



# Translating Multisectoral Nutrition Policy into Community Practice: Participation of Nutrition Officers in Tanzania Fosters Effective Collaborative Strategies to Improve Child Nutrition

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## ABSTRACT

**Background:** Globally, multisectoral coordination for nutrition is needed to tackle multiple determinants of undernutrition and address unacceptably high rates of stunting in young children. Tanzania has strong national policies and implementation plans to strengthen multisectoral nutrition (MSN) governance, yet local actors must transcend sector silos to fully implement MSN actions in communities.

**Objectives:** We engaged with Nutrition Officers in Regional Secretariats and District Councils to explore strategies, barriers, and facilitators for creating novel “MSN action teams.”

**Methods:** An initial “Learning Exchange” workshop gathered input from nutrition staff in 5 regions and invited their participation in mentoring and supporting MSN collaboration. Regional Nutrition Officers piloted action teams in their districts, supporting District Nutrition Officers to create teams of 3–4 officers from relevant sectors (agriculture, community development, health, education) to plan and implement community-based activities consistent with sector priorities and national policy. To learn from stakeholder experiences, longitudinal data were collected through individual semistructured interviews and documentation of activities; 27 officers were interviewed 1–4 times over 14 mo.

**Results:** Four districts successfully created action teams that bridged communication gaps between administrators and implementors; made progress on advocacy, collaboration, and budgeting for nutrition; and initiated MSN implementation in communities. Participants identified strategies to overcome challenges to cross-sector collaboration including heavy workloads and limited resources and supervisor buy-in. Based on their experiences and innovations in creating MSN action teams, stakeholders shared valuable recommendations for peer learning across sectors to scale up MSN collaboration. Officers’ presentation of insights to regional and district leaders buoyed interest in MSN action teams as a feasible and acceptable approach to strengthen local governance and implementation to improve child nutrition.

**Conclusions:** Experience-based input from government officers engaged in novel community and intersectoral collaborations provided actionable guidance for putting national MSN policy into practice and leveraging the capacity of implementation staff. *Curr Dev Nutr* 2022;6:nzac030.

**Keywords:** nutrition planning, policy implementation, participatory research, undernutrition, community engagement

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Abbreviations used: ASTUTE, Addressing Stunting in Tanzania Early; CHW, Community Health Worker; DNuO, District Nutrition Officer; MSN, Multisectoral Nutrition; NMNAP, National Multisectoral Nutrition Action Plan; RNuO, Regional Nutrition Officer.

## Introduction

Chronic undernutrition in early childhood, often measured as child stunting, is associated with negative cognitive, motor development, and educational outcomes (1, 2). Undernutrition is prevalent among young children in low- and middle-income countries owing to multifactorial causes at multiple levels, resulting in a need for systematic and multisectoral approaches to improve nutrition (3). Multisectoral interventions have shown better child growth and nutrition outcomes than isolated

health programs alone (4, 5). There is a need to build technical, managerial, and leadership capacities that will facilitate effective collaboration across sectors, and to engage personnel from a range of fields in nutrition-sensitive and integrated activities (6–8).

The Scaling Up Nutrition movement, launched in 2010, is an initiative by governments, agencies, civil society, and business and donor groups to eliminate malnutrition in all its forms, based on the principle that everyone has a right to good nutrition (9). International momentum for multisectoral nutrition (MSN) action is exemplified by the

national MSN policies targeting stunting reduction released by many member governments of the Scaling Up Nutrition movement (10). Despite growing political will to promote MSN (11), implementation remains challenging, especially at local levels. Efforts to integrate nutrition into other sectors must address numerous barriers, such as lack of clarity on responsibility; limited nutrition knowledge, training, and incentives among nonnutrition staff; and the challenges of cross-sector communication, coordination, and supervision of joint activities (12, 13). Given contextual differences, successful strategies must be informed by local implementors' experiences and perspectives.

Tanzania is a leader in MSN; the government's National Multisectoral Nutrition Action Plan (NMNAP) for 2016–2021 includes scale-up of MSN interventions and the governance to sustain them (14). Before the NMNAP's release, the government hired and trained nutrition officers and formed regional and district-level Multisectoral Steering Committees on Nutrition (15). At the district level, these Committees include Heads of Department and other leaders, and serve as the multisectoral monitoring body for nutrition activities, responsible for coordinating interventions and implementing the "Nutrition Compacts" signed by Government and Regional Commissioners to develop strategic nutrition action plans and effective utilization of funds (15). In addition, the government mandated other sectors to address nutrition, including district budget allocations of 1000 Tanzanian shillings (TZS) per child <5 y old (16). Factors affecting local implementation of these MSN policies and related government directives are not well known. Research on other health policies in Tanzania, including vitamin A supplementation, indicates implementation challenges with policy awareness, fidelity, funding, and enforcement mechanisms for utilization at district, ward, and village levels (17, 18).

Technical capacity often constrains scaling up coverage, adherence, impact, and sustainability of public health nutrition interventions, and strong leadership and managerial capacity are required to navigate the added complexity of intersectoral collaboration (7, 19). Training is the widely accepted approach to introduce new information and improve staff performance, yet it is insufficient to improve community-level service delivery outcomes (20, 21). The programmatic importance of capacity development is recognized but is hindered by lack of consensus on effective strategies, especially for unifying sectors to implement interventions (20, 22, 23). Challenges vary even across different community and work contexts within a given government system, necessitating attention to emic perspectives. To avoid one-size-fits-all recommendations, it is essential to engage stakeholders in designing and testing MSN approaches.

To learn about on-the-ground challenges to MSN implementation and identify solutions based on stakeholder experience, we collaborated with local government stakeholders in Tanzania to translate national MSN policy into action. We engaged with regional and district-level officers to explore the process of creating and mentoring MSN action teams (hereafter called "action teams") to strengthen local capacity and engagement in efforts to improve child nutrition. Based on this participatory orientation, we invited stakeholders to shape and pilot test approaches to building cross-sector collaboration and improving community-based services (24). We present what they taught us about the action team approach and the factors that influenced their capacity to engage in planning, implementation, and reporting of MSN actions.

## Methods

Whereas participatory or action research usually engages with lay community members (25), the stakeholders of interest in this research were frontline government personnel. We drafted an initial multisectoral approach, asked these stakeholders to develop and test strategies in their work contexts, and maintained regular contact to support and learn from them. This iterative and interactive process was intended to support shared learning across sites and the development of practical implementation approaches.

This study was part of the broader Addressing Stunting in Tanzania Early (ASTUTE) project (26), which sought to strengthen nutrition capacity in 5 regions of Tanzania with high rates of child stunting (27). Across these 5 regions, in the area surrounding Lake Victoria, ~17%–25% of the population never attended school, ~12%–18% of households reported food insecurity, and ~9%–17% of children under age 18 y lived in extreme poverty (28). Prevalence of stunting and underweight in children <5 y old ranged from ~28% to 42% and ~12% to 19%, respectively, and rates of anemia in children aged 6–59 mo ranged from ~58% to 71% (29).

