CITIES ACCELERATING TRANSITIONS TO REGENERATIVE FOOD SYSTEMS

INSIGHTS FROM AN EXPLORATORY STUDY IN DAR ES SALAAM, TANZANIA

GAIN Working Paper n°65

March 2026

Rachel Nel, Ann Trevenen-Jones, and Min Jung Cho

gain
Global Alliance for Improved Nutrition

TURFS Consortium
Transforming Urban-Rural Food Systems

GAIN Working Paper n°65

Recommended citation

Nel, R, Trevenen-Jones A, and Cho MJ. Cities accelerating transitions to regenerative food systems: insights from an exploratory study in Dar es Salaam, Tanzania. Global Alliance for Improved Nutrition (GAIN). Working Paper #65. Geneva, Switzerland, 2026. DOI: https://doi.org/10.36072/wp.65

© The Global Alliance for Improved Nutrition (GAIN)

Acknowledgements

Thank-you to the GAIN Food Systems Governance project team who supported the inquiry study, the Transforming Urban and Rural (TURFS) consortium members and inquiry participants, including representatives from Tanzania's three government tiers (central, regional and local), farmers, value chain businesses, traditional markets and supermarkets. This paper was produced as part of a TURFS consortium initiative, funded by the Laudes Foundation. The findings, ideas, and conclusions contained presented here are those of the authors and do not necessarily reflect positions or policies of any of GAIN's funding and TURFS consortium partners. All photographs included in this document have been taken with consent for use in publications. The photograph on the cover page is of an urban agricultural small plot in Dar es Salaam, 2024.

SUMMARY

Transformation towards just and sustainable food systems is needed to ensure the health of people and the planet. Current large-scale industrial agri-food systems practices across an increasingly urbanised system are increasing soil degradation. These practices, alongside intersecting environmental challenges and widening socio-economic inequalities, are negatively impacting food security and access to healthy diets and increasing interest in climate-smart, agroecological, and regenerative food production. Cities are dynamic places of human settlement where food systems innovation can be catalysed. This makes them key to food policy and delivering nourishing, just and sustainable food systems. In 2024-5, the Transforming Urban Rural Food Systems (TURFS) Consortium conducted a mixed-methods exploratory inquiry in Dar es Salaam, Tanzania to explore how cities can incentivise regenerative agricultural transitions. This inquiry focused on three areas of interest: food production, food retail, and food systems governance. Three participatory group workshops (with 146 total participants) and 27 key informant interviews were conducted.

The findings identified several avenues for stimulating regenerative agriculture transitions. These include leveraging of the city's organic food culture and better valorising access to existing local food systems data. It will be important to strengthen clarity, coordination, and resourcing of roles and responsibilities across local, regional, and national governments to facilitate coherent food systems governance. Enabling actions will be needed to foster effective and inclusive collaboration among diverse actors (e.g., farmers, vendors, governments, and researchers) on shared priorities. There remain persistent gaps in knowledge of local market systems and the practice of urban governance, as well as a limited understanding of the socio-economic and environmental costs, benefits, and trade-offs of regenerative approaches. The participatory approach adopted in the inquiry strengthens local-led regenerative transitions and can inform potential future approaches to deepen, scale and transfer learnings in cities worldwide.

KEY MESSAGES

- Evidence from Dar es Salaam suggests that cities can accelerate regenerative transitions by building on existing organic food cultures, valorising access to food systems data, strengthening multi-level governance, and fostering effective and inclusive collaboration across diverse food system actors.
- Food systems actors need to determine the value of a regenerative transition and how best to practice and harness their food systems relationships towards this goal.
- Participatory approaches can strengthen locally led and regenerative transitions while addressing persistent knowledge and capacity gaps. They can also inform future efforts to deepen, scale and transfer learnings across cities, and in different contexts.

BACKGROUND AND OBJECTIVE

Food systems significantly contribute to and are impacted by ecological crises (e.g., climate change, soil biodiversity loss, polluted fresh water) and social injustice (e.g., hunger and lack of access to healthy diets) (1-3). At the intersection of the rights to food, decent work, and a healthy environment lies a 'safe and just space' that is currently accessible to less than 1% of the global population (1). Beyond this space, 6.9 billion people live outside of the safe limits of ecological systems to support human wellbeing, and 3.7 billion people live in unjust social conditions. Mutually reinforcing ecological and social crises are common (4). Human activities are the dominant driver of harmful Earth systems change, associated with intensifying the magnitude of sustainability challenges and undermining of efforts to achieve Sustainable Development Goal (SDG) 2 on ending hunger and the broader 2030 Sustainable Development Agenda, including fostering peace and prosperity and ending poverty (1, 5, 6).

Sufficient food is produced globally to support the energy needs of the population (5). However, the distribution, affordability, and access to safe, nourishing, and culturally preferred food, at all times, for all people, is a major challenge (5, 7). Millions of people especially children, women of reproductive age, and vulnerable groups such as those residing in low-income countries remain hungry or undernourished due to insufficient access to and affordability of safe and nutritious food (5, 7). In 2024, 673 million people worldwide were chronically undernourished (3, 5) and about 2.3 billion people (28% of the global population) were moderately or severely food insecure, with the prevalence highest in rural areas (32%), followed by peri-urban (29%) and urban areas (24%) (3, 5).

This challenge is particularly acute in regions like Africa, where levels of moderate or severe food insecurity (affecting 59% of the population) are more than double the global average (28%). More than two thirds (67%) of the African population is unable to afford a healthy diet (5). Further compounding this challenge is a worldwide dietary shift towards convenient and often less healthy diets (8). These diets are generally characterised by inadequate consumption of fruits and vegetables and reliance on energy-dense, processed, micronutrient-poor staples (8). As a consequence, there has been a rise in the triple burden of malnutrition[1], and a growing public health burden fuelled by the prevalence of non-communicable diseases, like type 2 diabetes and heart disease (8-11). In Africa, these complex and interconnected trends present immense challenges that require urgent and innovative solutions (12).

In an increasingly urbanised world, cities play a critical role in addressing global challenges and, in particular, achieving the SDG2 goal of ending hunger and the SDG 11 goal of building inclusive and resilient cities. Agricultural practices are fundamental to feeding communities, providing livelihoods, driving economic development, and fostering social relations and food cultures. However, large-scale, industrial agri-food systems practices often negatively impact essential Earth systems, including climate, biodiversity, and land. These intensive practices, which are typically reliant on chemical inputs, like fertilisers and herbicides, have boosted crop yields and reduced pest and disease-related spoilage (16-19). However, they have also increased soil degradation and water pollution,

[1] The coexistence of undernutrition (wasting and stunting), overweight/obesity, and micronutrient deficiency within households, communities, and/or populations (9).

reducing long-term agricultural productivity and resilience to climate shocks (16-19). It total, food systems contribute 48% to global greenhouse gas (GHG) emissions (13-15). Reliance on chemical inputs, as well as practices such as soil tillage and large-scale mono-cropping, have further reduced biodiversity (15, 20), which can reduce the quality food production (20, 21). Food loss and waste (FLW), including that resulting from poor hygiene, storage and transport practices, limited access to farm to plate infrastructure and services (e.g., cold chains, potable water and sanitation), and unfavourable weather conditions (e.g., high temperatures and humidity), further undermine efforts to facilitate food security and access to healthy diets (22-24). Moreover, FLW represents a waste of natural resources used in agri-food production and is a source of GHG emissions (22–24).

To sustainably and urgently transform food systems for the wellbeing of people and planet, a combination of interventions is needed (1). It is estimated that when implemented together, interventions like dietary shifts to more plant-based diets, uptake of sustainable farming practices, and reducing FLW, could reduce GHG emissions from agri-food systems by at least half (1). There is growing interest in climate-smart, agroecological, and regenerative agricultural approaches, which can maintain and restore ecosystems while improving long-term food productivity, food security, and nutrition outcomes and fostering equitable livelihoods and inclusive food systems governance (25-28).

BOX 1. REGENERATIVE FOOD SYSTEMS PERSPECTIVE

A regenerative food systems approach systemically connects relationships between soil health, food quality, and human well-being. It prioritises nature-based solutions for climate adaptation, carbon sequestration, and biodiversity conservation (30–32). Broadly speaking, 'regenerative' agriculture, the basis of this approach, refers to practices that positively contribute towards climate, nature, and people e.g., crop rotation, use of organic fertilisers, and minimal use of chemicals like herbicides (31–33). Depending on the viewpoint, this approach can align with organic practices, small-scale farming, place-based grounded local food systems, climate-smart and grassroots agroecological practices, and the 'Zero Waste' circular economy. This inquiry adopted a similarly broad interpretation of regenerative food systems and was attentive to how participants understood and used and/or did not use various terms or concepts.

Regenerative agriculture (Box 1) is one of several approaches that some consider to be fundamental to food systems that are just, nourishing, resilient, and support local ownership (28, 29). It offers the potential to address current food systems challenges, with benefits such as reduced GHG emissions and improved soil health (17). Regenerative agricultural practices can also support improved health and nutrition. For example, a focus on soil health and biodiversity within regenerative approaches can increase the vitamin and mineral content of produce (27). Regenerative methods also emphasise reduced to zero use of chemical inputs and pesticides that are harmful to human health (18, 19).

