














Article

Building Towards One Health: A Transdisciplinary Autoethnographic Approach to Understanding Perceptions of Sustainable Aquatic Foods in Vietnam

Saihong Li ^{1,*} , Soon Yong Ang ² , Angus M. Hunter ^{3,4,5} , Seda Erdem ² , John Bostock ⁶ , Chau Thi Da ⁷ , Ngoc Tuan Nguyen ⁷ , Amina Moss ⁶ , William Hope ⁸ , Charles Howie ⁹ , Richard Newton ⁶ , Mercedes Arguello Casteleiro ¹⁰  and Dave Little ⁶ 

¹ Faculty of Arts and Humanities, University of Stirling, Stirling FK9 4LA, UK

² Stirling Management School, University of Stirling, Stirling FK9 4LA, UK; soonyong.ang@stir.ac.uk (S.Y.A.); seda.erdem@stir.ac.uk (S.E.)

³ Department of Sport Science, Nottingham Trent University, Nottingham NG1 4FQ, UK; angus.hunter@ntu.ac.uk

⁴ Faculty of Health Sciences and Sport, University of Stirling, Stirling FK9 4LA, UK

⁵ School of Medicine, Medical Sciences & Nutrition, University of Aberdeen, Aberdeen AB24 3FX, UK

⁶ Institute of Aquaculture, University of Stirling, Stirling FK9 4LA, UK; j.c.bostock@stir.ac.uk (J.B.); amina.moss@stir.ac.uk (A.M.); richard.newton@stir.ac.uk (R.N.); d.c.little@stir.ac.uk (D.L.)

⁷ Faculty of Applied Sciences, Ton Duc Thang University, Ho Chi Minh City 700000, Vietnam; chauthida@tdtu.edu.vn (C.T.D.); nguyenngoctuan@tdtu.edu.vn (N.T.N.)

⁸ Salford Languages, University of Salford, Manchester M5 4WT, UK; w.hope@salford.ac.uk

⁹ Faculty of Agriculture and Natural Resources, An Giang University, Long Xuyen City 880000, Vietnam; charles_a_howie@hotmail.com

¹⁰ School of Electronics and Computer Science, University of Southampton, Southampton SO17 1BJ, UK; m.arguellocasteleiro@gmail.com

* Correspondence: saihong.li@stir.ac.uk



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Abstract: As Vietnam navigates challenges to its animal, human, and environmental health (One Health) during rapid economic transitions, understanding local perceptions of sustainable food systems, particularly aquatic foods, is vital. This study employs a transdisciplinary, autoethnographic approach to exploring the cultural significance of aquatic food perceptions within Vietnamese communities. Data were primarily sourced through an autoethnographic triangulation method, involving detailed field diaries, vignettes, and interactive workshop data collected from local stakeholders. Our distinctive approach, involving researchers from environmental science, computer science, linguistics, political ecology, aquaculture, nutrition, human physiology, marketing, and accounting and accountability, as both participants and observers, illuminates the lived experiences that shape food perceptions within Vietnam's specific food agro-ecosystems. By embedding aquatic food perceptions within the One Health framework, we identify key intersections between human, animal, and environmental health. Through cross-disciplinary narrative analysis, our study uncovers the social, political, economic, cultural, and linguistic dimensions surrounding aquatic food perceptions at local, regional, and national levels in Vietnam. Our study highlights the unique contribution of qualitative methods to addressing questions that hard data cannot answer in understanding perceptions of aquatic foods. The study emphasizes the need for an integrated, culturally informed, and transdisciplinary approach to addressing the complex factors influencing One Health outcomes in Vietnam. This research contributes to the broader discourse on sustainable food practices and One Health initiatives, proposing culturally informed interventions aimed at enhancing ecological resilience and public health.

Keywords: One Health; aquatic food; food perceptions; autoethnographic approach; interdisciplinary; Vietnam

1. Introduction

Vietnam stands at a crucial intersection of cultural richness, biodiversity, and economic development. With its extensive coastline, inland water systems, and vibrant aquatic food sector, the country relies heavily on aquatic resources, not only as a culinary preference but as an integral component of livelihoods, nutrition, and cultural identity. This deep-rooted connection to aquatic food systems highlights their importance in shaping Vietnam's socio-economic and environmental landscape. However, the growing demand for high-quality aquatic foods, fueled by both local consumption and export markets, has introduced significant challenges in Vietnam. The country now faces the critical task of balancing economic growth, food security, and environmental sustainability.

As the demand for aquatic foods grows, the strain on Vietnam's ecosystems intensifies. Aquaculture practices and capture fisheries face mounting environmental pressures, including water pollution, habitat degradation, and biodiversity loss, which threaten the sustainability of these systems. Thus, Vietnam must navigate the dual challenge of leveraging export opportunities while preserving traditional practices and supporting local livelihoods. This makes new academic explorations of aquatic food perception and consumption in Vietnam imperative [1]. Understanding the intricate dynamics of how aquatic foods are perceived and consumed is essential both for preserving Vietnam's food heritage and for gaining comprehensive insights into the One Health framework, which clarifies the interconnection between human, animal, and environmental-ecosystem health.

Recently applied to the disciplines of aquaculture and food studies, One Health is considered to be a comprehensive, cohesive strategy to maintain a sustainable equilibrium and a means of enhancing the well-being of humans, animals, and ecosystems as it calls for collaborative efforts between multiple disciplines working locally, nationally, and globally [2–4]. In Vietnam, where the balance between these elements is integral to daily life, One Health is more than a theoretical concept; it is a practical necessity. As the demand for higher quality food increases, particularly among the young, aspirational demographic, there is a growing pressure to develop export markets that can meet this evolving consumer preference and generate income in the process. This trend presents significant economic opportunities; however, it also brings substantial environmental challenges. Producing more food of high standards for these global markets can lead to increased environmental degradation [5–7]. Balancing these competing demands requires a careful and strategic approach that not only satisfies consumer needs but also ensures the sustainability of food production practices. This dual focus on economic growth and environmental stewardship is essential for the long-term viability of the industry.

To date, the majority of existing research has primarily focused on highlighting top-down government efforts in implementing One Health in Vietnam [1,8] and has predominantly featured a terrestrial focus [9]. Limited attention has been given to exploring the perspectives of individuals and local communities regarding aquatic food perceptions and consumption that encompass products sourced from both aquaculture and capture fisheries, as well as understanding how these human behaviors impact One Health initiatives. These initiatives form the basis for a holistic approach to addressing challenges arising from the increasing demand for aquatic food, ensuring that the health of ecosystems, animals, and communities are considered in tandem. Additionally, a significant research gap exists in the lack of studies utilizing an autoethnographic approach to explore how researchers' personal backgrounds and experiences shape their understanding and interpretation of aquatic food perceptions and consumption. While autoethnography provides a unique framework for investigating complex socio-cultural dynamics, there has been a limited focus on incorporating self-reflection into the research process to critically evaluate how researchers' positionality influences their insights and findings.

To address these gaps, our study employs a transdisciplinary, autoethnographic approach. Autoethnography allows for the exploration of personal and cultural experiences, offering unique insights into how individuals in Vietnam, and those visiting Vietnam, perceive and interact with aquatic foods [10]. This method, involving researchers as both

participants and observers, enables a deeper understanding of these perceptions and their impact on One Health initiatives [2]. Our team of interdisciplinary researchers, with diverse expertise in environmental science, computer science, linguistics, political ecology, aquaculture, nutrition, human physiology, marketing, and accounting and accountability, each contribute their personal narratives. These narratives illuminate the lived experiences that shape perceptions within the specific agro-ecosystems in Vietnam.