There are 31 regions in Tanzania, each subdivided administratively into districts, divisions, wards, and villages. Regional governments supervise and coordinate integration of national strategies and programs, and district governments are responsible for actual program implementation. District Nutrition Officers (DNuOs) are placed within district Health Departments to implement nutrition activities, support integration of nutrition into other sectors, and monitor NMNAP implementation in communities (30). The cadre of DNuOs has the potential to connect national MSN policies to the implementation of services in communities; however, the lack of nutrition personnel at the community level, beyond health facility staff, necessitates collaboration for implementation. Our objective was to learn about and support DNuO capacity to collaborate across sectors with officers at the regional, district, ward, and village levels to implement the NMNAP policy. Regional Nutrition Officers (RNUOs) were selected as appropriate mentors for DNuOs and MSN action teams, because they provide technical assistance to DNuOs but are not their direct supervisors. Implementation is the jurisdiction of district governments, so DNuOs are directly supervised by District Medical Officers.

### Engaging stakeholders

RNUOs and DNuOs were invited to form collaborative action teams. All government staff that engaged in this research did so as part of their regular work role, and with permission of their supervisors. RNUOs were selected as mentors given their pre-existing roles supporting DNuOs and coordinating region-wide nutrition activities. We anticipated their involvement would build on existing relationships and support the sustainability and scalability of action teams. We invited RNUOs from the 5 regions participating in ASTUTE to attend a Learning Exchange Workshop, establish and support action teams, strengthen capacity, and participate in interviews.

Each RNUO chose 1 pilot district (of the 5–8 districts) in their region, in consultation with researchers. Eligible districts had an active DNuO, in the role for  $\geq 6$  mo, and were located where a round trip visit was possible within a day's travel from regional offices. RNUOs supported DNuOs to form MSN action teams of 3–4 officers from key

**TABLE 1** Outline of the approach suggested for strengthening multisectoral collaboration, and planning and delivery of community nutrition interventions<sup>1</sup>

Implementation phase	Activities
Participatory development of MSN action team approach	Learning Exchange workshop with RNuOs on mentoring, MSN action, and collaborative strategies. Develop plans for RNuOs to mentor DNuOs to create MSN action teams of 3–4 officers from nutrition-sensitive sectors, in collaboration with district leaders. Selection and outreach to district officers and their supervisors.
Step 1. Initiation and scoping	Action teams are formed and meet to discuss the nutrition situation, relevant policy, and possible activities based on knowledge of local nutrition problems, available resources, and capacities.
Step 2. Planning and design	Action team identifies focus and collaboratively plans MSN activities, considering inputs and implementation strategies, based on experience of potential barriers and facilitators.
Step 3. Community outreach and implementation	Action team leverages networks and resources to implement a community-based MSN activity, noting successes and challenges, and adapting plans as needed.
Step 4. Commitment, financing, and sustainability	Action team shares experiences with district leaders to identify steps to create an enabling environment for sustaining MSN collaboration and implementing future activities.

<sup>1</sup>Based on phases of implementation in a model published by Tumilowicz et al. (33). DNuO, District Nutrition Officer; MSN, multisectoral nutrition; RNuO, Regional Nutrition Officer.

nutrition-sensitive sectors to collaborate on community-level actions. To strengthen intersectoral communication among those implementing community activities, action team members were implementation-level district officers, rather than Heads of Department and members of Steering Committees on Nutrition. Members were invited by RNuOs and DNuOs, in consultation with candidates' supervisors.

### Implementation strategy

RNuOs attended a 2-d (16-h) Learning Exchange workshop in Mwanza, Tanzania in February 2018, during which they met with local nutrition experts and the research team to discuss study objectives, mentoring strategies, and MSN policy. RNuOs were asked to suggest feasible approaches to MSN collaboration at the district level. We suggested basic steps (Table 1), including monthly RNuO visits to selected districts to guide action team initiatives, but encouraged flexibility and sought input on adapting the approach to local contexts. In Tanzania, district departments are organized along sectoral lines, such as “agriculture” and “community development.” We refer to “departments” in the context of administrative divisions and “sectors” more generally.

All participants agreed to engage in the action team approach and had supervisors' permission. District officers participated voluntarily and were not compensated for their time. RNuOs were provided per diem and transport costs for in-person visits to districts, as was customary for out-of-office travel.

The research team assessed progress mid-study and identified funding as a major obstacle for teams to implement MSN activities. We then offered teams the opportunity to submit small grant proposals ( $\leq 875$  USD) to support an activity they proposed that could be completed in 2 mo and build multisectoral cooperation.

### Data collection

Two interviewers conducted interviews approximately quarterly with each participant between April 2018 and June 2019. In-depth interviews

(~60 min each) based on semistructured interview guides included open-ended questions intended to encourage respondents to share whatever they felt was most important and thereby direct the conversations. Interview guides were translated into Kiswahili and pretested locally with individuals in roles comparable with those of study participants. The interview guides were designed to be used flexibly, allowing interviewers to follow up on issues raised by respondents, and were adapted during research team debriefings as the study progressed. All participants gave written informed consent and were interviewed at private locations in their place of work. Participants not available during site visits completed telephone interviews.

The first interview preceded the formation of action teams and assessed baseline knowledge of MSN approaches and policy, activities in districts, barriers and facilitators to MSN collaboration, and motivation and self-efficacy to engage in nutrition teamwork. Later interviews assessed progress in forming teams, interaction of members, attitudes and experiences, and outcomes. Final participant interviews were held after completion of each team's community-based activity.

Interviewers also made regular support calls to RNuOs to help overcome challenges. In this way, the research team learned about RNuO perspectives on district governance, political processes, and relationships throughout the course of the project. Outside of support calls, we minimized interaction with RNuOs, relying on them to lead and mentor within the existing system.

All interviewees were approached by research staff who explained the study's purpose and planned uses of data, and all participants provided informed consent. Cornell University's Institutional Review Board and Tanzania's National Institute for Medical Research approved this study.

### Data management and analysis

Verbatim transcripts of interviews were professionally translated into English, and reviewed for completeness and accuracy (GCK, AK). Two

**TABLE 2** Additional quotes illustrating benefits, challenges, and factors that contribute to effective MSN action teams<sup>1</sup>

