



Challenges to Operationalizing Sustainable Diets: Perspectives From Kenya and Vietnam

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Despite the urgent need for comprehensive food systems strategies, the challenge lies in defining feasible, evidence-based intervention points. Too little is known about issues food systems decision-makers and other change agents are running up against, particularly in low- and middle-income countries where food systems are the most vulnerable to a growing number of intertwined crises. We look at this question through the lens of sustainable diets, a growing area of research and a concept that is the basis of over 30 sets of national guidelines that aim to simultaneously address health, economic and environmental dimensions of food systems. Based on 114 interviews carried out in Kenya and Vietnam, we examine the extent to which food systems researchers, business and project managers and policy actors are attempting to intervene in food systems in ways that mirror the concept of sustainable diets. We also consider how they are managing two key ingredients that are critical to systems-change—interdisciplinary data and cross-sector collaboration. Most stakeholders we interviewed were carrying out systems-based projects, oriented—even if not explicitly—around many of the sustainable diets domains: agriculture, livelihoods, food security/access/nutrition and/or environment. The majority faced formidable challenges with both data and collaborations, however, showing why it can be so difficult to move from normative ideals like “sustainable diets” to practical realities, regardless of the context. To support more comprehensive food systems policies and interventions, our findings suggest the need for strategies that can improve the collection and accessibility of actionable, cross-sector data, and mechanisms to overcome institutional barriers that limit collaboration.

Keywords: sustainable diets, food systems, policy process, collaboration, collective impact

INTRODUCTION

As the interconnected nature of food systems crises becomes more apparent, a consensus is emerging that multi-dimensional solutions are needed (IPES (International Panel of Experts on Sustainable Food Systems), 2020). Food systems now account for over a quarter of global greenhouse gas emissions as well as widespread water pollution, biodiversity loss, and soil erosion, while climate change, in turn, is placing farmer livelihoods and public food security at considerable risk (IPCC (Intergovernmental Panel on Climate Change), 2021). Twenty-two percent of children are stunted globally, due to undernutrition (FAO, 2018a), even as a third of food is wasted (FAO, 2018b) and overnutrition is increasing, leading to an alarming rise in obesity, overweight and diet-related diseases (UNICEF (United Nations Children's Fund), World Health Organization (WHO), and World Bank, 2019). Systems-based solutions are especially needed in low- and middle-income countries where food systems are the most vulnerable to these intertwined crises (UNICEF (United Nations Children's Fund), World Health Organization (WHO), and World Bank, 2019).

Despite the urgent need for comprehensive food systems strategies, the challenge lies in defining feasible, evidence-based intervention points. The International Food Policy Research Institute describes food systems as “the sum of actors and interactions along the food value chain—from input supply and production... to transportation, processing, retailing, wholesaling, and preparation of foods to consumption and disposal... [as well as] the enabling policy environments and cultural norms around food” (IFPRI, 2021). With so many moving parts, food systems are quintessential complex adaptive systems (Chapman et al., 2017), making the “leverage points” that can instigate systems change as diverse as the numerous contexts in which food systems are embedded. Environmental scientist Donella Meadows described leverage points as those “places within a complex system... where a small shift in one thing can produce big changes in everything” (Meadows, 1999, p. 1).

What would it take to support feasible, locally-specific actions that simultaneously address the health, economic and environmental dimensions of current food systems challenges? We look at these questions through the lens of sustainable diets, a concept that encourages consumption that is “protective and respectful of biodiversity and ecosystems; culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources” (FAO (Food and Agriculture Organization), 2010). As a concept, sustainable diets is generating considerable attention in scholarly frameworks that aim to guide analysis and action (e.g., Downs et al., 2017; Mason and Lang, 2017) and studies that model the environmental impact of various diets (e.g., Jones et al., 2016). Over 30 sets of guidelines now use the concept of sustainable diets, which are increasingly replacing more narrowly focused national nutrition guidelines (Joseph and Clancy, 2015). These guides, frameworks and analysis have advanced understanding about the concept, but little is known about the extent to which frameworks like sustainable diets

are practical for local decision-making and what challenges practitioners are running up against as they attempt more holistic food systems problem solving.

In the remainder of this paper, we summarize what has been studied about the barriers that may limit the application of systems-based strategies like sustainable diets frameworks in low- and middle-income countries, describe the methods we used to analyze diverse stakeholder perspectives and explain why we chose to focus on Kenya and Vietnam. Our findings highlight the types of interdisciplinary initiatives underway, the constraints to carrying out more systems-based interventions, and the implications for transforming food systems in the Global South.

LIKELY BARRIERS TO OPERATIONALIZING SUSTAINABLE DIETS

Given the limited understanding about the practical realities of turning the concept of sustainable diets into action and the variety of factors that could be at play, we narrowed our focus by drawing on research about broader efforts to intervene in food systems, such as scholarship on food systems governance (e.g., Chapman et al., 2017), food systems planning (e.g., van Bers et al., 2019), and the nutrition policy process (e.g., Pelletier et al., 2012; Gillespie et al., 2019). For various reasons—especially epistemological barriers and clashes in values—actors may not be motivated to adopt a sustainable diets or systems-based approach (Friedberg, 2016). Our first question, therefore, asked whether leading organizations in Kenya and Vietnam are applying a systems lens in a way that could conceivably advance sustainable diets. Secondly, we wanted to understand what may be limiting organizations that are convinced of the need to work systemically. Among these organizations, research suggests that two critical, yet understudied ingredients tend to limit their efforts, particularly in the Global South—interdisciplinary data and cross-sector collaboration.

The primary data needed to inform food systems decisions are mainly accessible from disparate and unconnected sources or are often more readily available in the aggregate (and usually national) levels, facilitating cross-country comparisons, with limited scope for informing decision making at the local level (Hsu, 2016; Sonnino and Coulson, 2020). Aggregate indices have been developed for food security and environmental sustainability, as well as country profiles, but these largely focus on single domains, such as nutrition (World Bank, 2011). Furthermore, efforts to model the environmental impact of various diet scenarios—particularly through life cycle analyses—have almost exclusively focused on high-income countries where the majority of relevant data exists (Jones et al., 2016). These data limitations might explain why most sustainable diet guidelines have emerged from countries in the Global North and why many lack sufficient scientific evidence to support their recommendations (Joseph and Clancy, 2015).