Our study aims to uncover the scientific, social, political, economic, cultural, and linguistic dimensions surrounding aquatic food perceptions and consumption at local, regional, and national levels in Vietnam. It aligns with global sustainability goals, including SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), and SDG 14 (Life Below Water). Consequently, we hope to contribute to the development of sustainable and resilient aquatic food systems, informed by a comprehensive understanding of the complex interrelations between dietary choices, health, and the environment amid Vietnam's rapid socio-economic transformations. To achieve this, we first present One Health as our theoretical framework. We then introduce autoethnographic and transdisciplinary approaches as our research methodology. Following this, we discuss how autoethnography underpins our understanding of the impact of aquatic food consumption and production on the One Health approach in Vietnam. Finally, we conclude this paper with a summary of our findings, their limitations, and recommendations for future research.

2. Aquatic Food Perceptions and Consumption and Their Impact on One Health

Vietnam has undergone rapid economic development and industrialization, making it one of the world's fastest-growing economies since 1986 [11]. Today, Vietnam stands as the fourth-largest producer for processed fish and seafood globally [12]. This remarkable economic expansion has led to rising incomes and the emergence of a burgeoning middle class.

As wealth inequalities have grown and exposure to global culinary trends has heightened, there has been a noticeable shift in dietary patterns within Vietnam. The traditional Vietnamese diet, once dominated by vegetables, is now giving way to increased consumption of meat, poultry, seafood, and dairy. Since 1985, there has been a staggering 500% rise in per capita oil and fat consumption, while vegetable intake has simultaneously declined [13]. Additionally, the introduction of fast food by international chains is rapidly changing the dietary habits of the younger population, moving them away from traditional practices [7]. Amidst these challenges, there is a heightened demand for fish products, and this is specifically driving an increased appetite for fresh and live aquatic foods. According to the Vietnam Ministry of Agricultural Report (2023), the average annual consumption of seafood in the domestic market was 33–35 kilos per person in 2010. This figure is projected to increase by an average of 5.37% annually. In addition, Vietnam is recognized as one of the top seafood producers and exporters globally. The above factors have been a key driver in the continued expansion of the country's aquaculture sector (Report on Vietnam Seafood Exports in 2023: <https://seafood.vasep.com.vn/reports/quarterly-report-on-vietnam-seafood-exports/reports-on-vietnam-seafood-export/report-on-vietnam-seafood-exports-in-2023-23979.html>, accessed on 28 October 2024). Subsequently, this upward trajectory is impacting Vietnam's socioeconomic transformation in terms of dietary choices and preferences.

However, the escalating demand for seafood has introduced substantial environmental challenges. Pollution entering the marine environment from aquaculture, agriculture, and coastal development further exacerbates these issues, raising concerns about the long-term viability of the industry (FAO Annual report 2022: <https://openknowledge.fao.org/server/api/core/bitstreams/fe920b40-aa2c-45e1-9ea8-8db7c2548c12/content>, accessed on 28 October 2024). Consequently, Vietnam faces the critical challenge of balancing increasing consumer demand with the implementation of sustainable practices to protect its marine and freshwater environments and ensure the future viability of its seafood industry.

Given these dynamics, it is increasingly important to study aquatic food perception and consumption at local, regional, and national levels.

2.1. One Health: Integrating Human, Animal, and Environmental Health

The origins of the One Health concept can be traced back to the realization that the wellbeing of humans, animals, and the environment are interconnected and interdependent. This recognition dates back to the 1800s when scientists first observed shared disease processes affecting both animals and humans (WHO (WHO One Health: <https://www.who.int/health-topics/one-health>, accessed on 28 October 2024)). A recognition of the significance of zoonotic diseases, highlighted by events like the COVID-19 pandemic, underscores the necessity of comprehending the interconnectedness of human, animal, and environmental health, and implementing effective measures to prevent and manage future health crises. This holistic approach to health challenges gained prominence in the 20th century, extending to issues arising from aquatic food production and consumption. The recent One Health joint plan of action for 2022–2026 [14] emphasizes the importance of collaborative cross-sectoral efforts to confront health threats and promote sustainability. This approach is particularly pertinent to Vietnam, where rapid industrialization and evolving dietary patterns that entail a demand for more aquatic food present new health and environmental challenges [1,9].

Today, there is a large body of research exploring the interconnected health of humans, animals, and the environment. Miao, Li [15] analyzed 12,815 publications, revealing a predominant focus on natural sciences with a lesser involvement of social sciences in One Health studies. Their work highlighted the need for more interdisciplinary and intersectoral collaboration in future research. Adisasmito, Almuhairei [16] redefined the One Health concept, emphasizing equity, socioecological equilibrium, and transdisciplinarity, aligning with sustainable and healthy future goals. Similarly, Mwatondo, Rahman-Shepherd [17] point out the expected increase in post-COVID-19 One Health investments, focusing on the human–animal–environment interface. However, they identify considerable deficits in stakeholder diversity and sector representation, alongside imbalances in resource allocation globally, which indicate a skewed investment pattern in One Health. The World Bank's study [1] on Vietnam identifies the country's advancements in applying the One Health approach, stressing the importance of multi-sectoral collaboration for health and sustainable development. Moreover, in common with food systems thinking and policy in general, terrestrial systems dominate aquatic ones by a substantial margin and the linkages are rarely adequately explored or articulated [18].

2.2. Aquatic Food Perceptions and Consumption

In examining the existing literature on aquatic food perceptions and consumption, a range of influential factors emerges. Thong and Olsen [19] underscore the critical role of social norms, arguing that seafood consumption is deeply embedded in cultural practices and collective expectations. Building on this, Fishbein and Cappella [20] highlight that consumer behavior is not merely a matter of individual preference but is significantly influenced by perceived normative pressures. These pressures often compel individuals to conform to the dietary habits prevalent within their social groups, thus reinforcing existing consumption patterns. Flotemersch and Aho [21] expand this discussion by demonstrating how sociocultural factors such as age, education, and gender further modulate aquatic food perceptions, suggesting that these variables intersect with social norms to create distinct consumption patterns across different demographic groups. Together, these studies reveal that understanding aquatic food consumption requires a holistic approach that considers not just economic or health motivations, but the broader sociocultural context that drives and sustains consumer behavior.

A comprehensive scoping review by Budhathoki [22] categorizes key themes in aquatic food consumption research, particularly in Asian contexts. Lamy and Szejda [23] highlight consumer attitudes, underscoring the variability influenced by species, product type, and

segmentation. Their findings point to a notable lack of information on health risks, health benefits, and sustainable choices in seafood consumption, an area our study seeks to explore further. Moreover, these studies sometimes overlook the complexity of social, political, cultural, economic, and linguistic influences, a gap that our research aims to address.

The existing research, while extensive, shows a deficiency in incorporating autoethnographic methods and cross-disciplinary perspectives, especially in the context of Vietnam. Our study intends to fill this gap, contributing to a more nuanced understanding of aquatic food perceptions and their impact on the One Health initiative.

3. Materials and Methods: An Autoethnographic Transdisciplinary Research Methodology

Autoethnography, a qualitative research methodology, leverages the researcher's personal experiences to analyze social, political, and cultural beliefs; practices; and encounters. Grounded in postmodern philosophy, autoethnography challenges conventional research practices that often maintain a detached and objective stance [24]. This methodology has been widely used in various disciplines, such as anthropology [10,25,26], gender studies [27], media and communication [28], literature [29], social science studies [30], and accounting research [24] as autoethnography connects individual experiences to broader cultural, political, and social contexts, offering insights into the intersections between self and society.