Theme	Illustrative quotes
Benefits of MSN action teams and collaboration	<p>Ever since the RNuO started coming, nutrition is being seen as an activity in this department. Before it was not even known if there are nutrition activities to focus on. So now it has been known. (Community Development Officer, #2)</p> <p>Things are happening because we are sharing. For example, Agriculture Officers provide us orange-fleshed sweet potato vines and bean sprouts and we bring them to the schools to improve the nutrition of our children. (Education Officer, #2)</p> <p>This is now one team, so if any concern arises [in the Steering Committee] any one of them can respond on nutritional issues rather than how it used to depend on one person only [the DNuO]. (RNuO, #4)</p>
Factors that contribute to effective teams	<p>A team member must be motivated by the reality of the situation, especially the malnutrition in their area. If we have a committed person, even if we don't have money, the activity can be done. We just need a few people who are committed and ready. (DNuO, #1)</p> <p>It requires a lot of commitment to the community. You must think, "I am a leader of a people who are malnourished, who need education to improve their knowledge and well-being" and you work with your heart. (Community Development Officer, #3)</p> <p>A good team discusses issues together and solves them together. They cooperate and give feedback on what is happening; not do something individually. They feel responsibility without considering which department they are from. (RNuO, #1)</p>
Challenges	<p>The challenge is everyone has their own workplan so everyone plans their own activities to push their private sector forward. The good news is, by using [action teams] everyone will gain an understanding of nutrition issues and will make plans that are related. (RNuO, #2)</p> <p>I do not have the final say. I can plan activities for Monday but then management gives me another task or place to go. For example, when it's time for results-based financing we are told to stop all other activities for two weeks, so every activity I have planned will be blocked, even things that are urgent. (RNuO, #1)</p> <p>Transport is a very serious challenge because we only have one vehicle for the entire health department. The only option is to use our own means—to take a <i>boda boda</i> [motorcycle taxi]. We just have to sacrifice. (DNuO, #4)</p>

<sup>1</sup>DNuO, District Nutrition Officer; MSN, multisectoral nutrition; RNuO, Regional Nutrition Officer.

coders (GCK, JM) and student research assistants independently coded 12 transcripts using a grounded theory approach to develop categories of participant experiences (31). Coders collaborated on a codebook of data-driven codes, definitions, and examples using Atlas.ti software (Scientific Software Development GmbH, version 8) (32). GCK and JM cocoded 40% of the remaining transcripts to standardize coding, jointly revising codes until reaching consensus. We used an inductive approach to identify emergent themes, summarizing across sites and participants, using numeric codes for sites and respondents to anonymize the data. We held peer debriefings with the research team to check analysis and interpretation. Participant experiences of, barriers to, and facilitators to MSN collaboration are summarized in what follows within 4 key overlapping steps in implementation (Table 1), based on a larger framework on implementation quality (33). We illustrate the range of stakeholder perspectives with quotes from interviews in the text and in Table 2, indicating each officer's job title and site number.

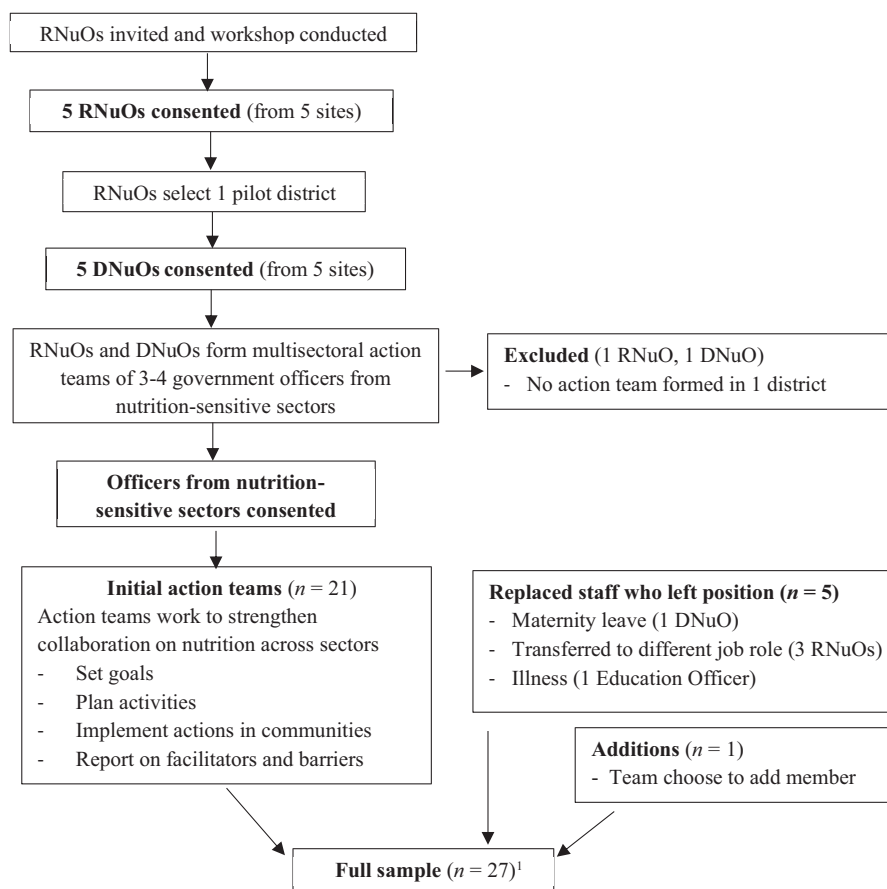
### Local dissemination of results

After the study, the local research team, participating officers, supervisors, and district leadership discussed preliminary findings and recom-

mendations in 90-min district-level meetings in 4 sites. General findings were reported for the study as a whole, not by district, to preserve confidentiality. Approximately 15 attended each meeting, discussed the results, and provided input on next steps and mechanisms to sustain action teams and strengthen MSN collaboration.

### Results

Of the 23 officers initially invited to participate, 21 engaged in initial action teams, and 16 completed the study (Figure 1). In Region 5, the RNuO was unable to form an action team owing to difficulty in balancing clinical and administrative duties and lack of supervisory support for engagement in the study; no further activities were conducted with the RNuO or DNuO in this region. Three other RNuOs were reposted after 4, 7, and 10 mo and 2 district officers went on extended leave; researchers recruited and engaged all the incoming officers. In total, 7 RNuOs and 20 district officers (10 men, 17 women) aged 26–50 y, with 0.5–22 y of experience in their current job, participated at some point (Figure 1).



**FIGURE 1** Flowchart of stakeholder involvement in the participatory process of implementing multisectoral nutrition action teams. <sup>1</sup>Participants ( $n = 27$ ) were interviewed 1–4 times across 14 mo; 66 in-depth interviews were conducted in total. DNuO, District Nutrition Officer; RNuO, Regional Nutrition Officer.

Officers were interviewed 1–4 times for a total of 66 interviews over 14 mo.

### Preintervention assessment

In initial interviews, participants across sectors understood stunting as “very serious” with impacts on “brain development,” “knowledge and understanding,” and “productivity of the nation.” Health and Agriculture Officers had greater knowledge on targeting, interventions, key nutrients, and crops of interest.

All participants viewed nutrition as cross-cutting and reported growing promotion of MSN. Nutrition Officers were eager to work with officers from other sectors but cited lack of allocated budget for nutrition outside the Health Department and insufficient incorporation of nutrition within other department workplans as constraints:

Truthfully, if you go to other departments, you are told they have reached the budget ceiling. You find other sectors have failed to plan for nutrition because their budget is small... so the budget is taken from the health department because it is the key department for nutrition.

(DNUO, #3)

Officers outside the health sector acknowledged this difficulty in implementing nutrition-sensitive initiatives:

Everything depends on existing workplans in different sectors. We can only participate if various department workplans show there are times when we should go to do something, for example, a meeting or workshop.

