resilience as the focal point of study.

Overall, we found that our framework could be a useful diagnostic tool in ex-ante assessments, but based on this, could also provide inputs for designing appropriate policy strategies for INGOs and their national counterparts to sustainably promote EbA now and in the future. We however argue that the set of conditions for success should be critically considered and adjusted/tailored to case-specific contexts, otherwise INGOs will soon lose their legitimacy in defining problems and solutions.

For future research, we suggest empirical inquiries to other cases in different regions in the Global South. We foresee that the replication of studies like ours will help expand, refine, and further validate the framework, eventually leading to theory on mechanisms that help explain a successful EbA implementation in the Global South.

CONCLUSION

We have engaged with the rapidly expanding literature on the implementation of EbA in the Global South. We noticed that INGOs are prominent in stimulating EbA implementation, but that systematic empirically derived insights into whether, how, and under what conditions their efforts may be successful are scarce. Our study attempted to address this gap in scientific literature by providing empirical insights into how INGOs operate, what challenges they face, and what conditions support them to successfully promote EbA in the VMD. Our study is a first step toward unfolding the opportunities of further scaling up EbA. We conclude that INGOs can increase their chances of success by providing salient, legitimate, and credible knowledge, investing in networking, and tailoring their strategies to the political context of the receiving nations. We argue that INGOs could play a role in further prioritizing EbA at national and international levels. This may lead to more systemic funding becoming available for EbA-related projects. More in-depth studies on the role of INGOs dealing with knowledge and policy translation are needed, especially to improve understanding of the role of contextual factors. Such understanding will require deeper insights into biophysical, social, economic, governance, legal, and political characteristics of the receiving nations, especially in the Global South. This may result in further tailoring of our conditions of success. Furthermore, we argue that further study focusing on the implications of the boundary work of INGOs to resilience would provide valuable insights into how these organizations contribute to the overall resilience of communities and societies. Understanding the intricate dynamics of the boundary work of INGOs is crucial for deciphering their role in enhancing resilience because it involves navigating and bridging gaps between different stakeholders, cultures, and systems. By delving deeper into this aspect, researchers can uncover specific strategies and interventions that effectively strengthen the adaptive capacity and sustainability of communities in the face of various challenges. This knowledge can inform policymakers, practitioners, and INGOs themselves, facilitating the development of more targeted and impactful initiatives to bolster resilience on a global scale.

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Data Availability:

Interview data are available on request because of privacy/ethical restrictions. The data and code that support the findings of this study are available on request from the corresponding author, Dr.

Annisa Triyanti. None of the data and code is publicly available because it contains information that could compromise the privacy of research participants. All participants interviewed for the purpose of producing this paper have provided consent to use the interview results without aggregation at the level of name and institution of the research participants (anonymized).

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Appendix 1. List of questions

1. What is your role within the MAM project (phase 1 and phase 2)? Do you represent a specific institution/organization within the project?
2. How is the MAM project organized in your area? (Who is involved in the project, what has been done and when?)
3. What are the problems that the project tries to address?
4. What became your motivation (your respective department) to be involved in this project?
5. What are your (the respective governmental department) contributions to the project? (e.g., knowledge, funding, network etc)
6. Which strategies does your entity use to enhance the interactions within the project?
7. What are the lessons learned from this project? What are the main impacts of this project?
8. In your opinion, do you think that the project is successful? and how would you describe 'success' at the local level/or what are the success factors of this project?
9. What is your main concern after the project ends?
10. How do you see the overall role of international organizations (i.e., IUCN and SNV) to promote the mainstreaming of Ecosystem-based approach in VMD?