Moreover, studies suggest that a lack of coordination and collaboration—especially the segregation of data collection, analysis, and related decision making within sectoral silos—often prevents food systems information from reaching the most

relevant decision makers and from being applied across sectors (Abson et al., 2017). Scholars have noted that achieving the food systems-oriented Sustainable Development Goals (SDGs), for instance, will be a challenge because national government agencies engage in limited coordination or data sharing (Nabyonga-Orem, 2017). The food security and agriculture oriented SDGs also contradict one another and offer ambiguous objectives that do not provide clear policy guidance about how to work across sectors (Blesh et al., 2019). Complicating this situation is the failure to harmonize aid; despite repeated declarations to do so, donor-managed data collection systems that work in parallel to public sector information systems continue to be the norm in most low- and middle-income countries (Fløgstad and Hagen, 2017). Sonnino and Coulson (2020), furthermore, argue that national governments and international institutions alike exhibit “path dependency and conceptual “lock-ins”...[that] constrain cross-sectoral [food] systems thinking” (p. 7); they found a “pervasive inertia and silo mentality at the local, national and translocal level, whereby “food system issues” are typically divided across multiple departments, ministries or state agencies” (p. 14). Studies of national cross-sector nutrition interventions (Pelletier et al., 2018; Michaud-Létourneau et al., 2019), and urban food systems governance (van Bers et al., 2019) have additionally shown how government staff often do not have the incentives or strategic capacity to form effective partnerships with other government units or key stakeholders outside of government.

METHODS

This study is part of a broader research partnership between the University of Michigan and the Center for International Tropical Agriculture (CIAT) in Kenya and Vietnam, what we refer to as *Entry points to Advance Transitions towards Sustainable diets* (EATS). For this portion of the project, we first examined the extent to which diverse food systems practitioners in both countries are attempting to intervene in food systems in ways that mirror sustainable diets. We then considered the ways that data and collaboration barriers noted above may be limiting attempts to implement systems-based strategies¹.

Site Selection

We selected Kenya and Vietnam as sites of analysis both for practical and theoretical purposes. From a logistics standpoint, CIAT has offices and long-standing food systems projects in both countries, offering a network of stakeholder connections we could draw upon to carry out interviews. More importantly, by comparing two countries that have similar agricultural, economic and nutritional characteristics, but substantially different political systems, a comparative method (Hopkin, 2010), allowed us to isolate the governance context as one of the most likely factors that may constrain—or enable—food systems transformation efforts.

Kenya and Vietnam are experiencing parallel changes connected to food systems, such as climate change impacts, urbanization and population growth, though Vietnam is more populated (~98 million and 295 people/km² compared to 53 million and 94 people/ km² in Kenya) (FAO, 2018a). Both countries since the 1990s have also encouraged land consolidation, a move away from communal land ownership toward private titling, as well as the expansion of agricultural exports and mechanization (FAO, 2018a; Daum et al., 2020; Nguyen and Warr, 2020). Average incomes have risen in both countries as both have experienced economic growth over the last decades, with a somewhat faster rise in Vietnam; each were upgraded by the World Bank to “lower-middle income” categories in the last decade (World Bank, 2015). On a mass basis per capita, vegetables and rice make up the majority of the Vietnamese diet, with irrigated rice the largest contributor of greenhouse gas emissions (GHGE) although rice intake has decreased recently²; a sharp rise in beef consumption is also increasing the carbon footprint of Vietnamese diets (Heller et al., 2020; Trinh et al., 2021). Beef along with dairy is the major contributor to GHGE in Kenya, though maize and vegetables make up most of the Kenyan diet on a mass basis per capita (Heller et al., 2020). Child undernutrition has fallen significantly in both countries over the last two decades, but a quarter of children under five remain stunted in each country even as the prevalence of overweight among adults is rising (FAO, 2018a). These nutrition trends led both governments to launch national nutrition strategies in the early 2010s (Prime Minister of Vietnam., 2012; Republic of Kenya, 2013).

Despite similarities today in terms of economies, diet-related GHGE and nutrition transitions, Vietnam and Kenya have different historical and contemporary governance structures. Vietnam established its single-party communist state with a centralized government when it gained independence from France in 1945 (Vu, 2016). Kenya was a one-party state with centralized governance since independence from the British Government in 1963 to December 1991. Today, Kenya is a multi-party democratic republic which devolved administrative responsibilities to its 47 semi-autonomous county governments in 2013 (Cheeseman et al., 2016). This difference in their political histories and structures, we presumed, may change how data is generated and shared, and more importantly, how government and other food systems actors interact to facilitate food systems change.

As a further point of contrast, we also focused on the large, capital city (Hanoi in Vietnam and Nairobi in Kenya) and a mid-sized city in a more agriculturally-focused region in each country (Son La Province in Vietnam, and Kisumu County in Kenya) to understand the influence that national government systems may have over data and institutional challenges at the local level.

¹This project was approved by the University of Michigan Internal Review Board in 2017.

²Ministry of Health (2021). General Nutrition Survey 2019–2020. https://moh.gov.vn/tin-noi-bat/-/asset_publisher/3Yst7YhbKA5j/content/bo-y-te-cong-bo-ket-qua-tong-ieu-tra-dinh-duong-nam-2019-2020.

TABLE 1 | Stakeholders interviewed in Kenya and Vietnam.

	Kenya		Vietnam		TOTAL
	Nairobi	Kisumu	Hanoi	Son La	
NGOs	14	10	10	0	34
Local government agencies	2	10	2	7	22
Research institutes*	6	2	10	0	18
International organizations	9	0	4	0	13
Businesses	2	3	6	2	13
National government agencies	7	0	2	0	9
Farmers associations or community groups	1	0	1	4	6
TOTAL	41	25	35	13	114

*Research institutes were public universities and government-run agencies. International research groups, like agencies in the Consultative Group for International Agricultural Research, were categorized as “international organizations,” though the majority in this category were part of the United Nations or bi- and multi-lateral institutions.

Sampling Process

In total, we conducted 114 interviews between April and October of 2018, including 66 in Kenya (41 in Nairobi and 25 in Kisumu) and 48 in Vietnam (35 in Hanoi and 13 in Son La) (Table 1). Given the many sectors and types of organizations involved in food systems governance and its context-dependence, we identified interviewees using a combination of purposeful stratified sampling developed through a document review and chain sampling.

The first three-quarters of our interviewees were identified through a scan we did of publicly available documents and discussions with CIAT staff, focusing on organizations that were leading major food systems interventions or policy reforms. We selected a mix of organizations that focus on nutrition, agriculture, economic development, and environmental issues (or a combination of these). We were also intentional about including non-governmental organizations (NGOs), national and local government agencies, research institutes, international organizations (e.g., United Nations (UN) agencies, bi-lateral and multi-lateral organizations), businesses, and farmer- and community-based food systems associations.

Using a chain sampling approach, we then asked these initial interviewees to identify key informants who could provide additional breadth, depth, and/or complementarity to the information already obtained. Chain sampling is useful for locating a population of interest that may not be apparent (Morgan, 2008), helpful in this situation because we believed that the document review would not capture the full extent of relevant organizations. Because chain sampling relies on referrals—based on who interviewees interact with or are aware of by reputation—it can still exclude participants who may not be connected to the initial list of interviewees. We attempted to limit this bias by first aiming for maximum diversity sampling through our earlier scan (i.e., identifying

a diverse set of initial interviewees to increase the likelihood of reaching different segments of the population of interest) (Morgan, 2008).