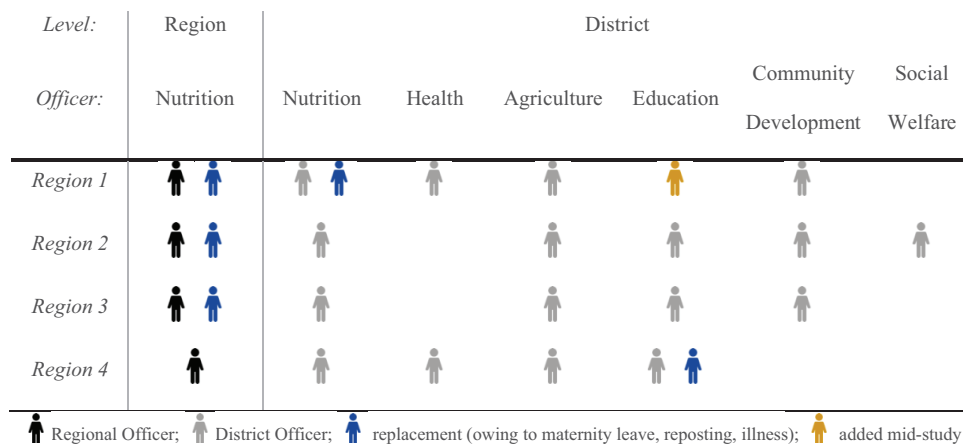
(Community Development Officer, #3)

Several officers viewed nutrition and health sector activities as exclusively clinical. In contrast, officers described frequent collaboration with staff from other departments on village-level activities outside nutrition, to share expertise and access target populations:

We usually work with Agriculture Officers. They know about farming and the land but the role of convincing the community is ours. The health sector is only found in the hospital, but we are the ones who go directly to the people, so we all must work together.

(Community Development Officer, #1)

Despite collaborative community-level outreach among agriculture, community development, and education, coordinating nutrition efforts across departments was new and RNuOs reported minimal connections outside Health and had concerns on how to foster collaborations:



**FIGURE 2** Composition of multisectoral action teams across sectors and study sites, as formed by Regional and District Nutrition Officers with support from district leaders.

This issue [MSN] was not there before, or it was not a priority, so I will have to bring it up again. The challenge is meeting with various people, Heads of Department, whom I do not know and who have completely different perceptions on nutrition. This new approach of being multisectoral is challenging for we must coordinate with those departments and make them into one entity.

(RNuO, #4)

The Multisectoral Steering Committees on Nutrition established in each district before our intervention involved higher-level personnel and, reportedly, lack of resources, commitment, and accountability limited effectiveness and impact, or even the ability to meet quarterly:

During meetings I ask [the District Committee], “What has been done?” but they have nothing to present. They have no agenda, so it’s me who speaks from start to finish. I think this [action team] idea is very good because they will have something to contribute, and there could be good continuity in future.

(DNuO, #4)

### Step 1. Action team initiation and scoping.

Forming action teams took 2–5 mo of gathering support from district leaders, requesting permission and recommendations from supervisors, developing letters of appointment, and recruiting team members. DNuOs, with mentoring from RNuOs, recruited officers who were self-driven, willing to volunteer, well-connected in communities, and experienced in maternal and child health, community-based programs, or poverty reduction. All action teams included officers from agriculture and education departments, and at least one from health, community development, or social welfare (Figure 2).

Mentoring by RNuOs was critical to articulating benefits of the action team approach and navigating political relationships to form and sustain teams:

I saw the team as a complicated thing. Why do we need a small team when there is the larger committee? The RNuO helped me see the difference and explained the purpose was to help me in my daily activities.

(DNuO, #4)

Education and Community Development Officers in 3 regions said their departments were in a prime position to work on nutrition given their strong presence in communities and access to school-aged populations and families, but their departments had not prioritized nutrition. Including them in action teams increased nutrition awareness and departmental commitment to MSN.

For RNuOs, increased connections with officers from other sectors expanded their capacity to supervise nutrition work, although many found it challenging to commit time to support action teams. Not surprisingly, frequency and quality of mentoring varied across regions. DNuOs with a supportive RNuO identified strong team members more quickly and gained access to the district’s higher-level Multisectoral Steering Committee on Nutrition. DNuO self-efficacy and ability to communicate helped elevate nutrition as a key issue and embed action teams:

The District Nutrition Officer is talking to Heads of the Department to explain the importance of the issue. Then Heads of Departments must understand the size of the problem, and what their contribution is, because someone who does not understand might think, “I’m not in the health sector, how can I be involved in nutrition?” But if he is aware, it becomes easier to organize and come together.

(RNuO, #1)

DNuOs had previously received NMNAP and district-level guidelines and most reported using them but wanted more guidance on practical application:

When the NMNAP came, it was just orally. I think even the RNuO would agree—we need someone to train us, so we understand it well since it is very detailed. I try to use it during planning and budgeting so I can link interventions and activities.

(DNuO, #3)

Most officers outside the health sector said nutrition was part of their job but were unaware of guidance on incorporating nutrition into their work. Three of 4 teams initiated team building by discussing what MSN could look like:

The team knows the word crosscutting (“mtambuka” in Kiswahili) but do they know why nutrition is crosscutting? The word is too broad. We can’t just say it is health, agriculture, education, etc. When the word is broken down, when we explain what possible activities to implement, that’s when people can understand.

(RNuO, #4)

Action teams found it easier to identify avenues for potential collaboration if they first shared departmental priorities and activities, learned about the district nutrition situation, and reviewed department workplans to find relevant activities, partnerships, and resources:

We need to sit together and share experiences for a long time. Let everyone bring forward what they are competent at, then come up with a common understanding... We will review each department’s planned activities, seeing which touch health and nutrition. Then we will prioritize them, identify sources of funding, even if it means requesting departments help raise the finances required. Then we will set out quarterly targets and strive to achieve them, whether we get funding or not.

(DNuO, #1)

Our participatory approach left teams to shape their goals and activities, which they found disconcerting at first. All RNuOs and DNuOs wanted more direction on how teams were to function, especially at study onset. Two DNuOs initially lacked strong regional support, affecting their ability to implement action teams:

[The team members] do not know what’s happening since nothing has been done so far. I requested them to come so that we can cooperate together on an activity even though I myself do not know its target.

(DNuO, #2)

Action teams met monthly, on average. Competing responsibilities, lack of workplace autonomy, and heavy workloads made it difficult for officers to meet regularly to focus on MSN. Officers reported that, despite strong motivation, action team activities were commonly disrupted, and balancing responsibilities was challenging throughout the study. Teams developed strategies to make progress such as meeting outside official work hours (including weekends), urging members to be reachable by phone, connecting briefly during other scheduled events, convening an incomplete team and following up with missing members, having DNuOs relay RNuO advice to the team, and selecting someone to lead when the DNuO was unavailable.

### **Step 2. Strategic planning and design.**

Team members originally saw their role as implementing nutrition activities as a team, especially providing joint nutrition education in communities on behavior change to reduce stunting. As they worked to find areas relevant to multiple sectors, teams identified school feeding programs as MSN activities in which officers from different departments had clear roles to play:

We brainstormed and said the activity which exactly fits is the issue of school feeding, because we look at the environment, what children eat, and if the diet is balanced. Agriculture sees whether a school has gardening to address food insecurity, Education considers class size and positive learning environment, and then

there is environmental hygiene of kitchens and restrooms. So, everyone has a role and we are moving well.