Autoethnography, as a research methodology, involves the researcher's active engagement and introspection, blending personal experiences with cultural analysis. While autoethnographic and transdisciplinary methods may introduce subjectivity, this subjectivity is a deliberate and valuable component of our research process. Reflexive practices enable researchers to critically examine their positionalities. This ensures that subjective insights enhance rather than compromise the validity of the findings. Autoethnography challenges the detachment of conventional research practices of hard data. Hard data, while essential, rarely capture the nuanced cultural and social dynamics that shape aquatic food perceptions. By contrast, in this study, we primarily sourced our data through an autoethnographic triangulation method. This approach involved collecting detailed field diaries, vignettes, and data from an interactive workshop with local stakeholders. All data were gathered during our field trip to Vietnam, funded by a NERC Discipline Hopping Grant in 2023. This field trip included visits to key locations like Binh Dien Market and the Vinh Hoang fish producing and processing company, and a 3-day interactive stakeholders' workshop. These immersive experiences (supported by local experts) enabled us to understand the local context of aquatic food consumption and its relation to the One Health initiative.

Fieldwork diaries have gained recognition as invaluable tools for documenting and reflecting upon personal fieldwork experiences, interconnecting concepts, and igniting creative insights [24,31]. These diaries enable us to record detailed observations and personal reflections, capturing moments of appreciation, surprise, doubt, and discomfort, alongside instances of resistance and support. Photographic vignettes, identified by Törrönen [32] as effective qualitative methods for depicting real-life scenarios, are employed in our study to explore individuals' views and interpretations of specific aquatic food perception in Vietnam. This approach enriches our analysis by adding visual depth and detail from our researchers' perspectives.

Complementing these methods, our 3-day interactive stakeholders' workshops, facilitated by AI-powered Poll Everywhere Questionnaires software (3.0.9) (<https://www.polleverywhere.com/>), engaged participants dynamically. Structured problem-solving workshops have proven to be an effective research tool for gathering participants' initial views and fostering discussion on different perspectives [33,34]. During the workshop, the use of questionnaires and discussion tools allowed participants to express their individual views on food perceptions anonymously and without external influence. This approach allowed for real-time feedback and interactive elements, like live polling and quizzes, thereby enriching participant engagement and data quality. Each researcher, acting both

as a witness and an object of this study, brought their unique perspective, enhancing the multidisciplinary breadth of our analysis. Together, these methods enriched our narrative and deepened our understanding of the societal implications of aquatic food practices in Vietnam, contributing to a more comprehensive analysis through varied lenses. This approach highlighted the unique contribution of qualitative methods to address questions that hard data cannot answer.

In conducting this autoethnographic study, we adhered to relational ethics, ensuring the privacy and safety of participants while maintaining the integrity of the research. Sometimes pseudonyms and alterations of identifiable characteristics are utilized to protect involved parties. Our study revolves around four key focus areas: visits to wet markets, exploration of fishery factories, stakeholder workshops, and observations of daily meals and social interactions. Each of these areas provides a distinct lens through which to view and understand the multifaceted nature of aquatic food perception and consumption in Vietnam.

4. Results: Fieldwork Reflections on Aquatic Food Perceptions Through the One Health Framework in Vietnam

4.1. Visiting the Wet Market

A wet market is also known as a traditional market. It is a cornerstone of local food systems, offering fresh produce, like meat, fish, and vegetables, in a vibrant, non-supermarket setting. While the term ‘wet market’ became widely used in the 1970s, its significance has evolved, especially in Vietnam, where such markets outnumber supermarkets, serving as vital channels for fresh food, particularly in non-urban areas. This is evidenced by data analyzed by [35], namely that the number of wet markets has remained relatively stable in Vietnam—around 8500—with minor fluctuations year on year.

Our visit to the Binh Dien Fish Market in Ho Chi Minh City, one of the largest and most important seafood markets in Vietnam, provided a valuable insight into Vietnam’s aquatic food supply chain, and into food consumption and its subsequent impact on One Health initiatives. As one of the major hubs for the seafood trade, it plays an important role in the aquatic food supply chain, not just in the city but across the region. The market offers a wide variety of poultry, meat, vegetables, and fresh and live aquatic products. This diversity makes it an important location for studying food perceptions and consumption. Additionally, it provides valuable contexts for exploring issues related to food safety, sustainability, and market dynamics within the framework of the One Health initiative. This market’s operations and its role in the local and regional economy exemplify the complex interplay of economic, cultural, and health factors in the seafood industry, all of which are integral to the One Health concept.

At the first light of dawn, while the local populace was mostly yet to rise, our scholarly expedition began aboard a bustling minibus destined for the Binh Dien Fish Market. This marked an energetic initiation of our inaugural field trip. Arriving at the market in the early hours, we were immediately struck by its size and dynamism. The array of seafood, from shrimps to diverse fish species, highlighted its importance in the local diet and economy. Advancing cautiously across the wet concrete floor, we smelt the mingling scents of freshly caught fish, which reflected the market’s emphasis on freshness, a key factor in consumer choice. Here, aquatic food was not merely sustenance but a cornerstone of Vietnam’s cultural identity, a recurring theme in the story of the market community’s connection to the waterways that nourish the land [36].

In the market, the marketing signs and labels related to aquatic products were written uniformly in Vietnamese as the primary customers are local residents and businesses; there were few, if any, foreign visitors. A mix of Vietnamese dialects was audible, such as the northern dialect, Hue (the central dialect), and the Saigon dialect (the southern dialect). People’s negotiations and banter are more than mere transactions; they are cultural exchanges rooted in Vietnam’s aquatic food traditions. Numerous bright, electronic displays indicated the names of the stalls and the vendors’ specialties. For example, the sign

‘VỤA THỦY HẢI SẢN’ advertised one vendor’s specialty of ‘Tôm Càng Xanh’—prized seafood items known as tiger prawns and king prawns in English—see Figure 1.



Figure 1. Vendors’ electronic displays.

As we interacted with vendors to inquire about prices, the origins of their catch, the health and nutrition benefits of their items, and the environmental impact of fishing, we found that few spoke English. Fortunately, three of our Vietnamese colleagues were scientists and knew some English. At times, though, they would confer among themselves to discuss what to translate and what to convey as ‘appropriate’. This raises an interesting question: to what extent were their decisions shaped by cultural considerations or by their perceptions of what was relevant for us as foreign researchers? While this observation might resonate with non-Vietnamese readers, it also invites reflection on how such interpretations may be viewed by Vietnamese academics—could it reflect a colonial construct or mindset, or does it point to the complexities of cross-cultural communication in research? This approach diverged from the typical role of interpreters and left us with only a partial understanding of the stallholders’ linguistic–cultural contexts. It was evident how the market serves as a communal hub, intimately connected to the people it serves, and how language at the local level acts as both a conduit and mirror to Vietnam’s rich aquatic food traditions. In many ways, the Binh Dien Fish Market stands as a testament to the vibrancy of Vietnamese culture. The market represents a living museum combining generational traditions with the vitality of preparing fresh goods for consumers, a tapestry of Vietnam’s relationship with its aquatic bounty.

The market is more than a mere techno-economic mode of exchange and is a hive of activity. Fishmongers, hawkers, traders, retailers, fish processors, lorry drivers, and scavengers, spanning myriad ethnic groups and clans, such as Kinh, Hmong, Khmer, Cham, and Chinese, converge to orchestrate the market as a social–cultural hierarchical space of exchange [37]. An informant told us that the primary source of fish is the Khmer communities residing near the Mekong River. Throughout the supply chain, productive labor is unevenly distributed and gendered, rendering the market not necessarily fully efficient (see Figure 2).

The sheltered space is occupied by established fish merchants and wholesalers who own either economic capital or possess political affiliation, paying monthly rent and for official licenses from the local authority. These merchants wield considerable influence, determining wholesale market trends and prices and operating under formal regulations and a stable fish distribution network. These traders are well-served with access to

clean water and electricity that facilitate keeping their live aquatic animals in good condition. Meanwhile, others on the economic system's fringes can only utilize the informal unsheltered spaces (See Figure 2).