Although we attempted to include a similar number of organizations from each city/country, sector and organization type, we were directed to a larger number of organizations in the capital cities, where most ministries, research institutes, international development partners, and major food businesses have their headquarters. More interviews were also conducted in Kenya than in Vietnam, due to the higher number of NGOs we were referred to in Kisumu³. We were only able to identify or were referred to a small number of farmers associations or community-based groups, likely because we were attempting to interview organizations known to be leading major interventions or policy reforms. Marginalized perspectives, particularly of indigenous or social movements, therefore, are not adequately captured in this study. Exploring the views of these less powerful groups would be beneficial as part of a paper that considers how current food systems interventions and policy could become more inclusive.

In most cases, we interviewed one person from each institution, with the exception of a few interviews where multiple staff participated. Interviewees, therefore, could not speak for their entire organization, but the majority were the directors of their organizations, the business owners, or managers of food systems projects, and as such, had a broad perspective of the work carried out in their organization. In our findings, therefore, we often refer to what “organizations” were doing, unless interviewees described their individual work or perspective. We also learned of many multi-institutional collaborations, but in most cases, we were only able to talk to one participating organization. One exception was the NADHALI project (described below), where we were able to compare the perspectives of five different organizations involved, in addition to the lead agency.

Interview Structure

We conducted semi-structured interviews, a style of interviewing shaped around pre-established questions drawn from trends and gaps in the literature that were open-ended enough to allow interviewees to introduce new themes and topics (Qu and Dumay, 2011). Specifically, we aimed to determine: (a) the extent to which organizations were applying a system-lens to their work and (b) the factors related to data and collaboration that were facilitating or debilitating their work on issues related to sustainable diets (see the interview guide in Appendix A).

In both countries, after being trained for a week with the lead author, three staff conducted the interviews in Kenya, including one US graduate student and two Kenyan CIAT staff, and three Vietnamese CIAT staff in Vietnam. Interviews lasted an average of 60 min and were conducted in participants’ offices.

³More NGOs likely exist in Kenya due to the proliferation of NGOs starting in the 1980s when neoliberal policies began to reduce state-provided services, and again after the 2000s when the government encouraged the growth of NGOs (Brass, 2012, 2016). In contrast, legal and bureaucratic requirements to operate as an NGO in Vietnam have historically been restrictive (Linh, 2017), especially in more rural provinces (Vu, 2019).

All interviews were carried out in English in Kenya (though interviewers in Kisumu had the capability of speaking in Swahili and other African languages). In Vietnam, six interviews were conducted with the lead author during the training week in English, and two partially in Vietnamese and English, with an interviewer in training serving as a translator. The remaining interviews were conducted in Vietnamese, transcribed and then translated by English-speaking Vietnamese university students.

Coding and Analysis

We carried out a thematic content analysis (Fereday and Muir-Cochrane, 2006) using Dedoose, version 8.4.37, a qualitative coding software that allows users to work simultaneously on a virtual platform. Transcriptions were coded iteratively, both deductively—based on codes that were specific to our research questions—and inductively, as we added new codes in response to emerging themes. For the deductive part of our analysis, we categorized the work of organizations around four of the most common domains that overlap in various sustainable diets frameworks (Jones et al., 2016; Downs et al., 2017; Mason and Lang, 2017; Mayton et al., 2020): (1) agricultural production, (2) livelihoods and economic development, (3) food security, food access or nutrition, and (4) the environmental impacts of or impact on food systems. In our findings, we refer to these four domains simply as “agriculture,” “livelihoods,” “food security/access/nutrition,” and “environment.”

For the inductive part of our analysis, we developed additional codes to track topics that organizations were devoting significant attention to that did not squarely fit within a single sustainable diet domain. The most common codes related to “market formalization” (efforts to formalize informal markets and value chains, such as creating more market regulations, promoting supermarkets, or developing export markets), “food safety” (improving sanitation and food handling practices), “governance” (efforts to democratize food policy decision-making), and “food waste” (efforts to reduce or recover post-harvest or post-consumer food waste).

The lead author developed the pre-established coding list and trained two research assistants to apply the codes and agree on a system for adding additional codes as they emerged. For the first five interviews, the lead author coded an interview, had the two research assistants code the same interview, and discussed points where there was disagreement until the three team members were applying a similar coding pattern. The two main coders divided the remaining interviews. The lead author then reviewed and adjusted codes on all interviews as a final pass to ensure consistency throughout. She also carried out the thematic clustering in the final analysis. All authors—including local CIAT partners—reviewed early drafts of the analysis to aid in interpretation. Feedback on earlier drafts was also captured through two presentations made at US-based sustainability and food systems research conferences, and a presentation made to ministry and research institute representatives in Vietnam.

We display in our findings the frequency with which various themes were mentioned across the interviews, a common

practice in interview analysis to be more transparent about how we identified patterns in the data and to offer at a glance the major areas of commonality and divergence (Sandelowski, 2001). Although all interviewers followed a standard set of initial questions, because semi-structured interviews are “co-constructed” (Alsaawi, 2014, p. 154), the flow of each interview differed, as follow-up questions varied depending on initial answers. Therefore, not asking all interviewees the exact same questions (as closed-ended interviews do), means that the themes that emerged are likely undercounted within this sample, while the statistical frequency of these themes in the general population of food systems practitioners in Kenya and Vietnam is also unknown, given that our sample was not random (Neale et al., 2014). Ultimately, as with most interview-based qualitative research, the patterns we found do not allow for inferences about prevalence beyond the stakeholders we interviewed, but the themes that did emerge—even when relatively small—suggest lines of inquiry worthy of further examination (Sandelowski, 2001).

RESULTS

Most stakeholders we interviewed in Kenya and Vietnam were carrying out cross-sector projects, oriented—even if not explicitly—around many sustainable diets domains: agriculture, livelihoods, food security/access/nutrition and/or environment. We found a small number of organizations who focus on single issues or who did systems-based work without any major constraints, but most faced formidable challenges with data and collaboration.