As increasing numbers of people live, eat, and waste food in urban and peri-urban areas, cities are uniquely positioned to drive innovation, like regenerative and equitable food

systems, in food policy (3, 34–36). They present opportunities to reimagine food environments in ways that benefit health and wellbeing, to champion regenerative agriculture, and invest in social-ecological relationships that connect cities with the broader rural and territorial landscape (8, 37–39). Multiple food system actors, levels, and sectors of governance interact in cities. At the city scale, international agreements (e.g., SDGs, Paris Climate Agreement) and national frameworks (e.g., national nutrition plans and strategies) intersect with local by-laws and strategic plans (e.g., on zoning or food procurement). While these intersections can produce complex governance arrangements, they also create opportunities for cities to contextualise and operationalise broader policy frameworks.

Despite the potential of regenerative agricultural food systems to contribute to sustainable and resilient communities and food systems, little is known about how to valorise the approach through an urban lens. The Transforming Urban Rural Food Systems (TURFS) Consortium[2] sought to address this knowledge-action gap by exploring how cities can provide incentives for scaling regenerative agriculture through a 2024-25 case study of Dar es Salaam, Tanzania, led by GAIN**.** This paper outlines the key takeaways of the case study.

DAR ES SALAAM, TANZANIA

Dar es Salaam, one of the largest sub-Saharan African cities, is located along Tanzania's Indian Ocean coastline. It is projected to become a megacity by 2029, with a current (2024) population of over 8 million (40). This city is rapidly growing as a result of rural-to-urban migration, particularly among youth, who make up over 60% of the population (41, 42).

Though urban households in Dar es Salaam tend to be more food secure than rural households, poor diet quality places urban households at risk of a range of poor nutrition and health outcomes. Adolescents, for example, experience high rates of malnutrition, with 16% of the 507 sampled adolescents resident in this city being overweight, 39% anaemic , and 23% stunted (43). These nutritional challenges are potentially linked to wider trends in Tanzania where increasing incomes have not resulted in improved dietary diversity of household diets (44). Similarly, with a dietary reliance on food purchases, along with increasing prices of nutrient dense foods like dried fish, Tanzanian's diets lack sufficient micronutrients (44). Rising urban populations and food preferences in Dar es Salaam are driving the sourcing of food from neighbouring regions, such as the Mbeya (for rice and potatoes) and Dodoma (for maize).

A number of small – mostly under 2 hectare - urban and peri-urban (UPU) agricultural plots are spread out across Dar es Salaam (45-47). Amaranth ('mchicha'), pumpkin leaves, cassava leaves, sweet potato leaves, okra, tomato, and eggplant are the main crops grown, with plots often located in backyards, near roads, railway lines, riverbanks, or floodplains (Figure 1) (46, 48). Despite the small scale, UPU agriculture plays an important role in fruit and vegetable consumption: most of the amaranth (70%), a micronutrient-

[2] Following the UN Food Systems Summit, the TURFS consortium formed to enable non-state actors to catalyse just and sustainable food system transformation at scale. It comprises CARE, Club of Rome, EAT Foundation, GAIN, International Centre for Climate Change and Development (ICCCAD), and World Wildlife Fund (WWF), with the cities workstream spearheaded by C40. Under this workstream, TURFS aims to harness the power of cities worldwide to advance regenerative urban–rural food systems.

dense leafy green, consumed within the city is produced within the city (47). Given that 74% of Tanzanians cannot afford a healthy diet, UPU agriculture in Dar es Salaam could play a key role in enhancing convenient, affordable access to healthy food for low-income and vulnerable urban populations, in addition to supporting livelihoods (5, 43, 47).

Figure 1. Dar es Salaam roadside agricultural plot and a billboard highlighting the presence of organic food promotion in the city

Tanzania's food system activities and nutrition outcomes operate within a complex governance structure (Annex 1). The central government (national level) allocates resources through national ministries, like agriculture, to city and municipal councils, such as for provision of agricultural extension services. Between these levels, the regional council plays a coordinating role, providing advisory and supervisory support to local authorities and representing the central government. This includes supporting the creation of local development plans. Dar es Salaam is a both a city and a region and is administered by a Regional Commission and five Municipal Councils. The municipal council of Ilala, the most populous municipality, also serves the official Dar es Salaam City Council. This complex food systems governance structure and the range of ministries dealing with food systems and nutrition considerations, creates several instances where the roles and responsibilities for national, regional, and local food systems governance overlap, have gaps, and/or are uncoordinated.

METHODOLOGY AND METHODS

This exploratory inquiry sought to better understand Dar es Salaam's food system and to identify pathways to incentivise regenerative agricultural transitions. It focused on three areas: food production, food retail (formal and informal), and food systems governance.

METHODOLOGICAL FRAMEWORK

A participatory action research (PAR) methodology framed this inquiry (49). PAR emphasises learning together with food system 'users' to gain holistic understanding of how they are embedded in the food system. It includes probing for nuanced and deep understanding of the root causes of challenges, identified by participants during the study, and co-designing potential ways to address these. The PAR framework and the mixed methods tools employed are informed by aspects of design thinking, such as empathising, sense-making and generating solution ideas with participants (50-53). Results are interpreted through reflexive thematic analysis (i.e., where themes do not emerge from the data but instead are constructed in the critical interaction with the data; and where researchers explicitly track and acknowledge their analytical subjectivity, based on who they are and their assumptions) (54). This approach encourages critical thinking and learning together about participants' roles and responsibilities, their food systems relationships, and their understandings of key concepts like regenerative agriculture. It also provides space for sensitive views and practices to be expressed. Moving beyond the learning and co-creation objectives, this approach strives to empower participants to advocate and influence social and ecological change in which their voices are heard and they are part of decisions and solutions (53).

MIXED-METHODS APPROACH

Between January 2024 and January 2025, the inquiry progressed through four core phases: inception, data collection, data analysis and feedback engagements with participants. Data collection comprised rapid reviews of peer-reviewed and grey literature, rapid field assessments, participatory group workshops, and structured key informant interviews (KIIs). At the end of each workshop or KII and following the closing feedback sessions, participants were given a further opportunity to share their feedback, including critical reflections on the process and what (if any) inspiration it had given them to champion for change in their food systems. Building trust was fundamental to the success of this study, with each activity (e.g., field visits, recruitment phone calls) striving to nurture trust while also recognising the limits to trust-building over a short time and with an exploratory agenda.

Given the exploratory character of this study, which aimed to inform participants and potential future interventions, permissions from the President's Office, Dar es Salaam's Regional Commissioners Office, and the City Council were obtained. Additionally, GAIN applied best practices concerning duty of care when engaging vulnerable participants, such as those from low-income communities and the informal food sector. This included obtaining permissions, informed consent, setting a minimum participant age of 18 years, and applying confidentiality and 'opt out' protocols.

Given the inquiry's time and budget constraints, and consistent with PAR and the goals of inclusive engagement of a range of food systems actors, it was key to identify a mix of

participants, primarily based on their role in the system. Recruitment of participants entailed invitations to identified and interested food systems actors to participate in one or more of the three workshops and/or as interviewees in the KIIs that followed. It also leveraged the country partnerships and programme legacies of GAIN, C40 and CARE. The primary selection criterion was the participant's role in the food system (food production, food retail, or food systems governance).[3] Additionally, selection sought to ensure a diverse mix of roles (e.g., farmer, farmer group representative, formal and informal agri-businesses of different sizes, food retailers, academia, and department officials from local, regional and central government). Where possible a gender balance was sought. Additionally, selection was attentive to ensuring producers that grew a mix of foods and a diverse food retailers, from traditional food markets to supermarkets. 'Snowball sampling' further supported recruitment, with the project team following up on suggestions made by identified participants; it was especially useful in helping to identify participants in KIIs where the focus was on learning more about aspects raised in the workshops and knowledge gaps. It also facilitated access to participants like low-income, small plot farmers.

Inception (January – July 2024)

This phase comprised project administrative, design and planning activities; discussions about the proposed study with the TURFS consortium, government, and community representatives; and obtaining official government permissions. To provide an initial understanding of Dar es Salaam's food system, rapid reviews of peer-reviewed and grey literature and rapid field assessments were conducted related to food production, food retail, and food systems governance. This informed the design of the workshops and KIIs and guided actor mapping, which supported decisions on who to invite to the workshops and KIIs.

Participatory group workshops (August – November 2024)

Three one-day group workshops – one per interest area - were facilitated in September 2024.[4] Post-workshop activities included data quality review, data management, analysis, and reporting. Of the total workshop participants (n=146)[5], there were 53 participants in the Production workshop, 47 in the Retail workshop, and 46 in the Food Systems Governance workshop. Participants in each workshop spanned 5 to 6 actor groups (food systems roles) (Figure 2). During the workshops participants were grouped in tables by role (e.g., farmers, government). This facilitated participation amongst those with similar roles and enabled comparative activities, during which actors moved between tables to learn more about other actors' views.

The workshops moved from participants mapping and sharing their food systems lived reality, to plenary engagements around their interpretations of key concepts like regenerative agriculture, to co-constructing Challenge and Opportunity trees (Annex 2). The food system mapping activities identified food systems relationships, with each table positioning their role at the centre of their map (Annex 3). This method is based on

[3] Consumers play a key role in shaping food systems but were beyond the scope of this study.
[4] There were between 3 and 17 participants seated at a table. While efforts to recruit a balance of actor groups were mate, actual attendance dictated the size of the table groups. For example, 3 market leaders were present in the Food Retail Workshop, while 17 farmers were present at the Food Production workshop.
[5] On occasion, the same person participated in two workshops.