Figure 2. The open market space is frequently teeming with marginalized fish vendors.

Informal market transactions are governed by underground social surveillance and cultural discipline, rather than formal regulatory codes and administrative frameworks. Perched on the damp ground amidst colorful fish crates, older people, predominantly women, engage in hawking and peddling to attract customers. While enjoying 'rent free' benefits, these informal female traders constantly face the threat of eviction by the local authorities due to a lack of political affiliation that would legitimize their presence, even within the peripheries of the marketplace [38]. Their customers are frequently not prominent fish retailers but rather ordinary housewives and small-scale vendors who are economically and politically marginalized. In contrast to the established fish traders, such as 'VỤA THỦY HẢI SẢN' in Figure 1, who are comfortably situated under shelter, these traders have formed tight-knit communal relations with their customer base.

Occupying the interstices between these two spheres are elderly women who belong to neither market realm, and they collect leftovers or discarded crab legs (Figure 3). They epitomize a vulnerable, mobile, and precarious labor force at the lowest echelon of society who struggle to make ends meet.



Figure 3. Crab legs are collected by old women, either for their own sustenance or for potential sale.

The Binh Dien Fish Market is a microcosm of Vietnamese society, where both powerful and powerless segments of the population coexist within the market space, each possessing an idiosyncratic way of participating in market transactions. However, the market's reality falls short of the harmonious environment envisaged by Smith [39], namely that the market is configured by an 'invisible hand' which optimizes equilibrium, where a cluster of self-interested social agents negotiate, reconcile, and reach a 'fair' and 'just' allocation of resources among humans, animals, and the environment. Consequently, there is an inherent disequilibrium among animal, human, and environmental health, necessitating a re-envisioning of the One Health notion of a 'Utopia-in-waiting', seemingly unattainable in the immediate future.

The market also offers diverse categories of food products and cultural experiences. However, beneath their vibrant exteriors lie the vulnerabilities of a complex web of risks to humans, animals, and the environment [19,38]. One striking observation is the prevalent selling of perishable products, such as seafood, poultry, and meat, in open-air settings without adequate cooling facilities and safe handling practices (e.g., keeping products on clean surfaces and in hygienic environments), which increases the likelihood of microbial contamination. These risky selling practices are entrenched within the community, normalized as part of the market's longstanding traditions and cultural norms.

Despite an awareness of associated health hazards, the convenience and familiarity of these practices render them resistant to behavioral change. Merchants and consumers adhere to established habits, perpetuating a cycle of risk acceptance within the market ecosystem. Although the different areas of the market are spatially separated according to product categories (e.g., vegetable, meat, and fish sections), they remain in close proximity; therefore, cross-contamination remains a threat to human health when food is improperly handled, particularly as consumers move from one market section to another [40].

One aspect of the visit that deserves attention is the perception of consumers regarding product freshness and the value they attribute to fresh foods. Specifically, the freshness of fish is perceived to be intact as long as they are alive. As consumers dine in restaurants, they often make selections from tanks of live fish. Similarly, in wet markets, consumers buy live fish in small water tanks or from plastic bags filled with water. Live fish are highly valued, and this influences market prices [19,40].

The connection between "freshness" and "live fish" is a significant aspect of consumption behavior in Vietnamese culture [19] (Thong et al. 2012). During the trip, it was noteworthy that less importance was placed on the origin of the live fish, whether they were sourced from rivers, high stocking density man-made ponds or tanks in farms, or net-enclosed areas or fish-traps (see Figures 4 and 5). This raises the issue of the impact of water quality on fish quality, wellbeing, and health. For instance, the water ponds or net-enclosed areas in farms might be contaminated by domestic waste, pesticides, and chemicals from adjacent fields, which can indirectly affect human health through the consumption of these substances via living organisms [40]. A farmer's financial difficulties may lead to the use of unsafe production techniques; in parallel, an increasing consumer demand for live fish that are sold at higher prices may incentivize farmers to continue opting for accelerated but unhygienic production methods. Intense systems of fish production carry high risk as they are vulnerable to pathogens which may destroy a crop in a very short period of time [41].

Although there was an initial sense of chaos in the market, as hundreds of people, motorbikes, and trollies wove between tanks, baskets, tables, trays, and on-floor displays of all types of seafood products, it became clear there was a hierarchy in terms of major stallholders occupying more central and signposted areas, predominantly selling live fish from large, well-aerated tanks, down to the peripheral traders selling whole or primary processed seafood mostly from the capture fishery. Many motorbikes had small tanks mounted at the rear with additional boxes strapped on and bags hung from those and the handlebars. Many of these people would be buying for restaurants, food stalls, and smaller retailers. Larger-scale buyers were probably less visible, with vehicles parked further away,

although an ongoing auction of baskets of farmed shrimp indicated they were active. There were also private buyers with just a shopping bag to fill for domestic consumption.



Figure 4. Water quality in a river and rice field.



Figure 5. Fish trap in the Mekong Delta.

Live products clearly command a premium over dead ones, as freshness is so highly valued. Much of the live produce was from aquaculture, as this can be harvested, transported, and kept alive more easily. The most common types of live produce were tilapia and catfish (*Tilapia* and *Pangasius*) with some cyprinids (and other pond fish). There were also live frogs and giant river prawns (*Macrobrachium*) sold as shown in Figure 1. However, there was little evidence of regard for animal welfare beyond the need to keep animals alive to the point of sale. This practice highlights the interconnectedness of human, animal, and environmental health. While the demand for fresh, live products supports food safety and quality for consumers, it also raises considerations for animal welfare and the sustainability of aquaculture practices.

From a hygiene perspective, there was little biosecurity with people moving both themselves and their produce between live and dead fish areas; this issue is particularly serious if the fish are diseased [42]. Most sellers appeared to specialize to some degree, with items such as frog only available from a couple of sellers. Many species and product types were found repeated across the market suggesting open competition with prices mostly

negotiated directly between seller and buyer. Proper handling of these live animals is crucial to minimize stress and prevent disease transmission, which is essential for safeguarding both animal and human health. Through a One Health lens, it becomes clear that balancing the benefits of freshness with the need for sustainable and humane practices is essential for promoting overall health and well-being.

For Vietnamese people, the Binh Dien Fish Market is the one of biggest public live fish markets in Vietnam. There, fish vendors use different clean water sources, such as fresh water (tap water), brackish water, salt water, or pre-mixed water, to store/keep their different fish aquatic species alive, before selling to buyers, customers, or transporting the fish to other small retail markets. In general, during the storing and transporting of live seafood, most fish sellers use aerators to provide oxygen for the fish. They regularly supply new water to the fish when they see the water is quite dirty or their fish are not strong enough, and this helps the fish live longer before they are sold to customers [7]. However, we found that one major problem at this public fish market was the strong smell of untreated wastewater. We observed that wastewater was generated from dead fish, fish cleaning, washing floors (by using chlorine and lime), and raw materials, as well as from melting salt and ice packs for keeping dead seafood for as long as possible. The wastewater generated by the fish market (if not treated) represents one of the main environmental challenges due to the relatively high constituents of organic matter [43]. These issues need to be addressed to maintain a cleaner market environment and to reduce the impact on the health of sellers and customers, as well as to improve food safety from One Health perspectives.