The Extent of Sustainable Diets Work

Across the two country samples, when organizations were asked to describe their current projects, few used the term “sustainable diets” (SD), yet two-thirds were engaging in projects that cross at least three of the four SD domains, with 38% focused on three domains and 26% on all four (Table 2). Only 14% of organizations were siloed in one domain. When working across three domains, organizations tended to combine either agriculture, livelihoods and nutrition (leaving out a linkage to environmental impacts, 16%) or agriculture, livelihoods and environmental factors (leaving out food security/access/nutrition, 13%). Considered from the perspective of linkages between at least two domains, food security/access/nutrition and environment were linked least often (by 39% of all organizations), while agriculture and livelihoods (59%) and agriculture and nutrition (56%) were integrated most often. Organizations in both countries, for instance, often referred to projects that focus on “nutrition-sensitive agriculture,” where projects encourage the production of nutritious and diversified crops typically for both household consumption and local markets. Many also referred to “climate smart agriculture,” what one NGO interviewee called the “new kid on the block” that many international agencies are promoting to increase productivity alongside resilience to climate change.

More specifically, in Vietnam, cross-sector projects that addressed multiple SD domains included a project led by the

TABLE 2 | Percentage of organizations that cover sustainable diet domains, by country and geographic area.

	Total	Country		Geographic area			
		Kenya	Vietnam	Nairobi	Hanoi	Kisumu	Son La
Number of organizations (n)	114	66	48	41	35	25	13
Percent of organizations that cover a certain number of sustainable diet domains							
Focus on four domains (%)	26	35	15	44	11	20	13
Focus on three domains (%)	38	44	29	41	29	48	31
Focus on two domains (%)	22	14	33	12	37	16	23
Focus on one domain (%)	14	8	23	2	23	16	23
Sustainable diet topics organizations leave out when they cover three domains							
Agriculture (%)	3	3	2	5	3	0	0
Food security/access/nutrition (%)	13	15	10	15	14	16	0
Livelihoods (%)	6	9	2	7	3	12	0
Environment (%)	16	17	15	15	9	20	31
Percentage of organizations making linkages between pairs of SD domains							
Agriculture and nutrition	56	67	42	73	31	56	69
Agriculture and livelihoods	59	70	44	76	40	60	54
Agriculture and environment	51	64	33	68	34	56	31
Nutrition and livelihoods	46	44	35	63	29	40	54
Nutrition and environment	39	47	27	56	29	32	23
Livelihood and environment	42	53	27	63	29	36	23

World Bank and the Hanoi city government to improve food safety, environmental contamination, and livelihoods in the local pork sector. The project was helping small-scale pig farmers build waste and water management systems, upgrade home-based slaughtering facilities, and improve wet market operations. In another project, the FAO was organizing regular meetings to develop partnerships and a common, holistic vision around food safety data collection and practices, involving 40 to 50 international institutions, NGOs, research organizations and government agencies. CIAT-Vietnam, our local partner, along with a coalition of national and international agencies, was also beginning to implement the CGIAR research program on Agriculture for Nutrition and Health (A4NH)⁴, focused on food systems, food safety, markets, policy environments and nutrition sensitive and sustainable agriculture practices. The Ministry of Agriculture and Rural Development, Ministry of Health and five other ministries were also launching the SDG 2-inspired Zero Hunger National Action Program to develop an integrated, national nutrition and agricultural household survey that will allow partners and data users to map areas most at risk of food insecurity and to develop nutrition sensitive agricultural strategies customized to local ecologies and socio-economic dynamics.

In Kenya, the Kenya Agricultural and Livestock Research Organization was working with partners to improve nutrition and create local markets and livelihood options for youth and low-income households using fruit that is underutilized locally and that is more resilient to climate change, such as the tree tomato. In another initiative, the United States Agency for International Development (USAID) was leading the

Partnership for Resilience and Economic Growth⁵, an initiative with an agriculture-nutrition focus that was trying to bring together USAID, FAO, UNICEF, the World Food Program (WFP), and other humanitarian and development partners to “deliver as one.” The idea was to meet several times a year to discuss new regions and projects being launched, identify beneficiaries already being reached, reduce duplication, and identify potential partnerships. The WFP as an institution was also restructuring from a “vertical” and more siloed approach, to a “horizontal” model, so that nutrition would cross all program areas. In another example, the FAO was leading the NADHALI project—an amalgam of the names of the three participating cities, NAairobi, DHakar and Lima—intended to build the capacity of local stakeholders to carry out a rapid, participatory urban food systems assessment and planning process (Fonseca et al., 2018). NADHALI in Nairobi involved ministries and county government, UN agencies, NGOs, bilateral organizations, university partners and the private sector who were attempting to develop the first comprehensive Nairobi Food Systems Strategy and Action Plan (Fonseca et al., 2018).

While there were differences by country—nearly twice as many organizations in Kenya worked across three or four SD domains (79%) than in Vietnam (44%) and only 8% of organizations in Kenya and 23% in Vietnam focused on a single domain—there were few differences in the level of interdisciplinarity of projects between the two cities in each country (e.g., Son La vs. Hanoi, and Kisumu vs. Nairobi) (Table 2). Across the entire sample, health-based organizations (e.g., the Ministry of Health), on average, combined the fewest

⁴See <https://a4nh.cgiar.org/>.

⁵See <https://www.usaid.gov/documents/1860/partnership-resilience-and-economic-growth-preg>.

TABLE 3 | Percentage of organizations that cover sustainable diet domains and other topics in current projects, and domains and topics associated with needed data and collaborations, by country and geographic area.

		Sustainable Diet Domains					Other common topics**		
		Agriculture* (%)	Food security/access/ nutrition (%)	Livelihoods (%)	Environment (%)	Avg SD domains (out of 4)	Market formalization (%)	Food safety (%)	Governance (%)
Topics covered	Kenya	94	73	73	67	3.1	77	32	48
in current projects	Nairobi	93	81	81	73	3.3	83	34	56
	Kisumu	96	60	60	56	2.7	68	28	36
	Vietnam	71	65	50	46	2.3	58	56	33
	Hanoi	63	60	49	51	2.2	63	57	34
	Son La	92	77	54	31	2.5	46	54	31
	TOTAL	84	69	63	58	2.7	69	42	42
Type of data	Kenya	42	42	18	24	1.3	24	12	2
organizations need	Nairobi	54	59	27	27	1.7	34	15	2
	Kisumu	24	16	4	20	0.6	8	8	0
	Vietnam	8	10	8	4	0.3	10	6	0
	Hanoi	11	14	11	3	0.4	14	9	0
	Son La	0	0	0	8	0.1	0	0	0
	TOTAL	28	29	14	16	0.9	18	10	1
Type of collaborations	Kenya	5	15	2	6	0.3	8	0	0
organizations desire	Nairobi	2	10	0	5	0.2	7	0	0
	Kisumu	8	24	4	8	0.4	8	0	0
	Vietnam	6	6	2	2	0.2	13	10	4
	Hanoi	6	6	0	3	0.1	14	14	6
	Son La	8	8	8	0	0.2	8	0	0
	TOTAL	5	11	2	4	0.2	10	4	2

*Organizations involved in "agriculture" worked with fisheries, livestock, urban farms, small-holder diversified farms and commodity crops for export or national markets.