Community-Based Participatory Asset Mapping and the WHO's organigraph methods[6] (55-58). Through Challenge and Opportunity tree activities, each table identified root causes and (later) solutions as per their food system priorities and the interest in sustainable and

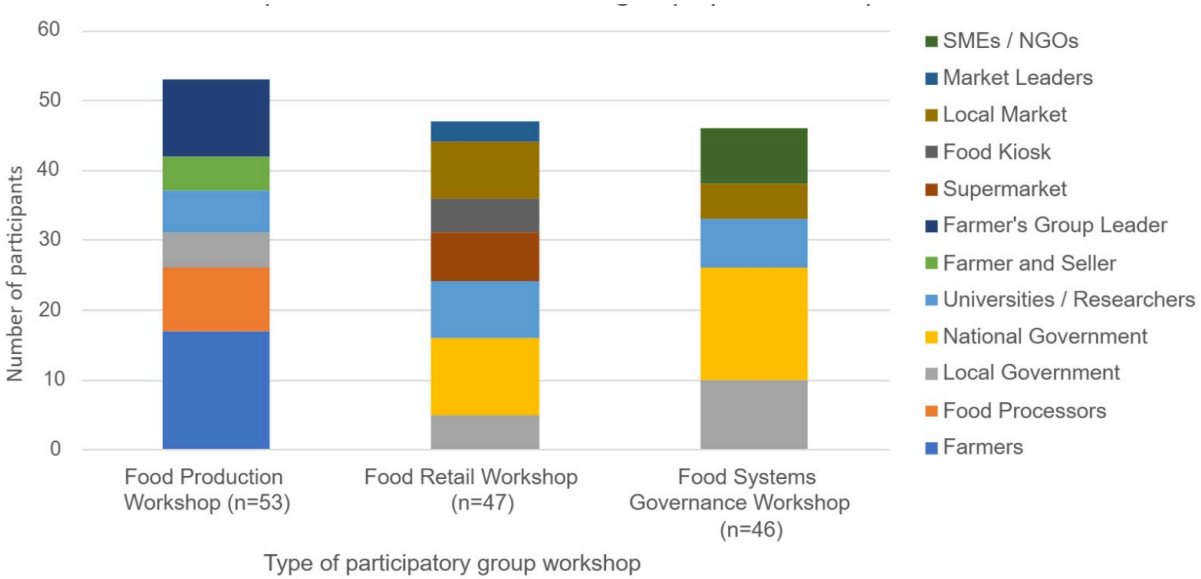


Figure 2. Representation of different actors (table groups) per workshop

regenerative food systems transitions for Dar es Salaam. Participants used these trees to further unpack perceived causal links between these and experienced and desired outcomes. Participants also completed a post-workshop feedback questionnaire that included Likert scale and open-ended questions to understand interest in and co-design future workshops as well as to inform KII recruitment and interview questions.

Key informant interviews (October - December 2024)

The KIIs followed the workshops with the aim of reaching more of Dar es Salaam's food systems actors and more deeply exploring key insights and knowledge gaps identified during the workshops and the rapid desktop study. Twenty-seven KIIs were conducted in person or by telephone, guided by structured questionnaires. KIIs were categorised by production, retail, and food systems governance. While all questionnaires shared a common introductory and concluding structure, the core questions were tailored to address issues specific to each interest area (Figure 3).

[6] Previously, GAIN's Keeping Food Markets Working programme tested and used this approach to co-design policy option toolkits for multiple cities in multiple counties. The toolkit for Pemba, Mozambique illustrates how this tool was used and the resulting policy options: https://www.gainhealth.org/sites/default/files/publications/documents/policy-options-toolkit-pemba-mozambique.pdf

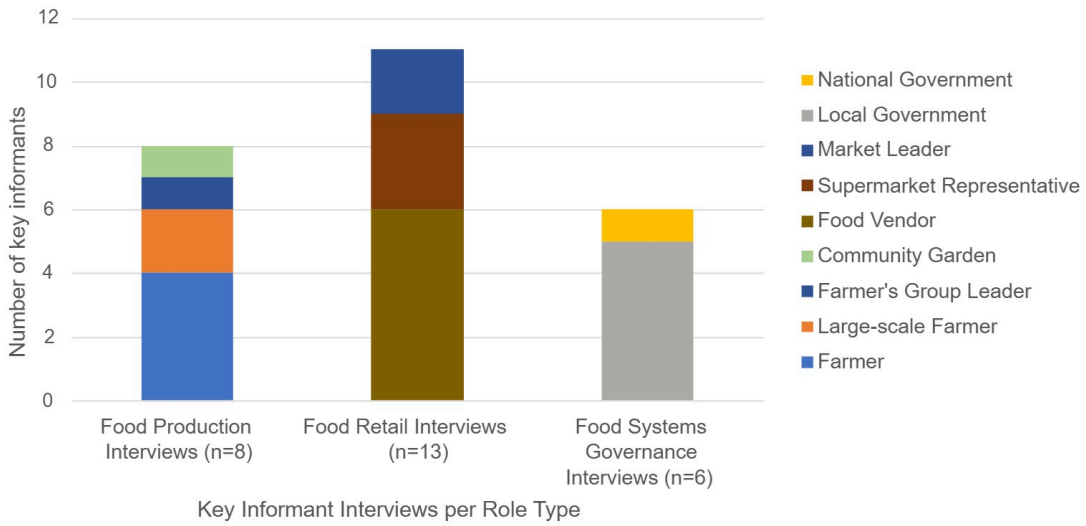


Figure 3. Representation of the key informant interview participants according to their food systems roles

Forms of data and analysis

Data collected from the workshops comprised the original annotated drawings and photographs thereof of food systems maps and challenge-opportunity trees, facilitator notes and feedback questionnaires. The food systems maps and challenge-opportunity trees were mostly drawn and annotated in Kiswahili and later translated into English - with quality checking between facilitators and translators. Maps and trees were redrawn, using PowerPoint; and registration and feedback questionnaire data inputted into excel data tables using a numbering system to replace participant names. Each of these activities, involves interpretation, and is in essence a form of analysis. Further to basic descriptive analysis of data like participant demographic information and questionnaire answers, reflexive thematic analysis was conducted using the interpreted evidence forms (58-60). Coding for themes interpreted from the data and having GAIN's analyst team engage in critical self-awareness (reflexivity) exercises - where they reviewed their assumptions and personal and theoretical positionings - were key to the analytical process (58-60). Three GAIN project team members further reviewed the analysis to support the quality of the analysis.

KEY RESULTS

Findings from qualitative analysis of the food-systems maps, challenge-opportunity trees, and KIIs were broadly classified in terms of challenges, opportunities, and enablers. While analysis from challenge-opportunity trees highlighted core issues and consequences, analysis of food systems maps highlighted relationships between actor groups and their perceived challenges and opportunities. KIIs provided context and clarity to these findings, reiterating key relationships, challenges, and opportunities.

'Challenges' included lock-in relationships that hinder progress towards more regenerative, equitable food systems. This included soil infertility leading to poor crop yield, which farmers might address by using large quantities of chemical fertilisers, further reducing long-term soil health. 'Opportunities' included relationships and actions that addressed identified challenges and/or resulted in 'win-win' outcomes for people and nature. For example, broadly regenerative practices of minimum soil tillage and reduced

fertiliser use could lower costs for farmers and improve long-term soil health. 'Enablers' consisted of the contextual, structural, and strategic levers that enable, sustainable, broadly regenerative, and equitable food systems transformation in the Dar es Salaam context (Table 1).

CHALLENGES HINDERING REGENERATIVE TRANSITIONS

Lack of explicit awareness of mandates and uncoordinated, overlapping government activities

Both within and across different levels of government, there was a substantial lack of awareness of how mandates were linked to regenerative food systems. For example, in the Food Governance workshop, only 38% of national government participants and 60% of local government considered links between their mandates and regenerative food systems. This gap in acknowledging the links between policy and regenerative food systems points to a lack of clarity of roles and mandates for addressing food system challenges.

Table 1. Overview of challenges, opportunities, and enablers identified through participatory workshops and KIIs

Challenges	Opportunities
1) Lack of explicit awareness of mandates and uncoordinated, overlapping government activities 2) One-way food systems relationships 3) Diverse definitions of regenerative food systems 4) Constraints to UPU agriculture 5) Cost of transitioning to sustainable practices	1) Evidence of some sustainable production and retail practices 2) Shared environmental concerns and interest in healthy food and environment 3) Potential to valorise food systems data
Enablers	
1) Leveraging the central role of the national government and the coordination capacity of regional and city councils 2) Co-designing effective and inclusive food systems transformation, involving diverse actors and co-benefits 3) Recognising that formal and informal food systems are intertwined and present innovative opportunities for locally led sustained food systems transformation	

KIIs with local government officials further reflected how blurred mandates and activities cost them time, budget, and effort, leading to low effectiveness and efficiency within and between departments. In the Production workshop, participants from local government additionally recognised delays in funding as a key issue at their governance level. Local and national government participants across workshops also identified limited implementation of existing policies and plans supporting regenerative food systems as a key challenge. An example of a plan that was mentioned is Tanzania's National

Multisectoral Nutrition Action Plan (NMNAP) for 2021/22 to 2025/26 (61). This plan identifies key activities for multiple government departments, including Agriculture, Finance, Planning, Health, and Education, to better leverage their mandates to address national malnutrition. However, this multisectoral responsibility for addressing malnutrition and wider food system challenges was less evident at local levels, as indicated by findings from workshops and KIIs.