The wide variety of fresh and live aquatic products undoubtedly provides a rich source of nutrition. The study of King, Brown [44] shows that low-fat, protein-rich foods high in Omega-3 offer the local population many health benefits that most other low- and middle-income countries do not enjoy. However, these health benefits may be easily lost if the immediate risk of food poisoning and transmission of aquatic pathogens to humans is high. There is a perception within the aquatic industry that zoonotic diseases are not a major concern, as the number of cases is relatively low compared to those in other animals and humans [45]. Yet, many diseases found in aquatic animals are classified as emerging infectious diseases (e.g., *Mycobacterium marinum*) by the WHO [46]. Given the growing global population and the increasing demand for seafood, these conditions are concerning from One Health perspectives. It was evident that wet market workers did not wear protective equipment, such as gloves, eye protection, or respiratory masks. Additionally, the cramped conditions in which the fish were kept further increased the risk of disease transmission between them. Proper protective measures are crucial for preventing the spread of zoonotic diseases, which can occur through direct contact with mucus, skin abrasions, or through indirect routes such as vectors, insects, contaminated surfaces, ingestion, or inhalation.

To sum up, Binh Dien Fish Market sheds light on how market mechanisms function in everyday life within the interplay of social, cultural, and historic-political contexts in postcolonial Vietnam. From a One Health perspective, if the market operates both economically and efficiently, optimal allocative justice can be achieved. This would elevate, maintain, and sustain the well-being of three interconnected entities: humans, animals, and the subsequently impacted environment. In this sense, One Health is not merely an aspirational vision that we aim to concretize, but an inevitable state of affairs integral to the existing social system.

4.2. Visiting the *Pangasius* Catfish Processing Facility

Our journey through Vietnam's aquaculture heartland led to the second stop of our field trip, the Vinh Hoang (Forever Global) international fish producing and processing company in Dong Thap Province in the Mekong Delta. The *Pangasius* species, a crucial species for both domestic consumption and export markets, is commonly found in British and European supermarkets [47]. We reflected on this product's importance as we approached

the company site, noting that Vietnamese exporters dominate this market. En route, we accessed the company's website and were surprised to find it exclusively in English, signaling its global market focus on attracting international investors and customers.

The Vinh Hoang website claims that the company, established in 1997, has become a global leader in the *Pangasius* catfish industry, championing sustainability and community engagement. We were told that the company produces 60% of what they process internally and sources the remaining 40% from other growers. This approach allows them to adjust production based on fluctuating demand, though it also introduces potential vulnerabilities at each stage of the supply chain. The company has identified environmental damage from aquaculture waste as a key risk and has developed both wetland areas and integrated agriculture for waste treatment and valorization. Additionally, it has created cosmetic products from *Pangasius* processing waste. The company (<https://www.vinhhoan.com>) claims to be the first *Pangasius* company in Vietnam to achieve Aquaculture Stewardship Council (ASC) certification (an aquaculture eco-label), and also has other certifications including Global GAP (<https://www.globalgap.org/>) and BRC (<https://www.brcgs.com/our-standards/food-safety/>, accessed on 28 October 2024). The company's significance is highlighted by its contribution to Vietnam's economy and to the local communities it supports through employment and associated businesses [48]. The company is vertically integrated with hatcheries, a feed factory, grow-out farms, a processing factory, and a value-added food division. It primarily exports to the USA (68%), with other significant markets being Europe and China in 2022. Its total income from *Pangasius* products was around GBP 270 million in 2022 [49].

Stepping into the company headquarters, we were greeted by the production manager in the conference room decorated with signs signaling the company's vision (TÂM NHÌN), mission (SỨ MỆNH), and business philosophy (TRIẾT LÝ KINH DOANH) in Vietnamese (see Figure 6). The English-only website and international focus were somewhat undermined by the production manager not being able to speak English. With no professional interpreters, our interactions were facilitated by our Vietnamese scientist colleagues, assisted by Google Translate.



Figure 6. Vinh Hoang company's vision, mission, and business philosophy.

The manager's presentation offered insights into the company's gender-inclusive leadership, with 11 of the 15 main managerial roles (including its CEO as the founder) being occupied by women. This embodiment of gender equity permeated every facet of their operations, going beyond mere representation to influence the essence of the company. It challenged preconceptions and signaled progress in the workplace, where leadership is voiced in the feminine as well as the masculine.

We then took the minibus to the harbor and boarded a boat to visit the company's fish production island, where we visited Vinh Hoang's ponds. We were instructed not to take any pictures of any facilities and were only allowed to view them from a designated spot. This restriction reminded us of the early 2000s, when we were deterred from visiting a large fish farm in this province [50]. The purpose of the company's policy against photographing was unclear, making it difficult to be certain whether fears of industrial espionage or issues related to production were behind the decision.

Upon arrival at the fishery production facility's conference room, we were introduced to its twelve large fishponds which operate on a 12-month cycle. These ponds demonstrate the company's adherence to a circular economy model where nothing is wasted, and everything has value; even the by-products of one process become the inputs for another. This process, referred to as 'free goods in flooded fields', was presented to us as visitors, showcasing a symbiotic relationship between aquaculture and the One Health approach. This connection was illustrated through visuals and explained by our Vietnamese scientist colleagues.

We observed that most *Pangasius* catfish pond culture in Vietnam, including this company, relies on the abundant water supply from the Hau and Tien Rivers in the Mekong Delta. The rapid growth of farmed fish aquaculture and *Pangasius* catfish farming has raised concerns over the environmental impact of both production and processing as almost all intensive *Pangasius* catfish farming systems have very high fish stocking density (30–50 fish/m², even 80–100 fish/m²) [51–53]. We also learned that these systems are often assisted by investment from foreign companies and rely heavily on commercial feed, which is predominantly made from imported feed ingredients.

The cramped conditions in which live fish are kept, both on farms and in wet markets, can significantly increase the risk of disease transmission, not only among the fish but also with potential zoonotic implications for humans [46]. This risk is often compounded by the lack of protective clothing and equipment for workers, which is crucial for preventing the spread of zoonotic diseases. However, this did not appear to be the case at the company we visited, where staff were observed using appropriate protective gear. Additionally, we learned that the company cleans and sterilizes its ponds at the end of each farming cycle, with sludge being regularly pumped out to a designated sludge pond throughout the cycle.

Given the cramped conditions in the 12 ponds, there may be uncertainty regarding the frequency of pond cleaning and sterilization among smaller scale producers—practices that are crucial for disrupting the life cycles of harmful parasites, such as nematodes, which thrive in unclean environments. Without consistent and thorough cleaning, these ponds are at greater risk of harboring and spreading diseases, posing major threats to animal health, human health, and the surrounding environment [46]. This situation highlights the critical need for a comprehensive and united One Health approach that integrates improved farming practices, better disease management, and enhanced biosecurity measures to ensure the sustainability and safety of aquaculture operations across Vietnam [42].

To maintain water quality, fishponds require regular water exchange, drawing from storage ponds or directly from rivers and canals. Effluent, sludge, and sediments from *Pangasius* catfish ponds are removed to sludge settlement ponds approximately every two months, and this helps to reduce environmental water pollution and adverse impacts on fish health during the fish farming cycle at Vinh Hoang. As fishpond sludge and sediments have high contents of organic matter (OM), nitrogen (N), phosphorus (P), micro- and macronutrients, they could be used as organic fertilizer supplements to enhance soil fertility for improved crop production, reduce environmental pollution, as well as to reduce the reliance on expensive chemical fertilizers [53,54]. To promote sustainable development and boost international exports in the aquaculture sector, fish farmers in Vietnam have recently adopted Best Practices for Aquaculture Management, along with various international standards, such as ASC, GAP, and ISO certifications [1]. Additionally, progress is being made in developing technologies to extract valuable chemicals from sludge, thereby mitigating its environmental impact [7].