**Only in Kenya, 20% of current projects also focused on food waste. Across the sample, 12% worked with informal markets. More than half (54%) of projects on food safety addressed three or four SD domains, but only 16% of governance projects, 8% of market formalization projects and 6% of food safety projects.

number of SD domains (2.0), compared to environmental (2.8), agriculture (3.0) and cross-sector organizations (3.1) (such as many NGOs and UN agencies). Environmental organizations were most likely to carry out projects focused on the environment and agriculture (and least often nutrition and livelihoods). Cross-sector organizations equally focused on making linkages between food security/access/nutrition and either agriculture, livelihoods or environmental issues, as did agriculture organizations, linking agriculture and all other SD domains.

Broken down by single domains, the majority of organizations across the sample were working on projects related to agriculture (84%), and over half to two-thirds on food security/access/nutrition (69%) livelihoods (63%) or environmental impacts (58%) (Table 3). In addition to these SD domains, and usually in conjunction, other food systems topics that organizations worked on included food safety (42%), food governance (42%), and market formalization (69%). In Kenya, 20% of organizations also worked on food waste.

Data Challenges

Three-quarters in Kenya and one third of organizations in Vietnam identified gaps in data that they believed were not being collected (Table 3), and many described issues with existing data around access, reliability, and usability (e.g., data that is outdated, overly aggregated, or contradictory/not comparable). While data issues were similar among stakeholders in the two countries, organizations located in the major cities tended to describe more problems with existing data than those in the less populated regions (Table 4), likely because more research-oriented institutions—those with the most data needs—have their headquarters in the capital city.

Issues With Data Gaps

Interviewees identified data gaps across all SD domains, but particularly related to agriculture and food security/access/nutrition (Table 3). In both countries, organizations needed food safety data (e.g., antibiotic use in livestock, levels of chemical residues, sewage in irrigation) and described struggles with evaluating the direct impacts of their own interventions on standards of living, agricultural productivity, nutrition outcomes, and environmental impacts. In Vietnam, other interviewees needed data on how many women and children receive nutrition counseling and the determinants of nutrition behavior change, the sustainability of diets by age group, the health and nutrition content of school meals, and street food vendor livelihoods. In Kenya, the list of data needs was long, from organizations wanting data on agriculture-nutrition linkages, indigenous foods (e.g., production levels, nutrition content), consumer data, value chains (e.g., the volume and productivity of individual commodities by county, rates of fertilizer use and irrigation, income farmers receive vs. brokers, numbers of larger corporate and small and medium enterprises who trade in certain commodities, locations of warehousing space, etc.), food waste (e.g., tonnage by source, such as post-harvest losses, restaurants, households, etc. and private sector involvement in waste management and reuse),

urban land and water suitability for food production, local soil fertility, malnutrition and obesity prevalence in informal settlements, river pollution levels, the locations of wetlands where agriculture should be restricted, biodiversity, and locally-specific hydrological and climate change projections.

Issues With Access

Across the sample, a small percentage of organizations believed existing data was easy to access, because it is publicly available (12%) and 10% because they have the relationships to get the data they need (Table 4). On the other hand, over a third of interviewees in Kenya (35%) and a 5th in Vietnam (21%) noted problems with acquiring data that other organizations collected. Interviewees in both countries were especially frustrated that they could not access data collected by national government agencies, citing the need for political connections or a bureaucratic process. In Vietnam, for instance, while government nutrition or agriculture data is often available at the commune level, more localized datasets are not always available or accessible. One NGO noted how they often revert to doing their own data collection for this reason. Similarly in Kenya, one interviewee described how, “accessing the available data is difficult; [my colleague] has to use the influence of her position or personal networks to get data or reports from the Ministry of Agriculture.” Another Kenyan organization discussed how, with “both our governments, national and local, getting data is a process where...you have to write letters and obtain signatures before you get the information that you want... I don’t understand why it’s so protected because it should be public data.” They described one project where they tried to get spatial data on urban agriculture in Nairobi, recalling how, “you call for a meeting, it is postponed, before you make a decision, somebody else changes... Then we got into elections, people changed, some left, those [who remained] said they can’t make decisions until a new leadership is in place... We stopped following up on it and we had to move on with what we had.”

Six organizations in Vietnam (13%) (compared to three in Kenya), described how data on food safety is especially difficult to acquire. Most noted issues with accessing national-level data because of concerns, they believe, over the sensitive nature of food safety outbreaks. They described how food safety data that is made available tends to be aggregated and is often offered too late for immediate action. Others described the confusion that is generated because multiple national agencies—including the ministries of Health, Agricultural and Rural Development, and Industry and Trade—collect different aspects of food safety data. In Kenya, too, an NGO stakeholder speculated that food safety data is “considered sensitive... There’s fear that you are going to cause a scare.” They described a need for shared data to inform solutions: “We do not have a multi-stakeholder initiative that can take responsibility to handle that information and translate it into solutions.”

Finally, three organizations in Kenya also believe that NGOs are likewise reticent to share data or coordinate data collection efforts, because of competition over funding or because of a sense that “surveys are heavily funded... [and that NGOs are often] just doing a survey because there’s nowhere else to spend the money.”

Issues With Data Reliability

One-fifth (21%) of organizations in Kenya and 17% in Vietnam described issues with data reliability, particularly data collected by the national or local government (Table 4). Interviewees in both countries shared concerns that data “may not have been scientifically collected” with weak sampling designs or that “statistics are arbitrary, based on educated guesses.” Many of the issues raised highlight capacity gaps in local data collection. In Vietnam, two organizations noted how local health offices often cannot engage in sophisticated data collection and analysis, particularly related to nutrition data managed by poorly paid or volunteer health promoters. In Kenya, eight organizations (12%) discussed at length how devolution has made local data collection “very messy now in Kenya,” particularly in agriculture. As one person described:

we had Provincial Agricultural Boards and a Central Agricultural Board in Nairobi, so there was a very well-connected system of collecting data. It was continuously updated on an annual basis... However, upon promulgation of the new Constitution, what unfortunately happened is that there was a very big rift between the county governments and the national government... [Currently to get] consolidated data for the country, you have to go to each county individually.

Other interviewees described how devolution has created a bifurcation, with some counties prioritizing agricultural data collection, and many that do not. As one person explained, “After devolution, counties have become like independent countries, so they recruit their own staff and officers of agriculture that do not report to the headquarters in Nairobi... They do not

have the capacity and the data... You will find that people with PhD and masters do not have computers; they keep the data on paper...” A World Bank (2018) review of Kenya’s agricultural information system similarly found that county government staff lack hardware and software as well as basic training in Microsoft Word.