One-way food system relationships

Food system maps produced by each table of participants illustrated the existence of multiple one-way relationships between actors. This involved transfer of knowledge, or services, or enforcement of regulation from one actor group to another without reciprocation in some form. Research and policy development was characterised by one-sided relationships, as highlighted by participants' food system maps (in all three workshops). For example, the national food and nutrition policy formulation process was supported by data from universities in Dar es Salaam. These maps illustrated a one-way flow of data (extraction) from actors like farmers, farmer groups, and traditional food markets to universities and researchers. However, food systems maps from food retailers and food producers during the Production and Retail workshops did not show bidirectional relationships with Universities/Researchers. Importantly, food producers and retailers expressed great interest in being involved in the dissemination of findings derived from their contributions.

Another example involving multiple one-way relationships that were viewed as beneficial but also excluding local voices are the contributions from Tanzania's Central Government. During the Food Systems Governance workshop, Central Government representatives illustrated the many ways in which this national level of government provides direct support at the city level, such as agriculture extension services (linked to the ward[7] level), training programmes (e.g., on food safety, food business operations, and nutrition), research (e.g., on nutrition, markets, food waste), coordination with industry and regional government, and issuing of food-based business operating permits. However, as evident from other actors' food systems maps (across all three workshops), there was a need for more inclusive engagement and enhanced coordination and coherence between these national-to-local government-driven activities and those of Dar es Salaam's regional and city governments, SMEs/NGOs, retailers, and farmers groups.

Diverse understandings of regenerative food systems

Participants had varying interpretations of what constitutes a 'regenerative' food system. Understandings and definitions of regenerative food systems varied by actor role in plenary discussions across the three participatory workshops. Introductory discussions during workshops highlighted that most actor groups were aware of at least one broadly sustainable food system term or practice, with 'organic' being the most referenced term.

Participants also had varying ideas regarding whether activities or actors beyond farmers and agriculture constituted part of regenerative food systems. For example, in the Retail workshop, almost all participants considered 'Food sourcing and selling' to be part of regenerative food systems, while in the Production workshop, this view was shared by

[7] In Tanzania, the ward governance level is structurally below the municipal governance level.

40% of the University/ Researcher participants, 60% of the Local Government participants, and 100% of the Farmer participants. Plenary workshop discussions also indicated varying considerations of 'gender and youth' as part of 'regenerative food systems'. Limited recognition of different actors and social identities' roles in regenerative food systems suggests gaps in understanding of how regenerative approaches intersect with broader social dimensions of food systems.

Constraints to UPU small-scale agriculture

There is a sizeable combined patchwork of urban and peri-urban (UPU) areas under crop production in Dar es Salaam. For farmers, vendors, and transporters, this local food production is an important source of sustenance and livelihoods. However, insights from the Production workshop and KIIs with food producers highlight how these farmers, several of whom are also local retailers, face several challenges that limit their ability to provide reliable quantities of safe, nutritious food. Due to the informal nature of much UPU agriculture, farmers face key challenges with land tenure (46). Workshops and KII insights indicated that limited access to capital and high operational costs further compounded this challenge. Infrastructure was an additional challenge noted during the Production workshop. Farmers and Food processors noted how a lack of modern technology for farming and storing crops led to lower yields and higher post-harvest losses. Supermarkets and kiosk vendors in the Retail workshop had similar concerns, noting poor infrastructure for transporting food products as a root cause of unstable food availability.

Costs of transitioning to sustainable practices

Despite interest in regenerative practices, KIIs and workshop insights suggested a hesitance to adopt regenerative practices due to perceived drops in yield. Although regenerative practices generally require fewer inputs, thereby reducing the amount of money spent on chemical fertiliser, these practices may lead to reduced yield in initial years of adoption (18). This change to regenerative practices can be risky from the farmers' perspective and may result in reduced profits. Due to these risks, some participants were reluctant to adopt more regenerative or similar practices, as noted in KIIs with farmers. Taking these risks may be further challenged by actors' poor access to credit and existing precarity.

Several farmers were employing broadly sustainable methods such as compost fertiliser, minimal tillage, and crop rotation. However, practices such as the use of compost fertiliser may have been driven by necessity rather than a commitment to sustainability, as KIIs with farmers highlighted how fertiliser was often one of their highest operational costs. This suggests that cost and time in relation to benefits are likely to influence the adoption of sustainable solutions.

OPPORTUNITIES FOR ENABLING REGENERATIVE TRANSITIONS

Evidence of some sustainable food production and retail practices

Many workshop participants practice and/or are aware of broadly regenerative, sustainable, or organic food systems approaches. For example, some reported compost use (in contrast to the reported wide use of chemical fertilisers), a preference not to use pesticides despite the known resultant yield reduction during the rainy season,

employment of minimum tillage and crop rotation practices, popularity of organically produced food, and efforts to practice food hygiene in supermarkets and local and traditional food markets to improve food safety and reduce food waste. Notably, there is a strong organic UPU food culture in Dar es Salaam; which appears to influence many participants' interpretations of what constitutes sustainable and/or regenerative food systems.

Shared environmental concerns and interest in 'healthy food and environment'

Workshops and KIIs also showed shared environmental concerns and substantial interest in realising a 'healthy food and environment'. In the Production workshop, for example, all participants who were both Farmers and Sellers were highly interested in regenerative production methods, while only 64% of Local Government and 44% of University/ Researcher groups were interested. However, KIIs with food producers as well as plenary discussions during the Production workshop highlighted that many that felt they did not know how to achieve such regenerative transitions. This lack of knowledge was further exacerbated by perceptions of limited present-day technical support, education/ training, and financing for regenerative systems – challenges highlighted during the Production workshop. While capacity building may be needed, shared concerns and interest indicate a potential opportunity for scaling current regenerative practices.

Potential to valorise several forms of food systems data

As highlighted in the workshops, universities and researchers tended to lead on food systems data collection from food producers and retailers. In the Governance workshop, participant representatives from small and medium-sized enterprises and non-government organisations emphasised the need for a more reciprocal relationship between universities or researchers who collected the data and farmers and retailers who shared their data. One suggestion was that research outputs should be made more widely accessible by considering creative formats and translations in Kiswahili and English.

DISCUSSION: ENABLERS OF REGENERATIVE FOOD SYSTEMS

Workshops and KIIs demonstrated several specific challenges and opportunities in Dar es Salaam. Each of these challenges and opportunities revealed enablers or 'levers' to effect food system transformation. A few of these levers can be activated through relatively simple and low-cost interventions. Examples include leveraging the existing UPU organic food culture, making existing food systems data more accessible to actors (e.g., farmers and vendors) who are often part of data collection processes, and providing research insights in Kiswahili and English (as highlighted during the Production and Food Systems Governance workshops). Other levers require technical support to re-conceptualise public-private partnerships and to design innovative investment models needed to facilitate food systems transformation. Investment options, for example, could integrate renewable energy, soil biodiversity, and market-data funding streams with structured 3- to 5-year repayment terms for small-scale UPU farmers that begin with small instalments. These models can be de-risked through a percentage of philanthropic, public, and private funding together with public-private partnership supported extension services. This approach may be well aligned with the transition time required to move from

conventional food production to regenerative agricultural production and then reap benefits that balance the costs, a challenge mentioned by participants.

Formal and informal food systems are intertwined and present innovative opportunities for locally led sustained food systems transformation

In Dar es Salaam, supermarkets, local and traditional markets, and kiosks are important places of food trade. This web of food hubs, connecting formal and informal food systems, plays a key role in livelihoods, local economic development, and enabling access to food, especially for vulnerable UPU communities (45, 46, 63). The activities of vendors and consumers as well as smallholder UPU farmers and local food supply chain actors across neighbouring regions intersect in these food hubs on a regular basis. At the juncture of supply and demand, these hubs were found to offer great potential to promote regenerative transitions and enable resilience to external shocks like flooding (which increasingly disrupts availability and access to food in Dar es Salaam)

Workshops and KII insights suggested that there is misuse or over-use of chemical fertilisers in the UPU agricultural food production (formal and informal) and the wider food system. These fertilisers were identified as the largest operational expense for farmers. At the same time, there was a shared recognition among farmers and retailers that organic agriculture reduces chemical fertiliser use and the associated cost. Organic UPU agriculture was expressed as both a choice and a necessity. However, because of the quick returns from high yields, participants reported that many farmers continue to rely on chemical fertilisers where possible.

Modern food systems are not designed to adequately include these smallholders, women, Indigenous farming systems, or the multitude of small businesses across the food value chain that help shape what food is accessible in local and traditional food retail markets, in kiosks, and from last-mile vendors (63). Though smaller-scale farmers and informal food vendors play important roles in resilience and innovation in Dar es Salaam, they are often disproportionately affected by environmental degradation or economic shocks and have limited access to protections. Regenerative transitions therefore need to actively work to reduce the inequities and vulnerabilities that leave people behind and undermine their potential (63-66).