(DNuO, #4)

During planning, teams struggled owing to limited funding allocations for nutrition in departmental budgets and minimal scope for MSN collaboration within existing workplans. The action team approach was intended to address such challenges but lack of access to funding, heavy workloads, and organizational silos initially undermined the ability to collaborate. To make progress, team members decided to engage in nutrition within individual departments in 4 key ways: 1) hold departments accountable for conducting nutrition-relevant activities already planned; 2) advocate to department leaders to be more nutrition-focused; 3) encourage departments outside Health to improve planning and budgeting for nutrition in the next budget cycle; and 4) deliver nutrition messages during their own community-based activities. Participants provided updates and shared feedback with teams.

Given multiple challenges, team member composition mattered for morale and eventual progress. Team member enthusiasm, motivation, self-sacrifice, and social conscience were critical to the planning process; these were characteristics considered by DNuOs in forming teams:

We haven’t solved the issue of lack of time. We don’t have a budget to help with this extra duty so we take it as a challenge because our aim is to help society. We commit ourselves and just continue... we even work extra hours and we have positive ideas and cooperation.

(Health Officer, Coordinator of Maternal and Child Health, #1)

### **Step 3. Community outreach and implementation.**

At the community level, 2 teams collaborated on ongoing activities, conducting joint supportive supervision of schools and health facilities, publicizing vitamin A supplementation, managing malnutrition cases, making household visits to follow-up on Community Health Worker (CHW) messages, and providing capacity building for CHWs. Several officers reported that joint supportive supervision improved relationships between CHWs and supervisors through identifying real-time implementation challenges and providing mentorship.

Lack of funds and transportation to visit communities was a key barrier to MSN implementation, partially addressed through appealing to the District Director for a vehicle and fuel; piloting activities nearby, to minimize costs; and ridesharing with partner organizations. One RNuO used regional funding to purchase orange-fleshed sweet potato vines for schools. Lack of funding was a long-standing problem for officers:

I work at the community level all the time... Sometimes I am forced to use my own money to ensure work progress. When it comes to work accountability, lack of resources is an irrelevant excuse for not fulfilling your duties. There is always work you are held accountable for.

(Community Development Officer, #1)

In response, we invited grant proposals for small, feasible MSN activities. Teams prioritized potential for meaningful short-term results; training and sensitization to build capacity of communities and local leaders; communities with critical nutrition needs; and financial gaps of ongoing activities. Funded activities varied by site with all participants reporting positive outcomes, as summarized in [Table 3](#). These activities

**TABLE 3** Community-based actions chosen and implemented by MSN action teams in 4 districts of Tanzania and quotes illustrating stakeholder responses<sup>1</sup>

Site	Grant activities	Salient quotes on value and impact
1	Held local training on MSN as a strategy to reduce stunting with primary health teachers, community health workers, extension officers, and religious leaders.	If you visit the people who we trained, they are different than those who weren't. Those religious leaders and school teachers reached hundreds of people with our messages. They also shared their experience so it's like we trained each other. There are things we don't know and we learnt from them, so we cooperated and produced something complete. We want to start a program with the District Director. I believe we can be more successful in communities with this multisectoral approach. (District Nutrition Officer)
2	Convened a District MSN Steering Committee meeting and sensitized members and community leaders on nutrition; shared challenges and successes of the action team approach.	The leaders we met with wished this program could be sustained and implemented often. They were so surprised when we told them malnutrition can affect how children learn as adults. They said it only affects children, but we told them no. So they saw it as a bigger problem: if all village members will suffer from malnutrition then they will not get the leaders to lead, they won't get energetic people to work. So it was realized that this issue of nutrition is important, and even when we left they told us we should visit again, not just once. (Education Officer)
3	Supervised ongoing horticultural projects. Initiated nutrition clubs in 20 primary schools. Developed local MSN Steering Committee in 5 communities. Organized nutrition screenings in district with highest rates of malnutrition.	We discussed with teachers the importance of agricultural activities in schools... You find that the whole community becomes educated—the teacher tells the child, the child tells the parent, the parents meet with agricultural officers and the whole community learns... I feel good about our activities because I am in agriculture, but I have, for example, participated in nutrition screening of children, so I find myself expanding knowledge and the scope of knowing things expands. (Agriculture Officer)
4	Evaluated school feeding program in 5 primary and 5 secondary schools using MSN questionnaire and checklist developed by the team.	It was crucial to visit schools. You can think things are going as planned, but when you go to the site you find something different. We evaluated knowledge but also the environment and learned a lot... We reported our observations to the Department Heads but since we are from different departments, everyone learned together. (Education Officer)

<sup>1</sup>MSN, multisectoral nutrition.

furthered implementation of NMNAP, albeit on a small scale, and allowed action team members to experience the benefits of coordinated, collaborative planning and implementation.

Two teams focused on governance, described in NMNAP as critical to creating enabling environments for MSN; they organized events to raise awareness and increase accountability for intersectoral collaboration. One team advocated to the district Steering Committee, whereas the other targeted community partners and outreach staff. Both events helped stakeholders revisit key actors, roles, and responsibilities to enhance MSN capacity. Two other teams undertook community activities linked to the NMNAP's goal of ensuring school children's access to diverse nutritious foods, building on education sector expertise and networks to improve school feeding and school gardens.

Whether meeting with district leadership or community outreach staff, officers in all 4 sites noted greater credibility and recognition when traveling and functioning as a team. This enabled individuals to transcend roles within departments (e.g., as Education Officer) and to have a voice and something important to impart based on expertise in intersectoral collaboration for nutrition. Furthermore, officers were motivated by seeing real impacts of collaboration:

[The action team approach] has not only opened me, it has also opened the other members to realize the importance of doing this as a team. And the results are visible, because there are important things we saw that we did not expect to find in schools.

(DNuO, #4)

The benefits that nutrition officers reported most often were learning to involve multiple sectors and work in communities beyond health facilities. Officers outside health reported learning the value of including nutrition in their work and finding it feasible and rewarding to include nutrition messages in their community activities. All officers appreciated that multisectoral collaboration increased their knowledge.

#### **Step 4. Enabling environments: commitment, financing, and sustainability.**

Most team members were highly committed, despite the demands of the work, and reported benefits such as positive team interactions, support, and assistance in carrying out their responsibilities. Commitment may also have reflected the careful selection of team members.

Given the perceived positive impacts of collaboration, the next step in the participatory process was to create enabling environments to sustain and potentially scale up the approach. In 4 sites with action teams, district-level dissemination meetings shared results and recommendations based on participant experiences and solicited the perspectives of broader groups of government stakeholders from regional and district levels. Discussions provided opportunities to synthesize action team learning and consider next steps. Important themes related to enabling environments were the value of team activities, funding constraints, and mentoring and structure of action teams.