In a final example, several participants in the NADHALI project illustrated how interdisciplinary data collection is particularly challenging, even for highly trained researchers. While most participants were encouraged by the initiative, some indicated that the timeframe—one year to develop a collaborative food systems strategy for Nairobi in addition to collecting most of the data needed to inform the strategy—was too compressed, as one person described:

The food system concept thinking is relatively new within the context of Nairobi. The understanding was that we needed to map the key components of the food system, that we needed information on production, consumption, distribution, from consumers, processors... on the policy and regulatory environment... on the physical environment, and soils, water and air and whether they are suitable or contaminated... food waste generated by households... actors within the waste management system... When you are putting everything together, it becomes extremely complex... It brings in very heavy data requirements and therefore time and resources, human but also material resources... If you have to understand the entire distribution system, the outlets are different. [A single farmer] has a different middleman who would come for mangoes, somebody else would come for vegetables and their systems are so different. That means that you have to follow each one...

TABLE 4 | Percentage of organizations reporting challenges with food systems data and collaboration, by country and geographic area.

	Total	Country		Geographic area			
		Kenya	Vietnam	Nairobi	Hanoi	Kisumu	Son La
Number of organizations (n)	114	66	48	41	35	25	13
No issues or data needs (%)	25	9	48	2	31	20	92
No additional data needs mentioned (%)	42	24	67	12	57	44	92
Easy to access—publicly available (%)	12	15	8	24	11	0	0
Easy to access—based on relationships (%)	10	14	4	22	6	0	0
Issues with existing data and/or lack of data (%)	75	91	52	98	69	80	8
Lack of data on certain topics (%)	58	76	33	88	43	56	8
Data access issues (%)	29	35	21	41	29	24	0
Poor data reliability (%)	19	21	17	22	20	20	8
Outdated data (%)	11	18	2	22	3	12	0
Not disaggregated to local level (%)	10	15	2	24	3	0	0
Data contradictory or comparable (%)	10	8	12	2	17	16	0
No issues with current collaboration and no mention of needed collaborators (%)	24	24	23	22	20	28	31
No issues with current collaboration noted (%)	45	38	54	39	49	36	69
No mention of need for more collaboration (%)	47	52	36	49	43	56	38
Issues with current collaboration and/or need collaborators (%)	76	76	77	78	80	72	69
Issues with current collaborations (%)	55	62	46	61	51	64	31
Need collaborators (%)	53	48	58	51	57	44	62

Issues With Usability

Interviewees also raised issues about the usability of existing data. Twelve organizations in Kenya (18%) and one in Vietnam discussed how data is often outdated (Table 4). Some in Kenya described how Ministry of Health nutrition data is frequently one or two years old, Health and Demographic Survey data may be four to five years old, and in the case of one national micronutrient study, seven years old. Many interviewees were also frustrated that the last official Kenya Census of Agriculture was conducted in the 1960s (also cited as an issue by the World Bank, 2018), forcing them to estimate using old data.

Another 15% of organizations noted that national data is often too macro to make decisions that are place-specific. One organization in Vietnam and five in Kenya discussed how data is often not available on urban areas. A Nairobi-based local government researcher and a professor attributed the issue to a tradition among government data collectors, and researchers in general, to focus food systems studies on rural areas. As one interviewee noted, “Whenever you say “food security,” for a long time it’s been [seen as] a rural problem and if you are thinking of production, then that [too is seen as a]... concern more of the rural systems than the urban system.” Five organizations in Kenya, however, felt that aggregated data was also problematic for many rural areas. One person noted how “Kenya has tried making data accessible, especially on websites, but that data is not sufficient to make informed decisions because it’s over summarized; we need data disaggregated at county levels.” Another interviewee noted how “we have some form of understanding from all these data sets but once we go onto the ground you find it’s not very specific to your area... you find it’s a whole different ball game.”

Finally, 11 organizations (10%), including five in Kenya and six in Vietnam, explained that data sets offer contradictory findings or are not comparable. Data on nutrition, for instance, is sometimes collected using different protocols or sampling systems. Others spoke of datasets covering sustainable diet domains, such as agriculture and food insecurity, but which focus on different time periods, geographic areas or populations, making it difficult to combine the data sets to form a composite picture.

Collaboration Challenges

More than three quarters described either a need for partners or issues with existing collaborations (Table 4). When they specified, interviewees often mentioned wanting more partners with an expertise in food security/access/nutrition (11%), especially in Kisumu (24%) (Table 3). Those frustrated with existing collaborations noted issues with the slow pace of bureaucracy in government offices, businesses and donor agencies; clashing mandates, limited time and staff rotation that makes it difficult for many national and local government staff to form partnerships; the poor understanding that national government and donors have of local realities; and the lack of transparency of many NGOs and businesses. Each frustration is described below, based on the type of organization interviewees attempted to work with.

National Government Agencies

In both Kenya and Vietnam, interviewees discussed the difficulties of working with the national government. In Vietnam, 15% discussed the need for personal connections to access national officials. One researcher also felt that national bureaucrats do not understand local needs, describing how: “Many of them are high-level managers who do few field visits and have little direct contact with farmers.” In Kenya, a similar percentage (15%) experienced barriers to working with national offices. Some think government agencies do not have the human and financial resources or time to commit to collaborations. Several noted that national staff do not have the capacity to deliver on their mandates, cannot make decisions quickly, and have a difficult time taking ownership of partnerships. Frequent rotation of staff further complicates partnership building. As one interviewee noted, “People keep on changing, so today you establish a working relationship with an individual, you work with them, start well, then along the way, she or he gets transferred or they retire, or they resign to other places.”

Local Government Agencies

Many organizations also find it difficult to work with local government. In Kenya, nine respondents (14%) from NGOs and local governments offices discussed how local bureaucrats do not have the funds or authority to engage actively in collaborations. In Vietnam, eight interviewees (17%) discussed issues with bureaucracy. One person from an NGO, for instance, described, how “Even though we are acquaintances and have partnered with provincial authorities, we have to spend a long time to complete procedures.” Coordinating across sectors like agriculture and health is especially challenging, as one business owner described, because “many government offices have different working plans.” An NGO staffer reiterated this challenge, describing how “Each sector is in charge of different parts without any cooperation in planning or sharing knowledge.”

NGOs

Turning the tables around, local government staff describe how NGOs often do not coordinate with them. In Vietnam, one local government employee mentioned that NGOs often do not seem interested in collaborating. In Kenya, actors from six local government agencies felt the same. They described NGOs as “opaque” and as working “in isolation... [and how] you have no idea how they come up with the activities and their findings, and what is going on the ground.” Similarly, another local government agency described how NGOs “go away and do not share what they find... they call you for that launch and after the launch they disappear.”