Regenerative transitions will therefore require a ‘whole of society’ effort and strategic balancing between local deepening versus scaling of regenerative practices. This will need to be supported by extension services, building capacity and skills, access to food systems data, and innovative financial arrangements to upgrade farm, supply chain, and retail infrastructure.

Leveraging the central role of the national government and the coordination capacity of regional and city councils

Tanzania’s central (national) government plays a dominant role in Dar es Salaam’s city-region food system, providing multiple valued services, from agricultural extension to training and policy guidance. Though capacity and interest in food systems transformation is strong at the national level, this potential is not realised on the ground, where the local government’s capacity and resources were perceived as more limited.

Enhanced coordination of city (municipal) and regional government with national (central) government can reduce duplication of effort and enable a more efficient allocation of resources. However, for local and regional governments to effectively leverage the central role of the national government, they need to understand the needs of and relationships between diverse food system actors - from production to retail.

Co-designing local food systems transformation solutions

It takes time to achieve inclusive and equitable engagement of diverse food systems actors and to co-design systemic transformative solutions before implementation can begin. Effective engagement requires comprehensive actor mapping that goes beyond the mapping of those who are interested and those who influence. It involves critical consideration of how actors are embedded in their food system and of co-benefits and trade-offs, as well as working with multiple forms of evidence. The diverse interpretations of regenerative food systems by the different workshop participants underscores the value of inclusive, participatory approaches. Understanding these interpretations and how they inform co-designed transformation solutions is fundamental to future efforts to realise locally led regenerative transitions.

To enhance participants' agency in co-designing challenges and solutions to food systems transformations, steps need to be taken to empower participants. For example, they need to have access to data on production methods, yields, food distribution, prices, and climate, as well as awareness of government resources and food systems governance processes. Sharing such information can support informed decision-making and consensus building to help mainstream sustainable food system practices, develop best practices for urban planning and local economic development, and guide public- and private-sector investment.

CONCLUDING COMMENTS

Just and sustainable transitions to regenerative food systems are urgently needed to safeguard the well-being of people and the planet (1). Without such transitions, the activities of the global population - that is increasingly urban - will accelerate pressures on Earth's natural systems, exacerbate diet-related ill health, widen socio-economic inequalities linked to food, and heighten disruptions to food supply chains (1-4, 41, 63, 66). Addressing these challenges requires inclusive, locally grounded, and globally connected approaches that strengthen resilience, support livelihoods, and ensure equitable access to biodiverse, nutritious and culturally appropriate food (64, 66-68).

Findings from this inquiry in Dar es Salaam highlight the interconnected challenges, opportunities, and enabling conditions shaping this mega-city's food production, retail, and food systems governance. Limited awareness of government mandates, alongside fragmented and overlapping public and civil society initiatives, points to the importance of strengthening institutional capacity and clearer articulation of roles and implementation of responsibilities. Complementing this is a need to better understand how to implement a 'whole of society' approach – bringing together the various government and non-government stakeholders to design for and implement local transformation. This can enhance the efficacy, quality, accountability, and transparency of multi-level food systems governance. It also informs the coordination of multistakeholder actions across production and retail (and other sectors). The inquiry further identified

constraints to systems thinking, including limited knowledge of actors' food systems relationships and a lack of shared understanding of regenerative food systems and how these connect with topics like climate, biodiversity, and socio-economic development.

As an exploratory inquiry, there are limitations on how much the findings fully reflect diverse views and the Dar es Salaam context. For example, the challenge trees developed in the workshops tended to be overarching snapshots of root causes, cause and effect linkages, and outcomes. Future efforts should encourage further unpacking of these elements and relationships. Gender was a recruitment consideration, but it was second to engaging actors on the basis of their role. It is important to engage more women, as well as youth, in further studies – especially given their role in food systems, their large numbers, and that their voices have tended to be marginalised in policy deliberations. Additionally, trust building and critical reflection by all actors are necessary for understanding and sharing challenges to, and co-designing solutions for, sustainable food systems transformation.

Views and knowledge about food systems are often not carefully curated by actors, waiting to be succinctly distilled during workshops, surveys, interviews or other. This is especially the case for tacit knowledge and practices, sensitive issues, and when bringing diverse actors together to discuss their food system. It is therefore vital to leave sufficient time for reflection between engaging and re-engaging actors; it is also important to later ensure actors are part of the reporting feedback. The approach taken in this inquiry of engaging small groups of potential participants during field visits, one-on-one emails, and telephonic communications during the recruitment process ahead of the workshops and then, after analysis, reporting the findings to participants provided opportunity for this reflection.

Adopting a broad definition of regenerative food systems, combined with participatory principles and tools, enabled the inquiry to explore views that may otherwise have remained overlooked and/or appeared disconnected from more evident narratives. Clarifying how different actors conceptualise regenerative food systems can inform the future design of engagement strategies and help motivate diverse stakeholders to support the transition towards more sustainable practices.

During 2024, in conjunction with this inquiry, three city-to-city learning exchanges were held between Dar es Salaam and cities within the C40 network (Lagos, Nairobi, and Quito). In January 2025, the insights from the inquiry and city exchanges were shared at a global multi-stakeholder meeting convened by the Club of Rome (as part of TURFS), at which opportunities to scale and transfer the Dar es Salaam case study were explored.

Looking ahead, as interest grows in the rights to food, decent livelihoods and a healthy environment, the focus on regenerative and other sustainable food system transitions is expected to expand. This inquiry has illustrated the value of implementing a participatory approach when facilitating inclusive, locally led regenerative transitions and scaling and transferring insights across diverse urban contexts.

REFERENCES

1. Rockström J, Thilsted SH, Willett WC, Gordon LJ, Herrero M, Hicks CC, et al. The EAT–Lancet Commission on healthy, sustainable, and just food systems. Lancet. 2025 Oct 11;406(10512):1625–700.
2. Steffen W, Rockström J, Richardson K, Lenton TM, Folke C, Liverman D, et al. Trajectories of the Earth System in the Anthropocene. Proc Natl Acad Sci U S A. 2018 Aug 14;115(33):8252–9.
3. HLPE. Strengthening urban and peri-urban food systems to achieve food security and nutrition in the context of urbanization and rural transformation. Rome: CFS HLPE-FSN; 2024.
4. United Nations Development Programme (UNDP). The next frontier: human development and the Anthropocene [Internet]. New York: UNDP; 2020. Available from: https://www.undp.org/serbia/publications/next-frontier-human-development-and-anthropocene
5. FAO, IFAD, UNICEF, WFP, WHO. The state of food security and nutrition in the world 2025 [Internet]. 2025 [cited 2026 Feb 9]. (SOFI). Available from: https://www.fao.org/publications/fao-flagship-publications/the-state-of-food-security-and-nutrition-in-the-world/en
6. United Nations. Global Multidimensional Poverty Index 2025 (MPI) [Internet]. New York: United Nations; 2025 [cited 2026 Jan 21]. Available from: https://hdr.undp.org/content/2025-global-multidimensional-poverty-index-mpi
7. Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, et al. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. Lancet. 2019 Feb 2;393(10170):447–92.
8. FAO, IFAD, UNICEF, WFP, WHO. The state of food security and nutrition in the world 2023: urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum [Internet]. 2023 [cited 2026 Feb 9]. (SOFI). Available from: https://openknowledge.fao.org/handle/20.500.14283/cc3017en
9. Nature Food. The triple burden of malnutrition. Nature Food [Internet]. 2023 Nov 1;4(11):925–5. Available from: https://www.nature.com/articles/s43016-023-00886-8.
10. Pallier PN, Collantoni E. Impact of nutrition on brain health [Internet]. Frontiers; [cited 2026 Feb 9]. Available from: https://www.frontiersin.org/research-topics/69046/impact-of-nutrition-on-brain-health
11. World Health Organization (WHO). Noncommunicable diseases [Internet]. Geneva: WHO; [cited 2026 Jan 21]. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
12. World Health Organization (WHO). WHO urges cost-effective solutions on NCDs and mental health amidst slowing progress [Internet]. Geneva: WHO; 2025 Sep 18 [cited 2026 Jan 22]. Available from: https://www.who.int/news/item/18-09-2025-who-urges-cost-effective-solutions-on-ncds-and-mental-health-amidst-slowing-progress

13. FAO. Greenhouse gas emissions from agrifood systems: global, regional and country trends, 2000–2022 [Internet]. 2021 [cited 2026 Feb 9]. Available from: https://www.fao.org/statistics/highlights-archive/highlights-detail/greenhouse-gas-emissions-from-agrifood-systems-en

14. WWF International. Farming with biodiversity: towards nature-positive production at scale [Internet]. 2021 [cited 2026 Jan 22]. Available from: https://www.wwf.nl/globalassets/pdf/farming-with-biodiversity_wwf-report-2021_spreads.pdf

15. Khatri P, Kumar P, Shakya K, Kirlas M, Tiwari K. Understanding the intertwined nature of rising multiple risks in modern agriculture and food systems. Environ Dev Sustain. 2023 Aug 6;26.

16. Khangura R, Ferris D, Wagg C, Bowyer J. Regenerative agriculture: a literature review on the practices and mechanisms used to improve soil health. Sustainability [Internet]. 2023 Jan 27 [cited 2026 Jan 23];15(3). Available from: https://www.mdpi.com/2071-1050/15/3/2338

17. Prăvălie R. Exploring the multiple land degradation pathways across the planet. Earth Sci Rev. 2021 Sep 1;220:103689.