Despite the economic gains derived from such activities, large-scale fish farming exerts considerable environmental effects, characterized by the accumulation of excess food and fecal waste in water bodies and sediment. This organic waste undergoes decomposition processes facilitated by microorganisms, leading to the formation of ammonia, nitrate, phosphate, and other toxins [55]. Consequently, the farming environment could rapidly deteriorate, rendering cultured animals vulnerable to diseases, oxygen depletion, and toxicity from metabolites [1,7]. Addressing water quality degradation in ponds at the company typically involves the immediate remedy of replacing water with higher quality alternatives from nearby rivers. However, this approach merely serves as a temporary fix, as waste from one farming area can contaminate water supplies in neighboring areas. Therefore, stringent monitoring and control of the farming process, coupled with wastewater and sludge treatment before discharge into the environment, are imperative to ensure the sustainability of fish farming activities.

Our observation of the fishpond site suggested that it was probably one of the best-constructed and maintained facilities in Vietnam according to our Vietnamese colleagues. A bilingual visitor's guide sign written both in Vietnamese and English stood just next to the fishponds. We were told that their fishery products are aimed at international markets only, such as the US, Europe, Japan, and Australia. Clearly, the sign indicated the company's international orientation and its global focus.

The appearance and functionality of the fish processing factory and its fishpond site showcased how human speculative accountability toward nature and animals can be subsumed within the capitalist mode of production embedded within postcolonial Vietnam [56] (Pelley, 2002). Like other postcolonial nations, postwar Vietnam witnessed a surge of economic growth stemming from neoliberal market reform. Yet, such market reform is not modelled on the tenets of the Western Washington Consensus Ideal, but rather constitutes the construction of the postwar Vietnamese socialist development identity and the 'Doi Moi' agenda of renewal [57,58]. Despite aspirations for sustainable development, economic growth remains a primary focus. Our observations during the factory visit centered on waste management and circular economy practices, highlighting the conversion of fish waste into economic value and the efficient management of resources. However, discussions on human speculative accountability toward the well-being of *Pangasius*, water quality, or the livelihoods of nearby villagers were limited.

Having endured decades of torment by global superpowers, the Vietnamese people have finally gained control over their natural resources. Post-war neoliberalism and economic modernization dictate that these resources should be harnessed for economic growth. Consequently, the so-called 'circular economy' has now incorporated a one-dimensional view of sustainable development/One Health concepts in which economic gains and material reuse are prioritized, although sustainable development/One Health concepts aim to reduce waste and promote resource efficiency. This approach sometimes overlooks the broader, interconnected health impacts on human, animal, and environmental systems. When conceptualizing One Health, research by Haraway [59] proves useful. She advocates for imagining our relationship with non-human species in the Chthulucene epoch, emphasizing the genuine importance of 'making kin' with them. By this, she suggests that humanity should nurture a sympoietic connection with animals and nature on our damaged planet, rather than asserting dominance over them in a process associated with Western Christian traditions. Conceptualized as such, One Health should not countenance humans as *Homo sapiens* mastering nature (fish and water in this case), with the natural world at their disposal within a parochially imagined rationality. However, this perspective sharply contrasts with what we observed in the field. Postwar Vietnam's rapid economic growth necessitates harnessing natural resources for development, often prioritizing GDP over comprehensive sustainability. This reality underscores the need for ongoing scrutiny and adaptation of One Health and circular economy practices.

Our experience at Vinh Hoang was enlightening, extending beyond the acquisition of new knowledge. While the company strategically utilizes language to appeal to in-

ternational investors, our visit was carefully curated to present a narrative designed to resonate with a European audience. They showcased what they intended for us to see, ticking a range of boxes that might appeal to Western sensibilities. Yet, beyond this crafted presentation, our visit deepened our understanding of the cultural and linguistic journey that seafood undertakes from the water to our tables. It also became clear that language plays a key role in how we perceive and connect with our global food sources. The visit to Vinh Hoang highlighted the need to recognize and respect the cultural and linguistic stories woven into our global food systems. We were reminded that the essence of food lies not only in its physical form but also in the people who produce it and the environment in which it is cultivated. This visit imparted a recognition of the importance of language and translation in navigating the intricacies of the global aquatic food trade and assessing its impact on One Health.

On the other hand, during the entire fish processing factory tour, we observed a focus on waste management and the circular economy. Specifically, we noted how waste products from fish, such as fish tails, were repurposed into economic value or, more precisely, into profitability, by redirecting them to another production plant. Additionally, we explored how *Pangasius* could be processed to create healthier food options for human consumption. In this respect, our observations indicate that the Vietnamese *Pangasius* sector is more advanced than most European industries in terms of using the whole fish and it builds on a history of efficiency. However, few of these discussions revolve around human speculative accountability toward the wellbeing of the *Pangasius*, the quality of the water, or the livelihood of the villagers who live near the fishponds. The field trips helped our researchers as observers to better understand the seafood market operation, the processes used by seafood retailers, and aquatic food consumption in Vietnam, and they were also used as follow-up discussion topics during the three-day stakeholders' workshop.

4.3. The 3-Day Interactive Stakeholders' Workshop

To deepen our understanding of the One Health approach, and its relevance to aquatic food consumption in Vietnam, we organized a three-day interactive stakeholders' workshop on the Linkages between Aquatic Food Consumption and One Health in Vietnam at Ton Duc Thang University, Ho Chi Minh City. The workshop commenced with presentations and discussions spanning various disciplines, initially appearing unfocused due to the range of topics and the contrast between specialized microbiology applications and the impacts of long-term landscape engineering. However, as the concept of One Health was explored and its implications for different stakeholder groups were discussed, the interlinkages between these topics became more apparent.

Our researchers documented the workshop, compiling reflective diaries and vignettes that captured the essence of the discussions. We organized group discussions centered around four key themes related to One Health: linguistics and culture, perceptions, behaviors, and government policy (see Figure 7). These discussions aimed to elicit participants' viewpoints on food perceptions and their impact on One Health in Vietnam. Following the focus group discussions, we conducted polls using the tool Poll Everywhere to gather insights on food conceptions and perceptions and their impact on One Health in Vietnam. To engage workshop participants actively, we devised bilingual interactive survey in both Vietnamese and English. The interactive responses revealed diverse emotions and insights, highlighting the value of interdisciplinary efforts in enhancing our understanding of perceptions towards One Health. The range of engagement, from informative to challenging, highlighted the intricacies of interdisciplinary communication.

Vietnam, in common with other fast-growing low- to middle-income countries, faces the challenge of the 'triple burden of malnutrition', encompassing undernutrition (wasting and stunting), hidden hunger (micronutrient deficiencies), and being overweight (inner city) [60]. Through our discussions, we gained an understanding of the issues prevalent in rural communities, where there is a high incidence of stunting and wasting in children due to limited and poor meal provision by schools. This problem is exacerbated by inadequate

hygiene, often leading to infections like diarrhea, which, if prolonged, can result in gut dysbiosis—an imbalance of microorganisms in the intestines hindering optimal absorption of vitamins and minerals [61]. The main reasons behind poor hygiene were identified as poor infrastructure, such as drainage, and a lack of awareness and education in these rural communities. Additionally, our discussions revealed insights into cultural beliefs regarding nutritional health. A notion emerged that freshness is crucial for good health, with a belief that it is better to consume animals or fish shortly after slaughter, rather than storing them in a fridge or freezer for an extended period. However, some studies argue that proper refrigeration and freezing techniques can retain the nutritional value of meat and fish, contrary to the belief that freshness is inherently better [62].