Private Sector and Donors

While many interviewees described effective partnerships with the private sector and donors, four organizations in Kenya were frustrated with their attempts to work with businesses, either because companies tried to take advantage of small-scale farmers, were not willing to be transparent, or were slow and bureaucratic. Two organizations in Vietnam also described companies who

were not interested in using evidence-based practices or who insisted on patenting a technology rather than making it freely available. *Two* interviewees in Vietnam and five in Kenya also discussed challenges with the slow pace and bureaucracy involved in working with some international funders or donors and others who appeared to care little about local contexts.

Data and Collaboration Successes and Strategies for Improvement

Despite the many challenges organizations described with cross-sector data and collaboration, a quarter of organizations across the sample had no major issues with data and nearly a quarter were content with the extent and quality of their current collaborations. Others, as we discuss below, offered concrete ideas about what could further improve the quality of food systems data and collaboration.

Some interviewees in Kenya described how they relied on universities for certain agricultural data or for research partnerships when they needed evaluations or new data collected. Others drew regularly from ongoing household surveys conducted by the Kenya National Bureau of Statistics, and seasonal, rapid Food and Nutrition Security Assessments conducted by the Kenya Food Security Steering Group (a collaboration of government departments and international agencies)⁶ In Vietnam too, some organizations mentioned the large amount of data on agriculture that they regularly use from the General Statistics Office and nutrition data from the Ministry of Health.

Effective collaborations typically had memorandums of understanding or some mechanism to reduce duplication and ensure that all interests, expectations, and roles were clear from the outset. Most also established ongoing communication systems, whether through monthly meetings or steering committees. To work effectively with government, several interviewees noted how critical it is to capture the attention of long-term bureaucrats. As one person in Kenya advised, “work with the stable technocrats—not appointed officials... [For our project] it was like having an internal advocate, people that speak [politicians’] language and are able to explain certain issues... sharing the information upwards.” And in Vietnam, several interviewees noted that it was key to get the support and to stay in regular contact with the Communist Party Central Committee at the province level, both for interventions and new data collection. As one person noted, “When the provincial level grasps it, others shall follow.”

As interviewees reflected on ways of improving data collection and collaboration, many pointed to the need for more time. One participant in the NADHALI project, for instance, felt that the FAO headquarters in Rome forced the “collaborative” effort on Kenya-based organizations, and that the pace⁷ at which they were expected to work was especially daunting:

It came as a top-down project. It was designed in Rome and sent to Nairobi, and you are told to “just like it” and “swallow it.” We of course liked it, but if it’s new thinking, it takes time for people to even understand. It took six months of a one-year project to know what we were supposed to do. So suddenly, one year is gone, the studies were not yet over... We were supposed to come up with a food systems strategy at the end of it all which has not been done and the project is [over]... If we could’ve had a [longer] bottom-up approach, meaning that if you have an idea, share it with us, look at it together, go look for funds, then we implement, [maybe we could have accomplished more].

A staff member at a national government agency also believed that it may be too soon since devolution in 2013 to see the development of effective data collection and data sharing systems across Kenya: “To me that’s a very short time to have concrete systems. It would be very ambitious to expect the county to have the data at their level... Maybe in the next five years we will... [be able to] ensure that things work.” Such efforts will require intentional, national leadership, however. The World Bank’s (World Bank, 2018) review of Kenya’s agricultural information system, for instance, suggested that legislative frameworks should mandate coordination between national level offices that produce and use agricultural data, and data sharing agreements with county governments.

Many interviewees also spoke about the need for this type of data coordination and management across national agencies around food safety. An earlier study of Vietnam’s food safety risk management system (World Bank, 2016) prompted a pilot being carried out in Ho Chi Minh City to test a model where a single board manages all aspects of food safety, from production to processing, distribution, and sales (VOV., 2017). In Kenya too, a local government agency believed a similar model was needed there, noting how “We all are targeting the markets for some sanitation issue and food safety issue, but we never get to sit together and compare notes, so I think we need a more robust inter-sectoral coordination system.”

Other interviewees envisioned a more comprehensive solution to data sharing. Five organizations in Kenya and two in Vietnam want a common platform for sharing interdisciplinary data—a “one stop shop,” “dashboard” or “open data platform” that links agricultural, economic, health and environmental data. As one interviewee expressed: “Data is everywhere—I wish it was just in the Kenya National Bureau of Statistics... [like] a platform or portal whereby people can just login to the system and get data. I think data is there, there’s just a logistics issue of identifying who has the data and who wants it.”

DISCUSSION

The goal of achieving sustainable diets is quickly becoming a moral imperative as the climate crisis becomes more urgent, the contribution of food systems to GHGE becomes more apparent (IPCC [Intergovernmental Panel on Climate Change], 2021),

planning initiative connected to NADHALI had begun in Kisumu later in 2019, on pause due to the COVID-19 pandemic.

⁶See, for example: <https://fews.net/east-africa/kenya/food-security-outlook/february-2021>.

⁷Two years after we conducted the interview, partners in Nairobi indicated that NADHALI stakeholders in Nairobi attempted to follow through on the strategic plan after FAO funding and coordination ended, but they eventually stopped meeting by the last quarter of 2019. At the same time, a spin off food systems

and global nutrition deficiencies erode further under COVID-19 and other shocks, deepening health and economic impacts (Béné, 2020). The majority of institutions we interviewed in Kenya and Vietnam were carrying out cross-sector projects that combined many of the domains that make up the concept of sustainable diets—agriculture, livelihoods, environmental impacts and/or food security/access/nutrition. They focused least, however, on the linkages between the environment and food security/access/nutrition, the primary impetus of sustainable diets conceptual frameworks (Joseph and Clancy, 2015) and research (Jones et al., 2016). More needs to be done to promote the concept, but our findings show why it can be so difficult to move from normative ideals like “sustainable diets” to practical realities, regardless of the governance context. To support more comprehensive food systems policies and interventions, our findings indicate the need to improve the collection and accessibility of actionable, cross-sector data, and strategies to overcome institutional barriers that limit collaboration.

Improving Food Systems Data

At least a quarter of organizations in our study faced no data access issues, but more often, interviewees were concerned about data gaps, had access issues, or noted that accessible data was unreliable, outdated, overly aggregated and incompatible. These data issues exist in different sectors independent of efforts to understand and intervene in food systems, but when confronted collectively, the task of unraveling each of the challenges with nutrition, agriculture, environment, and economic data becomes all the more daunting. At a minimum, funding, equipment, capacity building and staffing to improve data collection in each of these sectors is critical as are strategies to develop more trans-disciplinary data collection and evaluation strategies. None of these issues have simple fixes, nor are they unique to Kenya and Vietnam (IFPRI (International Food Policy Research Institute), 2014; Gillespie et al., 2019). Public sector nutrition and agriculture systems that rely on local-level data collection from under-resourced and under-staffed agencies, in particular, face chronic and uneven issues with data reliability, data sharing, and data management (Fløgstad and Hagen, 2017).