18. Ghosh P, Hazra K, Mandal B. Prospects of carbon farming and its role in food and environmental security. 2024 Aug 1;728–40.

19. Monoculture of crops: a challenge in attaining food security. In: Advances in food security and sustainability [Internet]. Elsevier; 2024 [cited 2026 Jan 22]. p. 197–213. Available from: https://www.sciencedirect.com/science/chapter/bookseries/abs/pii/S2452263524000168

20. Bhardwaj RL, Parashar A, Parewa HP, Vyas L. An alarming decline in the nutritional quality of foods: the biggest challenge for future generations' health. Foods. 2024 Mar 14;13(6):877.

21. FAO, IFAD, UNICEF, WFP, WHO. The state of food security and nutrition in the world 2024 [Internet]. Rome: FAO; 2024 [cited 2024 Nov 13]. 286 p. (SOFI). Available from: https://openknowledge.fao.org/handle/20.500.14283/cd1254en

22. Akkerman R, Cruijssen F. Food loss, food waste, and sustainability in food supply chains. In: Bouchery Y, Corbett CJ, Fransoo JC, Tan T, editors. Sustainable supply chains [Internet]. Cham: Springer International Publishing; 2024 [cited 2026 Jan 23]. p. 219–39.

23. Beuving M, McNabb WC, Smith NW. Global nutrient content embedded in food losses and waste: identifying the sources and magnitude along the food supply chain. Sustain Prod Consum. 2024 Nov 1;51:519–31.

24. Stringer L, Fraser E, Harris D, Lyon C, Pereira L, Ward C, et al. Adaptation and development pathways for different types of farmers [Internet]. 2020 Feb [cited 2026 Jan 22]. Available from: https://hdl.handle.net/10568/111564

25. Costa C Jr, Thornton P, Wollenberg E. Global hotspots of climate change adaptation and mitigation in agriculture. Front Sustain Food Syst [Internet]. 2023 Nov 16 [cited

2026 Jan 22];7. Available from: https://www.frontiersin.org/articles/10.3389/fsufs.2023.1216205/full

26. Babaniyi GG, Ibrahim F, Akor UJ, Daramola OE. Regenerative agriculture for food security. In: Aransiola SA, Babaniyi BR, Aransiola AB, Maddela NR, editors. Prospects for soil regeneration and its impact on environmental protection [Internet]. Cham: Springer Nature Switzerland; 2024 [cited 2026 Jan 22]. p. 227–42. Available from: https://doi.org/10.1007/978-3-031-53270-2_10

27. Wilson KR, Hendrickson MK, Myers RL. A buzzword, a "win-win," or a signal towards the future of agriculture? A critical analysis of regenerative agriculture. Agric Hum Values. 2025 Mar 1;42(1):257–69.

28. Buckton SJ, Fazey I, Sharpe B, Om ES, Doherty B, Ball P, et al. The regenerative lens: a conceptual framework for regenerative social-ecological systems. One Earth. 2023 Jul 21;6(7):824–42.

29. Sands B, Machado M, White A, Zent E, Gould R. Moving towards an anti-colonial definition for regenerative agriculture. Agric Hum Values. 2023 May 4;40.

30. Jayasinghe SL, Thomas DT, Anderson JP, Chen C, Macdonald BCT. Global application of regenerative agriculture: a review of definitions and assessment approaches. Sustainability [Internet]. 2023 Nov 14 [cited 2026 Jan 23];15(22). Available from: https://www.mdpi.com/2071-1050/15/22/15941

31. Regen10. Outcomes framework [Internet]. [cited 2026 Jan 23]. Available from: https://regen10.org/outcomes-framework/

32. Newton P, Civita N, Frankel-Goldwater L, Bartel K, Johns C. What is regenerative agriculture? A review of scholar and practitioner definitions based on processes and outcomes. Front Sustain Food Syst [Internet]. 2020 Oct 26 [cited 2026 Jan 23];4. Available from: https://www.frontiersin.org/articles/10.3389/fsufs.2020.577723/full

33. Sonnino R. Food system transformation: urban perspectives. Cities. 2023 Mar 1;134:104164.

34. Moragues-Faus A. Towards a critical governance framework: unveiling the political and justice dimensions of urban food partnerships. Geogr J. 2020 Mar 1;186:73–86.

35. Urban–rural food system convergence as a vector for sustainable transformation [Internet]. [cited 2026 Jan 23]. Available from: http://ouci.dntb.gov.ua/en/works/leRRyyK9/

36. Trevenen-Jones A, Sietchiping R, Githiri G, Forster T, Daniel K, Troccoli C, Moon RJ, Ramos JC. Territorial governance and food markets for sustainable food systems (white paper). Nairobi: UN-Habitat; 2025.

37. FAO. FAO framework for the urban food agenda [Internet]. Rome: FAO; 2019 [cited 2026 Jan 23]. Available from: http://www.fao.org/documents/card/en/c/ca3151en

38. United Nations. The Sustainable Development Goals report 2025 [Internet]. 2025 [cited 2026 Jan 23]. Available from: https://unstats.un.org/sdgs/report/2025/The-Sustainable-Development-Goals-Report-2025.pdf

39. Trevenen-Jones A, Nel R, Sutarjadi E, and Hafsari Purwindah R. Food systems governance and the public sector: an overview. Global Alliance for Improved Nutrition (GAIN). Working Paper #47. Geneva, Switzerland, 2025. DOI: https://doi.org/10.36072/wp.47

40. National Bureau of Statistics Tanzania. Tanzania population and housing census 2022 [Internet]. [cited 2026 Jan 23]. Available from: https://microdata.nbs.go.tz/index.php/catalog/45

41. World Population Review. Dar es Salaam population 2026 [Internet]. 2026 [cited 2026 Jan 23]. Available from: https://worldpopulationreview.com/cities/tanzania/dar-es-salaam

42. Zu Selhausen FM. Urban migration in East and West Africa since 1950. In: Migration in Africa [Internet]. 1st ed. London: Routledge; 2022 [cited 2026 Feb 9]. p. 281–307. Available from:https://www.taylorfrancis.com/books/9781003225027/chapters/10.4324/9781003225027-18

43. Kimaryo C, Efraim J, Njenge N, Sunguya B, Haskins L, Hatløy A, et al. The triple burden of malnutrition among adolescents in Dar es Salaam, Tanzania: the role of gender, household environment and food insecurity. PLoS One. 2025 Dec 5;20(12):e0337102.

44. Ignowski L, Belton B, Tran N, Ameye H. Dietary inadequacy in Tanzania is linked to the rising cost of nutritious foods and consumption of food-away-from-home. Glob Food Secur. 2023 Jun;37:100679.

45. Wegerif M. Feeding Dar es Salaam: a symbiotic food system perspective [Internet]. 2017 [cited 2024 Dec 31]. Available from: https://www.proquest.com/openview/7478676cfb0d74226c7e868c57920f67/1

46. Wessels MT, Hemerijckx LM. Going with the food flow: the contribution of urban agriculture to a growing African city. Dev South Afr. 2024 Nov;41(6):1214–29.

47. Yadav A, Yadav K. From humble beginnings to nutritional powerhouse: the rise of amaranth as a climate-resilient superfood. Trop Plants. 2024;3(1):0–0.

48. Mdee A, Mushi A. Untangling blame and responsibility for service delivery and local governance performance: testing a grounded social accountability approach in Tanzania. Local Gov Stud. 2021;47(6):993–1013.

49. Cornish F, Breton N, Moreno-Tabarez U, Delgado J, Rua M, de-Graft Aikins A, et al. Participatory action research. Nat Rev Methods Primers. 2023 Apr 27;3(1):34.

50. Pandey A, Dev Sharma S, Rawat A, Divya D, Gotte RK. Designing a better food system in India: a design thinking approach [Internet]. 2024 [cited 2026 Feb 9]. Available from: https://www.researchgate.net/publication/379524327

51. Mikelsone E, Cīrule I. Design thinking approach to create impact assessment tool: Cities2030 case study. Sustainability [Internet]. 2024 Nov 4 [cited 2026 Jan 23];16(21). Available from: https://www.mdpi.com/2071-1050/16/21/9593

52. Trevenen-Jones A, Greenwood M, Muketha M, and Kebenei M. Empowered local agency, infrastructure investment, and governance: a model and case for traditional food markets. Global Alliance for Improved Nutrition (GAIN). Working Paper #49. Geneva, Switzerland, 2025. DOI: https://doi.org/10.36072/wp.49

53. West S, Haider LJ, Hertz T, Mancilla Garcia M, Moore ML. Relational approaches to sustainability transformations: walking together in a world of many worlds. Ecosyst People. 2024 Dec 31;20(1):2370539.