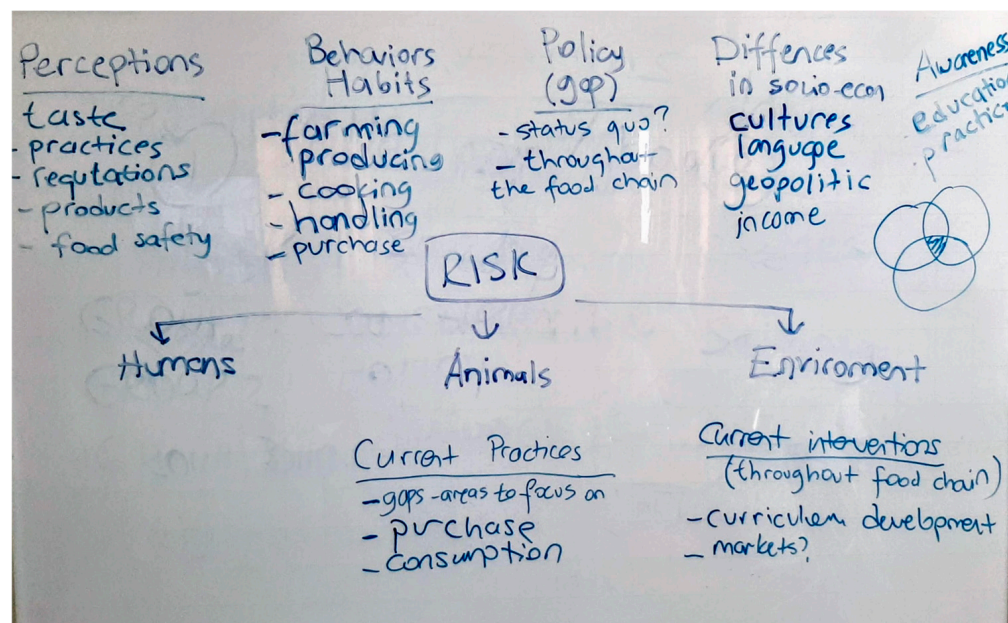


Figure 7. Workshop themes discussed.

One pivotal theme explored during the workshop was around the empowerment of grassroots communities within the framework of the One Health concept. Many participants emphasized that the concept only becomes practical and dynamic when integrated into the everyday politics and desires of grassroots communities, rather than remaining a top-down approach dictated by hierarchical structures. The consensus was that the successful implementation of One Health in real-world practice depends on the involvement of the “silent majority”—those who have not traditionally participated in shaping the discourse. This aligns with the thesis of De Certeau and Rendall [63], which highlights the interplay between knowledge and power within various epistemic frameworks.

Grassroots empowerment allows us to delineate the boundaries of the accountability we can exercise. The previous literature on accountability has been concerned with how excessive accountable demands can lead to a burden for the accountant to discharge their accountability [64]. The One Health concept reiterates that our expression of accountability is grounded not only in humans but also in non-human animals and nature on Earth. Accountability, in this sense, is, as Fisher, Tronto [65] articulate, an ‘activity that includes everything that we do to maintain, continue, and repair our ‘world’ so that we can live in it as well as possible’ (p. 40). However, given the social disequilibrium and imperfection in the world, achieving a balance of accountability across these three social entities is hardly possible. Therefore, One Health has become a form of political rhetoric that political institutions and the intelligentsia have come to mobilize as an ideology through which the Anthropocene’s catastrophic effect on global health issues can be addressed via policy, program, and action.

Considering the multitude of entities, encompassing humans, animals, and the environment, for which we must be accountable, our accountability towards One Health extends beyond the limits within which we can effectively be held accountable. The everyday tactical life of grassroots communities has emerged as a tangible solution to address the accountability limits concerning One Health. As De Certeau and Rendall [63] remarked, ‘it must constantly manipulate events in order to turn them into opportunities’, and thus the notion of One Health should be leveraged by the grassroots communities to maneuver for their own advantage. This strategy can be advanced through public dialogue and discussion, allowing grassroots communities to define what One Health means for their specific contexts.

There were also instances when we listened to an interlocutor discussing the predicament of a village woman they encountered, who barely had enough fish for daily consumption. Poverty has deprived people like her of the possibility of any meaningful engagement with One Health. But this allows us to contemplate how One Health can contribute towards bringing about social justice. Empowerment is both root and solution. Given the plight of the most deprived sections of Vietnamese society, the success of any One Health program can only be achieved when it effectively addresses the everyday struggles of the wider community as a whole.

As the concept of One Health was explored with implications for different Vietnamese stakeholder groups, the interlinkages between different topics became more apparent. The increase in aquaculture production in the Mekong region of Vietnam over the past 30 years can be seen as the successful implementation of new technologies based on abundant water resources and traditional subsistence fish culture practices. From an aquaculture technology perspective, there has been a substantial increase in productivity which serves the goals of both economic development and increased food supply. However, there have also been negative environmental consequences, such as the increased release of organic and inorganic nutrients into the environment, for which the solution from an aquaculture technology perspective is to find a technological fix. Less apparent from an aquaculture technology perspective is the social impact of aquaculture intensification through the corporatization of export-oriented production or impacts on broader agricultural activities and therefore population diets and associated health. There are also real and predicted changes taking place in the amount of water flowing in the Mekong River, some due to climate change, such as the amount of rainfall and also the ingress of saline water as the surface level of water in the East Sea rises, while changes in upstream uses, such as hydroelectric dams, are already being felt [66]. The health of the aquaculture species has been a key factor in developing aquaculture technologies that allow intensification. More recently, a focus on animal welfare has been encouraged as it is both closely aligned with health metrics and responds to broader concerns of consumers for ethical food production. Methods for better understanding the interactions between aquaculture and biodiversity, climate change, human health, and wellbeing are urgently needed so that important trade-offs can be appreciated before they are well-advanced. However, it was also clear that purely technocratic solutions might have limited impact without also understanding the dimensions of culture and social power structures.

During three days of deliberation, participants extensively explored the correlation between human health, animal health, and environmental health in a Vietnamese context. This underlined the value of increased interdisciplinary collaboration among experts, rather than working individually, as well as across cultures, Vietnam and the UK. Over recent decades, the escalation in both the number and frequency of zoonotic diseases and disease outbreaks, most notably, but not limited to, the recent COVID-19 pandemic, have highlighted the imperative for a global consideration of the interconnectedness between humans, animals (aquatic and terrestrial), and the environment in healthcare strategies. Moreover, animal and human welfare must be integrated into our endeavors to avert future pandemics, recognizing that large-scale livestock farming, both aquatic and terrestrial, can foster conditions conducive to the emergence and dissemination of novel pathogens [40].

Consequently, concerted efforts are imperative to mitigate the potential global impact of such activities. This event was intended to provide managers and planners with the insights and tools needed to enact informed decisions and solutions, thereby helping to foster a safer and more sustainable environment for both humans and animals, both locally and globally.

On certain occasions, the workshop was interpreted by two young Vietnamese teachers who are English language teachers from TDTU and who attended the workshop during their teaching break. Although performing interpreting duties, these teachers were not trained as professional interpreters, and they both encountered challenges, including the interpretation of complex technical terminologies related to One Health, aquatic food, and ecology, as well as translating the diverse contexts of cultural traditions. We observed that their interpretation occasionally led to a recontextualization of the focus group discussions, especially in relation to traditional practices that influence dietary choices. For instance, participants discussed the consumption of specific seafood for health benefits, which were rooted in family and religious beliefs. They also discussed the practice of consuming, transporting, and releasing common carp during God Kitchen (Ông Táo) Day in Vietnam. These cultural practices were at times misrepresented in the summaries provided by the interpreters, highlighting a gap in cultural and linguistic understanding.