One way to begin to narrow in on where to focus data improvements would be to identify issues that are understudied and that could offer important leverage points for sustainable diets. Aside from life cycle data needed on the environmental impacts of food production and distribution practices that are unique to low and middle-income countries (Jones et al., 2016), in our study, food systems data on urban regions, informal settlements and peri-urban areas as well as food safety, food waste, and informal food markets came up regularly as being particularly understudied topics that could have ripple effects on sustainable diets, also in need of study in other areas of the Global South (Jones et al., 2016; Sonnino and Coulson, 2020).

Legislation requiring data sharing and open data platforms, as some organizations suggested, could also help to leverage existing data, especially information already collected by national government agencies. But the idea needs further thought and development. Limited research exists on the logistics, quality control, and equity implications of open data platforms in the

Global South, especially in food systems (Koskinen et al., 2019). Some scholars are also concerned that open data strategies may lead to a focus on big data, what the FAO, World Bank and other international organizations are proposing that municipal governments use to develop “food smart urban areas,” using predictive analytics or data mining of user behavior data (FAO (Food and Agriculture Organization), 2010, p. 22). Without careful deliberation, these types of data fixes could fail to improve data collection on topics and populations that cannot be captured by big data technologies, leave unaddressed or worsen existing inequities, and undermine the democratization of food systems decision-making (Bronson and Knezevic, 2016).

Fostering Cross-Sector Collaboration

Cross-sector collaboration that draws on diverse knowledge becomes all the more important when data systems are insufficient for understanding how to approach complex food systems problems. Interviewees in both countries, however, described how cross-institutional initiatives can be difficult to establish because government staff at all levels face high turnover, and have little time, incentives and resources to commit to partnerships. Government staff, on the other hand, also described how NGOs, the private sector, and donors create their own set of challenges. The fact that these issues of engagement and decision-making were consistent in both countries, despite their different political structures, suggests a widespread need to shift the culture around problem-solving to more fully embrace participatory and systems approaches, regardless of where administrative power resides. A cultural shift alone, however, will be insufficient if numerous capacity constraints are left unaddressed, particularly among mid-level managers and frontline staff who are crucial to carrying out higher-level commitments (Gillespie et al., 2019).

In addition to time, staffing and funding—joint fact finding and agenda setting also requires strategic champions (Pelletier et al., 2012; Cabannes and Marocchino, 2018; Gillespie et al., 2019). The memoranda of understanding and similar consensus building strategies interviewees highlighted in successful collaborations allude to the need for effective facilitators to negotiate and maintain these agreements. Research on the nutrition policy process in the Global South has shown that if such champions do not naturally emerge, “boundary-spanning actors” can play this role, people with a dedicated job to bring stakeholders from multiple agencies and sectors together around a common purpose, “by sharing information, facilitating common understanding... managing relationships... generat[ing] trust and commitment, and help[ing to] problem-solve and innovate” (Pelletier et al., 2018, p. 2). “Backbone organizations” have played a similar function in collective impact projects—a model being used to guide multi-institutional nutrition collaborations, such as the Global Alliance for Improved Nutrition and Alive and Thrive (Hanleybrown et al., 2012; Michaud-Létourneau et al., 2019). Backbone organizations usually secure dedicated funding to build a common agenda, shared measurement systems, mutually reinforcing systems, and mechanisms for stakeholders to remain in constant communication (Hanleybrown et al., 2012). In Kenya and

Vietnam, the conveners of efforts such as the NADHALI and Zero Hunger projects were likely attempting to serve in boundary shaping and backbone roles, but at least in the case of the NADHALI project, the time devoted to the ambitious endeavor was insufficient.

CONCLUSION

Systems change is nothing less than a paradigm change, one of the hardest types of changes to accomplish (Meadows, 1999). While our study offers insights about some of the practical challenges involved in achieving such paradigm change around sustainable diets—gathering systems-based data and engaging in cross-sector collaboration—our findings also raise more questions than answers. As the SDGs, sustainable diets guidelines, and other holistic food systems interventions continue to be promoted, particularly in the Global South (IPES (International Panel of Experts on Sustainable Food Systems), 2020), action research that follows transformation initiatives (e.g., Pelletier et al., 2018) is needed that goes beyond studying the “what” of food systems change – the content of actions that decision-makers *should* take—to testing and understanding more of the “how” of systems change (Blesh et al., 2019; Gillespie et al., 2019; van Bers et al., 2019).

A key lesson these findings emphasize is that initiatives aiming to design systems-based solutions must be built and funded—to be sustained beyond short-term projects, a common refrain that researchers have found to be the limiting factor in other food systems collaborations and shared measurement efforts (Gillespie et al., 2019; Judelsohn et al., 2021). Sufficient time is needed to work through numerous data-related and institutional constraints—such as the added time, resources, mandates and skills that local and national government agencies needed in Kenya and Vietnam—and to build buy-in, trust and commitment, particularly if stakeholders have never worked together or if a network is mandated or imposed (Popp and Casebeer, 2015). Collective impact initiatives have often taken six months to two years just to identify and bring stakeholders together to formulate a common agenda, analyze baseline data, and establish shared metrics. Then another decade or more is needed to implement actions and achieve impact (Hanleybrown et al., 2012; Cabannes and Marocchino, 2018). In other words, “collective impact is a marathon, not a sprint” (Hanleybrown et al., 2012, p. 2).

Finally, as the concept of sustainable diets begins to gain public attention (Brody, 2019), there is also a need to critically examine how policy actors, businesses and other organizations operationalize the term, to ensure that it does not become an empty label that reinforces business as usual, as some scholars have noted about nutrition sensitive and climate smart agriculture initiatives (Newell and Taylor, 2018). Truly transformative interventions must go beyond technocratic cross-sector data collection or collaborations between existing decision-makers, toward the integration of traditional and scientific knowledge and efforts to co-design interventions with marginalized actors, with the intention to “confront

and undermine incumbent power and lock-ins to single, dominant systems” (Anderson and Leach, 2019, p. 137). As our findings suggest, the process of framing and studying problems, sharing data, democratizing governance, and formulating and implementing policy actions becomes even more complex when the ultimate goal is to not only improve nutrition and food security, but to simultaneously protect environmental resources and promote equitable food systems livelihoods.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because participants were informed that their interviews would remain confidential. Interview transcripts have too many details to share, with numerous identifiable data throughout. Requests to access the datasets should be directed to Lesli Hoey, lhoey@umich.edu.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Michigan Internal Review Board. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

All authors contributed to the production of this manuscript and have approved the final version.

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SUPPLEMENTARY MATERIAL

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