54. Ahmed SK, Mohammed RA, Nashwan AJ, Ibrahim RH, Abdalla AQ, Ameen BMM, Khdhir RM. Using Thematic Analysis in Qualitative Research. Journal of Medicine, Surgery, and Public Health [Internet]. 2025;6(6):100198. Available from: https://www.sciencedirect.com/science/article/pii/S2949916X25000222

55. Tiliouine, Adam, Kosinska, Monika & Schröder-Bäck, Peter. World Health Organization. Regional Office for Europe. Tool for mapping governance for health and well-being: the organigraph method [Internet]. 2018. Available from: https://iris.who.int/handle/10665/329424

56. Burns JC, Paul DP, Paz SR. Participatory asset mapping toolkit [Internet]. Washington, DC: Healthy City; 2011 [cited 2026 Jan 23]. Available from: https://communityscience.com/wp-content/uploads/2021/04/AssetMappingToolkit.pdf

57. The Grassroots Collective. Using problem and objective trees for community development projects [Internet]. [cited 2026 Jan 23]. Available from: https://www.thegrassrootscollective.org/problem-objective-tree-development

58. Byrne D. A worked example of Braun and Clarke's approach to reflexive thematic analysis. Qual Quant. 2022 Jun 1;56(3):1391–412.

59. Ahmed SK, Mohammed RA, Nashwan AJ, Ibrahim RH, Abdalla AQ, Ameen BM, et al. Using thematic analysis in qualitative research. J Med Surg Public Health. 2025 Aug 1;6:100198.

60. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101. Available from: http://dx.doi.org/10.1191/1478088706qp063oa

61. United Republic of Tanzania, Prime Minister's Office. National multisectoral nutrition action plan 2021/22–2025/26 [Internet]. [cited 2026 Jan 23]. Available from: https://www.pmo.go.tz/uploads/documents/sw-1646121553-NMNAP.pdf

62. Cook B, Trevenen-Jones A, Sivasubramanian B. Nutritional, economic, social, and governance implications of traditional food markets for vulnerable populations in sub-Saharan Africa: a systematic narrative review. Front Sustain Food Syst. 2024;8:1382383. doi: 10.3389/fsufs.2024.1382383.

63. United Nations Development Programme (UNDP). Supporting food systems transformation towards sustainability and resilience [Internet]. New York: UNDP; 2021 [cited 2026 Feb 8]. Available from: https://www.undp.org/sites/g/files/zskgke326/files/2024-10/undp_white_paper_supporting_food_systems_transformation.pdf

64. World Health Organization (WHO). Guidance on mainstreaming biodiversity for nutrition and health [Internet]. Geneva: WHO; 2020 [cited 2026 Feb 9]. 81 p. Available from: https://www.who.int/publications/i/item/9789240006690

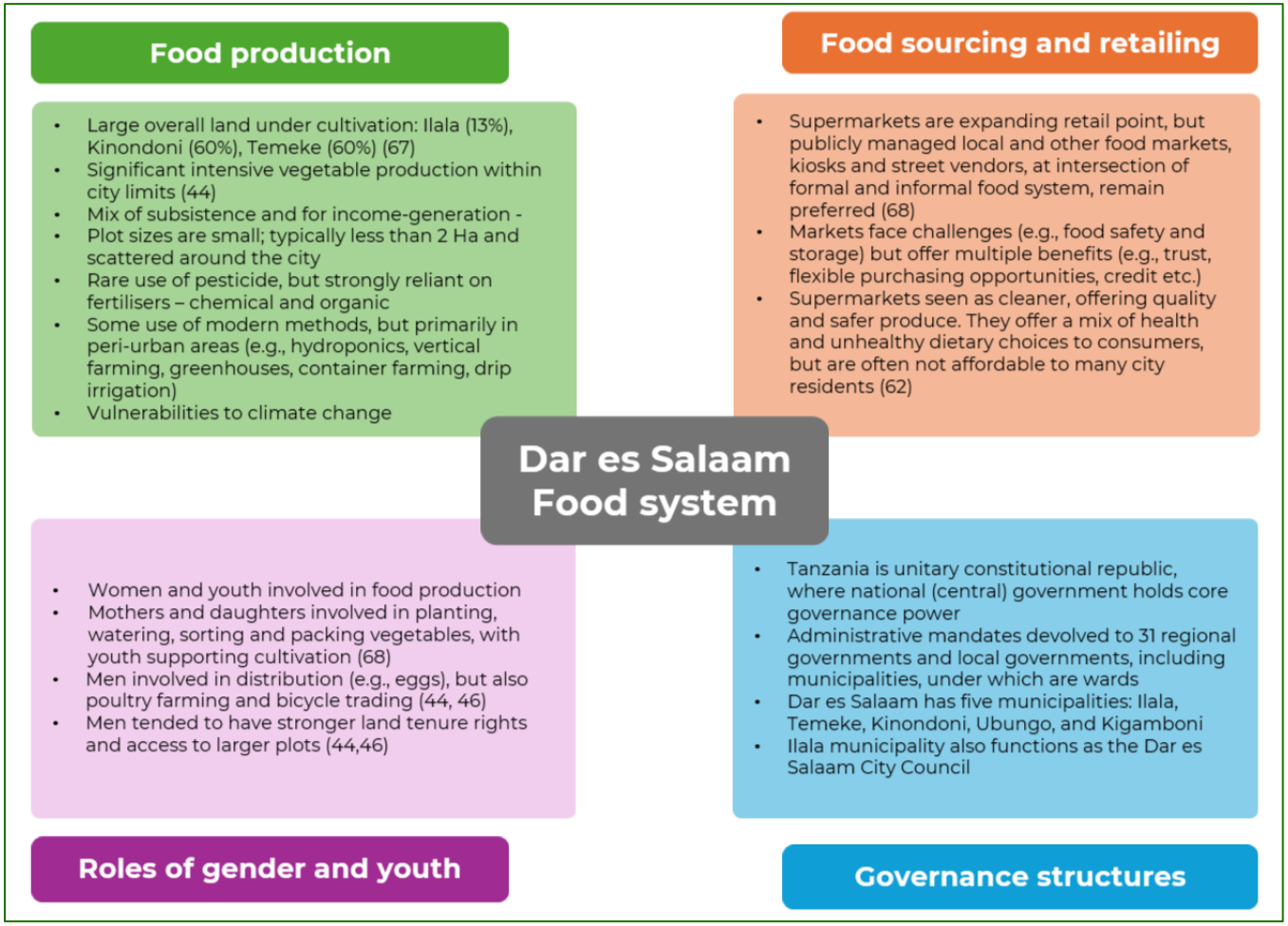
65. European Commission. Urbanisation worldwide: knowledge for policy [Internet]. [cited 2026 Jan 23]. Available from: https://knowledge4policy.ec.europa.eu/foresight/topic/continuing-urbanisation/urbanisation-worldwide_en

66. Schmidt S. Getting the policy right: urban agriculture in Dar es Salaam, Tanzania. Int Dev Plan Rev [Internet]. 2012[cited 2026 Feb 9];34(2):129–45. Available from: http://dx.doi.org/10.3828/idpr.2012.9

67. Mamiro P, Marras S, Kagaruki G, Sunguya B, Mlunde L, Kimambo SM. Street food vending and consumption in Dar es Salaam marketplaces. Survey report. 2019.

68. McLees L. A postcolonial approach to urban studies: Interviews, mental maps, and photo voices on the urban farms of Dar es salaam, Tanzania. Prof Geogr [Internet]. 2013;65(2):283–95. Available from: http://dx.doi.org/10.1080/00330124.2012.679449

ANNEX 1. OVERVIEW OF DAR ES SALAAM'S FOOD SYSTEMS CONTEXT



ANNEX 2. DESIGN AND FLOW OF KEY ELEMENTS OF THE WORKSHOPS

Registration and Welcome

including a second level registration by table facilitators, with consent statement, of participants at their group tables (based on their role); note on respectful, participatory engagement guidelines and focus on realities of participants; and framing of the workshop/s.

(Plenary)

Exercise: Food systems mapping

Annotated maps drawn by participants (as table groups) showing their food systems relationships.
(Table activity)

Interpretations of 'Regenerative'

Sharing and understanding different interpretations of key terms e.g., organic, agro-ecological, regenerative, circular and sustainable food systems.

(Plenary)

Exercise: Challenge and Opportunity Trees

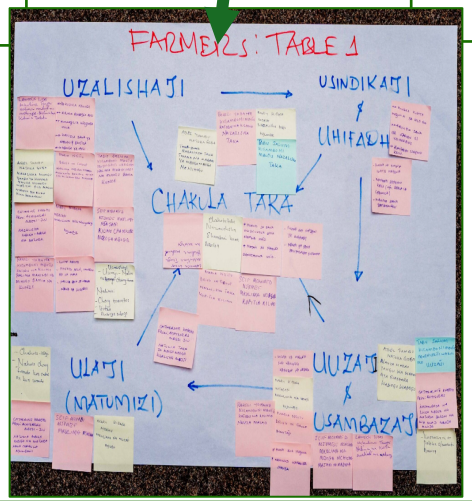
Trees co-designed by participants (as per their food systems role)

(Table activity)

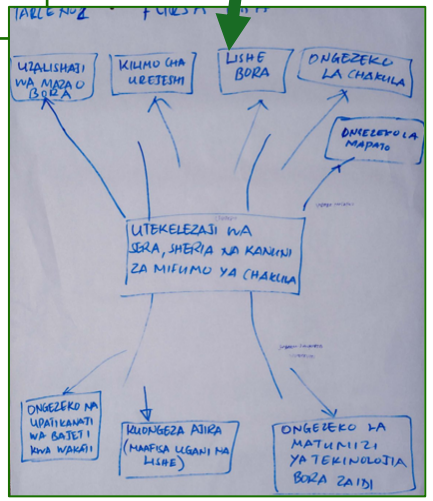
Closing

Feedback questionnaire, and next steps including mention of planed post reporting sharing of the findings.