Leaders in every district voiced support for strengthening and sustaining action teams and engaging officers outside nutrition to improve MSN action and governance at grassroots levels. Importantly, they saw



how action teams helped fulfill district responsibilities. For example, 1 team was congratulated for improving MSN accountability across administrative levels by having ward and village leaders sign the Nutrition Compact and establishing ward-level nutrition committees. Their timing was opportune, coming just before a national directive to establish such committees, enabling implementation of this directive far ahead of other districts.

Attendee ideas for future activities included developing district MSN action plans tailored to community needs; community-led, transparent management of school feeding programs; revising Education Department curricula to integrate nutrition issues; and building on effective malaria campaign strategies by incorporating nutrition messages into religious teachings.

As expected, attendees noted funding challenges, but leaders favored finding ways to fund action teams because they improved regional ability to report on required national government nutrition-sensitive indicators. Two sites suggested teams include or engage with Planning Officers who allocate funds to departments, recognizing the importance of such alliances for sensitizing Planning Officers to allocating earmarked funds to meet district nutrition needs.

Flexibility in the selection of mentors and team members was seen as crucial for teams to be successful. The action team approach built on existing administrative operations and systems, creating an implementation-level team, in contrast to the Steering Committee on Nutrition that included Heads of Department. Views varied on who should mentor action teams, with some support for RNuOs as mentors (despite high turnover) and others suggesting District Medical Officers. Another suggestion was that Steering Committees directly assign, manage, and monitor action teams. However, outside the meetings, action team members expressed concern about lack of commitment to nutrition at higher levels. One DNuO reported reprimands for encouraging interactive discussions during Steering Committee meetings, given expectations that the DNuO alone compile and present information. District officers felt the action teams educated the people critical to NMNAP implementation:

The main activities we have done together as an [action team] are supervision, engaging in nutrition meetings, and identifying challenges in relevant sectors. I report [on these activities] ... to my Head of Department but also to the Nutrition [Steering] Committee, so people are taking note that something like this is taking place.

(Agriculture Officer, #4)

## Discussion

Implementation of multisectoral solutions to child undernutrition requires actors at all levels to collaborate, including personnel at the frontlines, yet most research and advocacy focus on national and international levels. Local implementors bound by work contexts and supervisory structures cannot be expected to shift toward intersectoral collaboration unless mentored and empowered to do so. Approaches must reflect the day-to-day work experiences of the stakeholders who will be the face of MSN in communities. Participatory research provides opportunities to learn directly from stakeholders engaged in new and daunting

challenges of MSN, allowing them to shape strategies and share awareness of what is needed at the frontlines.

We engaged with RNuOs to mentor DNuOs in forming MSN action teams to increase awareness of policy and work toward its implementation, on a small scale. This approach, designed in consultation with Tanzanian officials to fit the local context and be sustainable, was only a starting point for regional and district actors. Our research team worked closely with these stakeholders, informing our exploratory qualitative analysis of their perspectives. The results are context-specific, as intended, but the participatory process and findings on challenges and successes offer guidance on exploring intersectoral collaboration in other settings.

Lessons learned from the process were numerous; officers learned from each other across sectors and shared their learning with researchers, communities, and local government leadership. The most effective action teams were guided by understanding of national policy recommendations and actively engaged with leaders and the community. Although not all sites were equally successful, in the 4 sites where action teams were created, collaboration contributed to progress on NMNAP implementation, strengthening nutrition-focused goals, and encouraging integration. Teams leveraged complementary expertise and contacts. Whereas DNuOs usually worked through health facilities, the networks of officers in other sectors allowed greater community engagement and provided channels for delivering nutrition messages. In action teams, officers from various sectors communicated, built relationships, shared responsibilities, innovated, and strove to achieve common goals. Nutrition Officers heightened awareness of nutrition among department heads and learned about relevant activities in other departments, preparing them to share data with Steering Committees and monitor allocation of nutrition funds. Mentoring by RNuOs and planning concrete activities demystified MSN and provided a roadmap to operationalize NMNAP and Nutrition Compacts in local governments. Dissemination meetings validated participating officers, and shared team activities, successes, and recommendations with leaders with the means to sustain the approach.

Officers faced many challenges including heavy workloads, departmental “silos” for funding and reporting, low engagement in existing intersectoral structures, and views of nutrition as a health sector responsibility. These issues have been noted in other contexts, as well as the importance of interpersonal communication and mutual understanding of roles in overcoming challenges (34). Building the MSN capacity of staff is not sufficient without enhancing organizational support and community awareness (23). The participatory approach allowed us to capture challenges from officers’ perspective and learn from strategies they developed, based on their knowledge of government systems, that we could not have devised.

Conducting this research in a participatory manner meant stepping back so teams could choose activities to pursue. Although the broader ASTUTE project focused on stunting prevention and the first 1000-d period, several teams developed activities aimed at older children. School feeding programs were seen as a good place to start because officers from multiple departments had clear roles to play. Flexibility was important in the initial stages as teams looked for common ground; building on existing expertise may be critical for collaboration and short-term success to motivate continued engagement in nutrition-sensitive activities. Strong motivational leaders, such as some RNuOs or

DNuOs, enabled team members to see roles for themselves and feel valued. Although there was initially some question as to why additional teams were being formed, RNuOs helped explain that these were *action* teams of implementation staff, to complement the Steering Committees. Many officers indicated that once they became involved in the MSN action team, they found the collaboration rewarding.

We also left it to stakeholders to decide which sectors to include in action teams, and they found flexibility helpful for adapting to context and including available and motivated team members rather than a fixed set of sectors. However, the make-up of teams was similar across sites and aligned with global and national MSN guidance (9, 14).

The importance of supportive supervision for optimal performance is widely recognized (7). However, working across organizational “silos” to implement MSN required DNuOs to take initiative and act with autonomy to create something outside the usual work structures. Mentoring was important to build confidence, explain MSN guidelines, and provide credibility through RNuOs’ external authority to convince supervisors of the value of the initiative.

It was challenging to identify appropriate mentors and convey how mentors guide and advise. The RNuO was a relatively new position in government and the level of nutrition expertise varied. During the Learning Exchange workshop, some RNuOs lacked confidence about mentoring DNuOs, and I asked, “Who will mentor the mentors?” There was a tendency to see mentoring as synonymous with supervision, with more emphasis on accountability than support. We asked workshop participants for words in the local language that captured the sense of a mentor as both an advisor and a friend, someone with more experience but focused on enhancing mentees’ success. Supportive RNuO mentors, regardless of nutrition background, were able to convey the importance of MSN action teams to department heads and facilitate team-building.