Interestingly, during our workshop, some scientists demonstrated a preference for digital tools like Google Translate or ChatGPT over the services of the interpreters. They collaborated among themselves to decide what to translate and then provided summaries in English to other participants. This preference stemmed from their past international projects, where they lacked support for translation. Remarkably, more than 90% of existing scientific research projects, including EU-funded initiatives, have not allocated budgets for translation. Consequently, it is likely that a significant amount of nuance and meaning has been lost in these projects.

The workshop highlighted the vital role of language and translation in fostering cross-cultural comprehension, especially in international research collaborations. It exposed the often-overlooked need for linguistic expertise in science projects, where the absence of dedicated translation budgets could lead to inaccuracies. This gathering was not merely an academic exercise but a reflection of the broader scientific research landscape, across research agendas of different subject disciplines, emphasizing the urgent need to integrate linguistic skills into our collaborative endeavors. As we navigate the path toward global scientific cooperation, the recognition and incorporation of language expertise are not luxuries but necessities.

5. Discussion

The distinctive approach of involving researchers from diverse fields, including environmental science, computer science, linguistics, political ecology, aquaculture, nutrition, human physiology, marketing, accounting and accountability, and other fields, has provided a unique lens through which to explore aquatic food perceptions in Vietnam. By employing an autoethnographic approach with field diaries, vignettes, and interactive workshop stakeholder responses, we have attempted to capture the multifaceted social, political, economic, cultural, and linguistic dimensions that shape food perception patterns in Vietnam. This cross-disciplinary collaboration has been instrumental in uncovering the lived experiences within Vietnam's specific food agri-ecosystems.

Our research underlines the key role that aquatic foods play in traditional practices, economic livelihoods, and dietary health in Vietnam. The findings from the wet market visit highlight the cultural importance of freshness and the informal economic structures that govern local food transactions. The catfish farm and processing facility visit demonstrates the industrial scale and global economic significance of Vietnam's aquaculture sector, as well as the environmental challenges associated with it. The stakeholders' workshop emphasizes the necessity of integrating local cultural practices and community engagement into One Health initiatives. By embedding aquatic food perceptions within the One

Health framework, we have identified key intersections between human, animal, and environmental health. This study highlights the need for an integrated transdisciplinary approach to address the complex factors influencing health outcomes in Vietnam. Our findings advocate for culturally informed interventions and policies that enhance ecological resilience and public health. Discussions for future research can be summarized as follows:

Firstly, Vietnamese cultural practices place a high value on the freshness of food, particularly aquatic products, favoring immediate consumption over refrigeration. While these traditions are deeply rooted and contribute to dietary habits, they pose potential risks to food safety and public health. Future research should explore how these cultural dimensions influence food handling in wet markets and should develop strategies to respect these practices while addressing safety concerns. By exploring the ways in which cultural beliefs shape food handling and consumption, we can identify strategies that balance respect for traditional practices with the need to improve food safety. We can also use computer technology, such as AI, to develop culturally sensitive linguistic and translation tools for public health intervention that enhance nutritional outcomes and reduce the risk of foodborne illnesses, ultimately supporting healthier communities while preserving cultural heritage.

Secondly, intensive fish farming, while economically beneficial, presents significant environmental challenges, including water pollution, deforestation, and ecological degradation. These practices threaten the long-term sustainability of aquaculture in Vietnam. This pressing issue necessitates comprehensive research that can be facilitated by AI-assisted tools to understand the extent and nature of these impacts. Future research should focus on conducting longitudinal studies to assess the long-term environmental effects of high-density fish farming. Such studies would provide valuable data on how accumulated waste, excess nutrients, and other pollutants from intensive aquaculture practices affect water quality and local ecosystems over time and also on how usable waste nutrients can be captured and recycled. Furthermore, research into these issues will offer cost benefits to producers, reuse of the waste as valuable inputs elsewhere in the food production ecosystem, and more efficient use of dwindling water sources. Additionally, research should aim to develop and test sustainable aquaculture practices that mitigate these environmental harms. By exploring alternative farming techniques, waste management systems, and environmentally friendly feed options, researchers can propose methods that minimize ecological damage while maintaining productivity. Promoting ecological resilience through sustainable aquaculture practices not only helps protect natural resources but also ensures the long-term viability of the aquaculture industry in Vietnam and in other similar contexts.

Thirdly, effective One Health initiatives that integrate human, animal, and environmental health perspectives are essential for addressing the complex factors influencing health outcomes in Vietnam. The pressing issue lies in the need for holistic approaches that not only consider these interconnected health domains but also incorporate cultural, linguistic, and socio-economic dimensions unique to Vietnamese communities. Future research should focus on using AI to evaluate existing One Health initiatives related to aquatic food systems and determine their effectiveness and areas for improvement. This would involve comprehensive assessments of how well these initiatives address the intertwined health challenges and their impact on community well-being. Additionally, research should identify strategies to enhance the integration of cultural practices, local languages, and socio-economic contexts into these initiatives. By ensuring that health interventions are sustainable and culturally informed, researchers can propose more effective solutions that resonate with local communities, leading to better health outcomes and greater ecological resilience. This integrated approach will not only strengthen One Health initiatives but also contribute to the broader goal of sustainable development and improved public health in Vietnam.

Fourthly, exploring the intersection of policy, regulation, and practice in the management of aquatic food systems is essential for creating sustainable and equitable food systems and their relationship to broader food systems. Research should aim to identify

gaps and inconsistencies in the current regulatory framework that governs aquaculture and fisheries in Vietnam, assessing how these regulations impact the daily practices of stakeholders involved in the production, distribution, and consumption of aquatic foods. By critically examining the alignment—or misalignment—between policy intentions and on-the-ground realities, researchers can uncover areas where regulatory improvements and public education are needed. This includes evaluating the effectiveness of existing policies in promoting environmental sustainability, food safety, and social equity. Additionally, research should consider the challenges faced by local communities and small-scale producers in complying with regulations, ensuring that policies are inclusive and supportive rather than burdensome. The findings from such research can inform the development of comprehensive policy recommendations that bridge the gap between regulation and practice, fostering a more resilient and fairer aquatic food system that benefits all stakeholders, from producers to consumers.

Lastly, an issue raised by our Vietnamese colleagues and other stakeholders during the discussion session was the disparity between the expectations of national/international projects and their outcomes when implemented in local and rural areas. The bottleneck issues identified include: (1) confusion between scientific language and local language as well as culture; (2) projects are usually managed vertically from national and international levels to local levels, lacking connectivity and support between multiple stakeholders; (3) very little project funding usually remains to implement the project at local and rural levels, which is not enough to implement a strategic long-term project; (4) since most implemented projects in Vietnam are implemented vertically (top-down), they rarely encompass the horizontal links between related ministries. To understand the intricate dynamics of how aquatic foods are perceived and consumed, and to gain comprehensive insights into the One Health framework, it will be important to involve a range of government divisions, including the Ministry of Agriculture and Rural Development, the Ministry of Natural Resources and Environment, the Ministry of Health, the Ministry of Education and Training, and many stakeholders including scientists, policymakers, and farmers.

6. Conclusions

In conclusion, this research emphasizes the importance of culturally and contextually sensitive approaches in addressing One Health challenges. While grounded in Vietnam's aquatic food ecosystems, the findings offer a transferable framework for addressing global issues at the intersection of sustainability, food safety, and the health of humans, animals, and the environment. The autoethnographic and transdisciplinary methodology employed in this study presents a replicable approach that can be adapted to explore similar dynamics in diverse cultural and ecological contexts, contributing to a broader understanding of One Health interconnections. Although this research does not generate hard data, it provides a foundation for future mixed-methods studies, bridging qualitative insights with quantitative evidence to develop interventions that are both sustainable and culturally informed. This study serves as a foundation for future research and policy-making, highlighting the need for continued transdisciplinary collaboration and community engagement.

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