(Plenary)

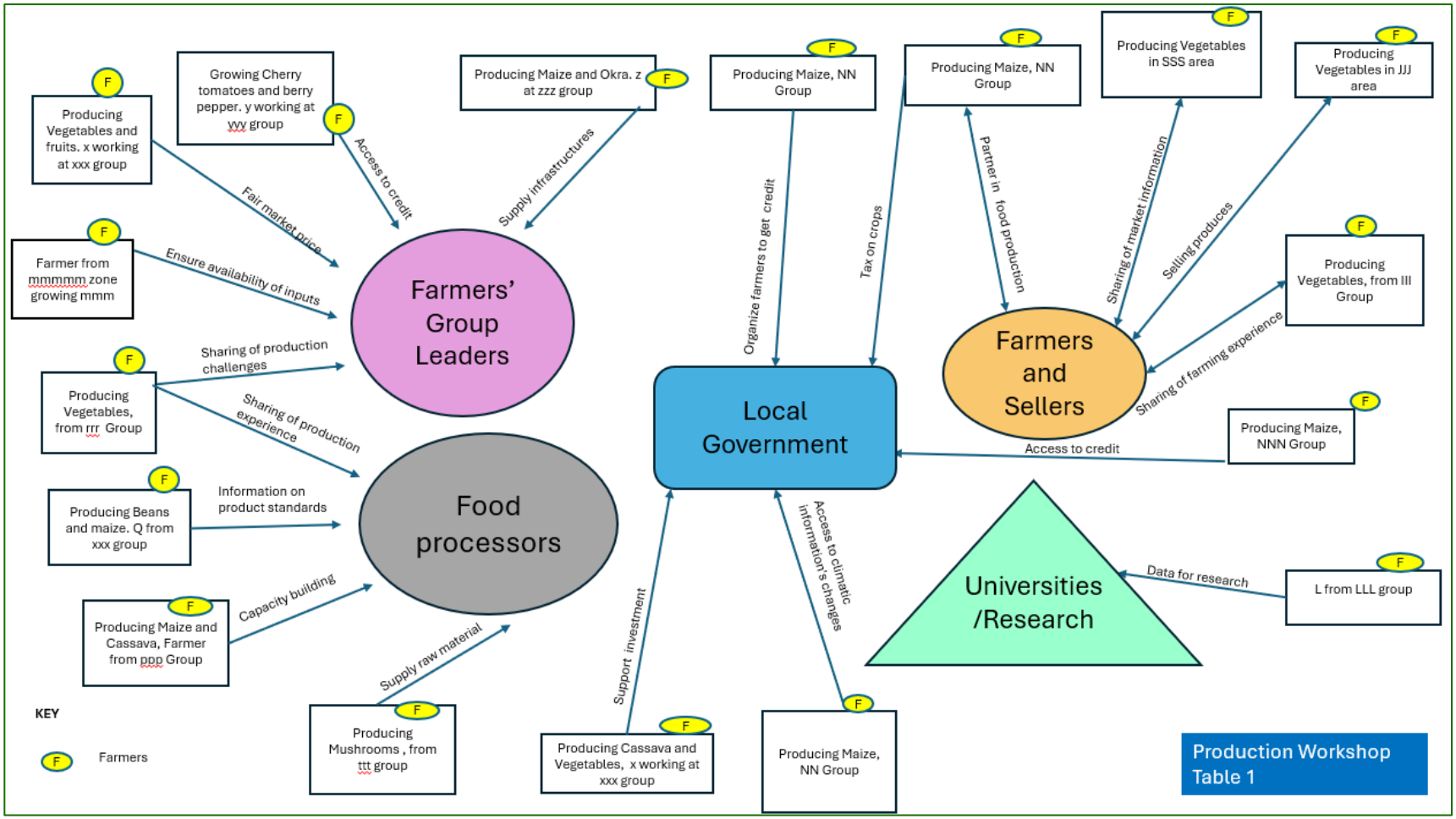


Following development of each table's food system map, participants were asked to walk around and provide other tables' maps with feedback

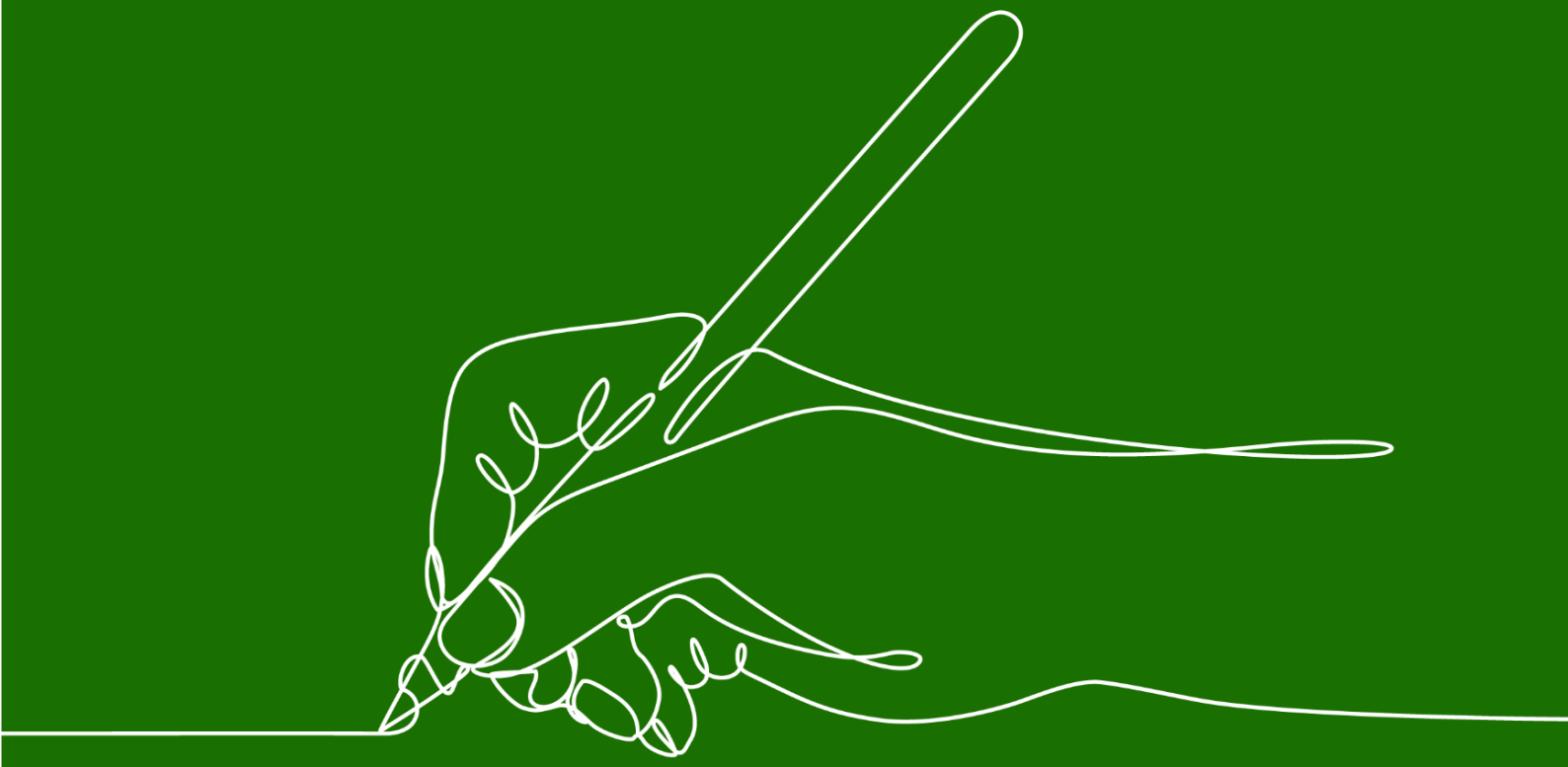


After the challenge-opportunity trees were developed, participants then viewed each other's table maps and their insights (based on their food system roles) were recorded. This served to add further dimensions to the insights and was not for verification purposes.

ANNEX 3. EXAMPLE OF A FOOD SYSTEM MAP DEVELOPED BY A TABLE OF WORKSHOP PARTICIPANTS*



*names of groups and organisations removed for confidentiality purposes



gain
Global Alliance for Improved Nutrition

ABOUT GAIN

The Global Alliance for Improved Nutrition (GAIN) is a Swiss-based foundation launched at the UN in 2002 to tackle the human suffering caused by malnutrition. Working with governments, businesses and civil society, we aim to transform food systems so that they deliver more nutritious food for all people, especially the most vulnerable.

ABOUT THE GAIN WORKING PAPER SERIES

The GAIN Working Paper Series provides informative updates on programme approaches, research and evaluations, and on topics of relevance for our work. The full series may be accessed at https://bit.ly/gainpub

The Global Alliance for Improved Nutrition

Rue de Varembé 1202 | Geneva | Switzerland| info@gainhealth.org

www.gainhealth.org
GAINalliance
GAINalliance
Gainadm
GAINalliance
Global Alliance for Improved Nutrition