### Strengths and limitations

This innovative implementation study addressed a gap in research on MSN collaboration and implementation in local governments. Although leadership, policy, and coordination at higher levels are essential, so is full engagement of frontline staff. Interpretation and implementation of policy by “street-level bureaucrats” determine whether and how the intended benefits reach communities (35). Our participatory methods allowed the MSN process to unfold within the actual work context, as we monitored progress and challenges through in-depth interviews. Results emerged from interactions with team members as they forged their paths, and we learned directly from their experiences. This in-depth approach was only possible on a small scale, and we cannot claim results are generalizable, although the methods could be adapted to other contexts. The failure of 1 site to create an action team must be borne in mind when interpreting positive interview responses in other sites—we cannot conclude this approach is easy or works everywhere. Generalizability was also limited by allowing RNuOs to select study districts. The tendency to choose nearby sites with strong DNuOs enhanced the likelihood of success and must be considered in interpretation of the results. This was, however, reasonable in the early phases of testing a new strategy, and in dissemination meetings and interviews, it was noted that experienced DNuOs often mentor colleagues in other districts, and study participants in action teams could now use this approach to scale up MSN activities in new sites.

Participatory methods mitigate barriers to learning created by power differentials and the outsider status of researchers, including assumptions and lack of understanding of context on the part of researchers, and deference or acquiescence on the part of participants (25). Although we cannot rule out the influence of social desirability, relationships built during 14 mo of supporting personnel to work together contributed to the validity of responses. There were advantages and disadvantages of the Tanzanian research team’s dual role in conducting regular data collection interviews as well as making support calls and giving advice. This built rapport, helped solve problems, and captured insights about process; we also acknowledge possible influences on interview responses and the success of activities. The workplace setting meant that staff concerns about how their performance was perceived could have influenced interview responses. To mitigate this, we endeavored to ensure privacy during interviews and confidentiality of data. Respondents’ openness about challenges and lack of progress suggests they were reasonably comfortable sharing negative as well as positive experiences during the study.

Similarly, the emergent need to provide small amounts of funding for community-based activities put researchers in the unplanned role of donor. We learned that sustainable MSN action depends on integrated planning and budgeting at the local level and, in this short-term study, pre-existing workplans and associated budgets were a major constraint. Although this can be viewed as reducing generalizability, it is also true that in future, functioning MSN action teams could support cross-sector planning and budgeting. Although sustainability is unknown, results provide guidance on mentoring teams to engage in collaborative MSN implementation.

Comprehensive, multisectoral interventions improve growth, diet quality, and diet diversity in young children, and have shown greater effects on growth than has nutrition education alone. Although strong national policies are essential, policy documents are necessarily detailed and difficult to comprehend. We found limited translation into practice and a lack of sectoral collaboration even within government structures with formal Multisectoral Steering Committees to implement NMNAP policies and strategies (15). As a result, Nutrition Officers were burdened with responsibility yet had little authority to act or initiate collaborations, a combination known to reduce motivation (36). Implementing MSN policy requires development of technical capacity as well as a system to support an empowered, collaborative workforce to achieve policy objectives (37).

### Conclusion

Effective local implementation of MSN policy requires country-level commitment together with local leadership and capacity building, and community engagement to ensure efforts fit the program context. Changes in formal structures and work culture are needed at all levels, including the frontlines; working across sectors is not possible when resources and accountability are highly “siloeed.” Participatory engagement of relevant stakeholders must inform the development of viable strategies. The regional and district-level officers who participated in this exploratory study demonstrated that action teams are a feasible, low-cost strategy to support local coordination across sectors for nutrition. There were many challenges and not all efforts were successful, but teams created and tested strategies and shared experiential learning. Most importantly, those involved learned the value of

MSN and were motivated to continue collaborating. To close the implementation gap between MSN policy and community impacts, systems should provide supportive mentoring, opportunities to innovate and leverage complementary expertise, and adequate resources to support implementation.

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## References

- Perkins JM, Kim R, Krishna A, McGovern M, Aguayo VM, Subramanian SV. Understanding the association between stunting and child development in low- and middle-income countries: next steps for research and intervention. *Soc Sci Med* 2017;193:101–9.
- Leroy JL, Frongillo EA. Perspective: what does stunting really mean? A critical review of the evidence. *Adv Nutr* 2019;10(2):196–204.
- UNICEF. Nutrition, for every child: UNICEF Nutrition Strategy 2020–2030 [Internet]. New York, NY: UNICEF; 2020 [cited 6 March, 2022]. Available from: <https://www.unicef.org/media/92031/file/UNICEF%20Nutrition%20Strategy%202020-2030.pdf>.
- Miller LC, Neupane S, Joshi N, Lohani M, Rogers BL, Neupane S, Ghosh S, Webb P. Multisectoral community development in Nepal has greater effects on child growth and diet than nutrition education alone. *Public Health Nutr* 2020;23(1):146–61.
- Suresh S, Paxton A, Pun BK, Gyawali MR, Kshetri ID, Rana PP, Cunningham K. Degree of exposure to interventions influences maternal and child dietary practices: evidence from a large-scale multisectoral nutrition program. *PLoS One* 2019;14(8):e0221260.
- Engle PL, Black MM, Behrman JR, Cabral de Mello M, Gertler PJ, Kapiriri L, Martorell R, Young ME. Strategies to avoid the loss of developmental potential in more than 200 million children in the developing world. *Lancet* 2007;369(9557):229–42.
- Jerling J, Pelletier D, Fanzo J, Covic N. Supporting multisectoral action: capacity and nutrition leadership challenges facing Africa [Internet]. In: Covic N, Hendriks SL, editors. *Achieving a nutrition revolution for Africa: the road to healthier diets and optimal nutrition*. Washington (DC): International Food Policy Research Institute (IFPRI); 2016 [cited 6 March, 2022]. p. 147–69. Available from: <https://www.ifpri.org/publication/supporting-multisectoral-action-capacity-and-nutrition-leadership-challenges-facing>.
- Ruel MT, Alderman H. Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? *Lancet* 2013;382(9891):536–51.
- Scaling Up Nutrition (SUN) Movement. *Scaling Up Nutrition* [Internet]. Geneva, Switzerland: SUN Movement; 2015 [cited 23 January, 2022]. Available from: <https://scalingupnutrition.org/>.
- Scaling Up Nutrition (SUN) Movement. Annual progress report 2018 [Internet]. Geneva, Switzerland: SUN Movement; 2018 [cited March, 2022]. Available from: [https://scalingupnutrition.org/wp-content/themes/elision/pdf/SUNPR-2018/SUN\\_Report\\_EN\\_2018.pdf](https://scalingupnutrition.org/wp-content/themes/elision/pdf/SUNPR-2018/SUN_Report_EN_2018.pdf).
- Baker P, Hawkes C, Wingrove K, Demaio AR, Parkhurst J, Thow AM, Walls H. What drives political commitment for nutrition? A review and framework synthesis to inform the United Nations Decade of Action on Nutrition. *BMJ Glob Health* 2018;3(1):e000485.
- Fanzo J, Marshall Q, Dobermann D, Wong J, Merchan RI, Jaber MI, Souza A, Verjee N, Davis K. Integration of nutrition into extension and advisory services: a synthesis of experiences, lessons, and recommendations. *Food Nutr Bull* 2015;36(2):120–37.
- Marasini MK, Mugenyi S. Overcoming the limits of evidence on effective multisectoral nutrition policy. *Food Nutr Bull* 2016;37(4\_suppl):S183–4.
- United Republic of Tanzania. National Multisectoral Nutrition Action Plan (NMNAP): from evidence to policy to action: July 2016 - June 2021 [<https://www.tfnc.go.tz/uploads/publications/sw1556116940-NMNAP%202016%20-%202021.pdf>] [Internet]. Dar es Salaam, Tanzania: United Republic of Tanzania, Prime Minister's Office; 2016 [cited 7 March, 2022]. Available from: [http://docs.scalingupnutrition.org/wp-content/uploads/2017/09/NMNAP\\_Tanzania.pdf](http://docs.scalingupnutrition.org/wp-content/uploads/2017/09/NMNAP_Tanzania.pdf).
- United Republic of Tanzania. Terms of reference for multisectoral committees on nutrition for regional secretariats and local government authorities [Internet]. Dodoma, Tanzania: United Republic of Tanzania; 2018 [cited 6 March, 2022]. Available from: [https://panita.or.tz/wp-content/uploads/2014/04/panita\\_national\\_4.pdf](https://panita.or.tz/wp-content/uploads/2014/04/panita_national_4.pdf).
- President's Office Regional Administration and Local Government (PO-RALG). Report on pre-planning and budgeting orientation conducted at council level to Multisectoral Steering Committee for Nutrition on 12th–29th November 2018. Dodoma, Tanzania: PO-RALG Division of Health, Social Welfare and Nutrition Services; 2018.
- Idd A, Yohana O, Maluka SO. Implementation of pro-poor exemption policy in Tanzania: policy versus reality. *Int J Health Plann Manage* 2013;28(4):e298–309.
- Lyatuu MB, Mkumbwa T, Stevenson R, Isidro M, Modaha F, Katcher H, Dhillon CN. Planning and budgeting for nutrition programs in Tanzania: lessons learned from the national vitamin A supplementation program. *Int J Health Policy Manag* 2016;5(10):583–8.
- Shrimpton R, du Plessis LM, Delisle H, Blaney S, Atwood SJ, Sanders D, Margetts B, Hughes R. Public health nutrition capacity: assuring the quality of workforce preparation for scaling up nutrition programmes. *Public Health Nutr* 2016;19(11):2090–100.
- Waisbord S. When training is insufficient: reflections on capacity development in health promotion in Peru. *Health Promot Int* 2006;21(3):230–7.
- Crigler L, Fort AL, Diez O, Gearon S, Gyuzalyan H. Training alone is not enough: factors that influence the performance of healthcare providers in Armenia, Bangladesh, Bolivia, and Nigeria. *Performance Improvement Quarterly* 2006;19(1):99–116.
- Leeman J, Birken SA, Powell BJ, Rohweder C, Shea CM. Beyond “implementation strategies”: classifying the full range of strategies used in implementation science and practice. *Implement Sci* 2017;12(1):125.
- Shrimpton R, Hughes R, Recine E, Mason JB, Sanders D, Marks GC, Margetts B. Nutrition capacity development: a practice framework. *Public Health Nutr* 2014;17(3):682–8.
- Wallerstein N, Duran B, Oetzel JG, Minkler M. *Community-based participatory research for health: advancing social and health equity*. 3rd ed. San Francisco, CA: Jossey-Bass; 2017.
- Chambers R. *Whose reality counts? Putting the first last*. London, UK: Intermediate Technology Publications; 1997.
- IMA World Health. ASTUTE [Internet]. Washington (DC): IMA World Health; 2019 [cited 8 September, 2021]. Available from: <https://imaworldhealth.org/astute>.

27. Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) [Tanzania Mainland], Ministry of Health (MoH) [Zanzibar], Tanzania Food and Nutrition Centre (TFNC), National Bureau of Statistics (NBS), Office of the Chief Government Statistician (OCGS) [Zanzibar], and UNICEF. Tanzania National Nutrition Survey using SMART methodology (TNNS) 2018 [Internet]. Dar es Salaam, Tanzania: MoHCDGEC, MoH, TFNC, NBS, OCGS, and UNICEF; 2018 [cited 6 March, 2022]. Available from: <https://www.unicef.org/tanzania/media/2141/file/Tanzania%20National%20Nutrition%20Survey%202018.pdf>.
28. Ministry of Finance and Planning—Poverty Eradication Division (MoFPED) [Tanzania Mainland], National Bureau of Statistics (NBS). Tanzania Mainland Household Budget Survey 2017–18: key indicators report [Internet]. Dodoma, Tanzania: MoFP-PED and NBS; 2019 [cited 23 January, 2022]. Available from: [https://www.nbs.go.tz/nbs/takwimu/hbs/2017\\_18\\_HBS\\_Key\\_Indicators\\_Report\\_Engl.pdf](https://www.nbs.go.tz/nbs/takwimu/hbs/2017_18_HBS_Key_Indicators_Report_Engl.pdf).
29. Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) [Tanzania Mainland], Ministry of Health (MoH) [Zanzibar], National Bureau of Statistics (NBS), Office of Chief Government Statistician (OCGS) [Zanzibar], and ICF. Tanzania Demographic and Health Survey and Malaria Indicator Survey 2015–16 [Internet]. Dar es Salaam, Tanzania and Rockville, MD: MoHCDGEC, MoH, NBS, OCGS, and ICF; 2016 [cited 23 January, 2022]. Available from: <https://dhsprogram.com/pubs/pdf/FR321/FR321.pdf>.
30. United Republic of Tanzania. Terms of Reference for the District Nutrition Officer. Dodoma, Tanzania: United Republic of Tanzania; 2014.
31. Strauss AL, Corbin JM. Basics of qualitative research: grounded theory procedures and techniques. Newbury Park, CA: Sage Publications; 1990.
32. MacQueen KM, McLellan E, Kay K, Milstein B. Codebook development for team-based qualitative analysis. *CAM J* 1998;10(2): 31–6.
33. Tumilowicz A, Ruel MT, Pelto G, Pelletier D, Monterrosa EC, Lapping K, Kraemer K, De Regil LM, Bergeron G, Arabi M, et al. Implementation science in nutrition: concepts and frameworks for an emerging field of science and practice. *Curr Dev Nutr* 2019;3(3):nzy080.
34. Kim SS, Avula R, Ved R, Kohli N, Singh K, van den Bold M, Kadiyala S, Menon P. Understanding the role of intersectoral convergence in the delivery of essential maternal and child nutrition interventions in Odisha, India: a qualitative study. *BMC Public Health* 2017;17(1): 161.
35. Lipsky M. Street-level bureaucracy: dilemmas of the individual in public services [Internet]. 30th Anniversary ed. New York: Russell Sage Foundation; 2010 [cited 20 September, 2021]. Available from: <http://www.jstor.org/stable/10.7758/9781610446631>.
36. Dickin KL, Dollahite JS, Habicht J-P. Enhancing the intrinsic work motivation of community nutrition educators: how supportive supervision and job design foster autonomy. *J Ambulatory Care Manage* 2011;34(3):260–73.
37. Gillespie S, Menon P, Kennedy AL. Scaling up impact on nutrition: what will it take? *Adv Nutr* 2015;6(4):440–51.