Sustainability of community-based workers in multisectoral food security programs: a case study of producer leaders, village vaccinators, mother leaders, and community health workers in Burkina Faso

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Abstract

The community-based worker (CBW) model is commonly used by food security projects as an approach to catalyze community-driven development and to enhance long-term sustainability of project impacts in rural areas of low-income countries. However, there is limited follow-up research exploring how CBWs continue to carry out expected activities in the years that follow project exit. This case study examines how four different CBW roles—producer leaders, village vaccinators, community healthcare workers, mother leaders—all trained to contribute to the food security goals of a multi-year initiative in Kaya, Burkina Faso, sustained their respective activities post-project. Two years after the project ended, we collected qualitative data to examine how well these CBWs continued providing the activities that they had been trained to provide as expected by the project. We employ a conceptual framework of sustainability and exit strategies to assess what factors contributed to sustained activities and, where activities ceased, what caused them to stop. We find that where activities were sustained, all four hypothesized factors—sustained capacities, resources, motivation, and linkages—were present. We conclude by discussing key lessons and considerations for using the CBW model: (1) gradually transition to independent operation during project lifetime; (2) integrate CBWs into permanent and functional systems through gradual project exit; (3) professionalize the CBW role (re-think the volunteer approach); (4) what to do about resources and (5) co-develop endogenous definitions and indicators from the project onset.

Keywords Food security, Community development, Community-based workers (CBWs), Agricultural development, Sustainability

Introduction

Embedded in the 2030 Sustainable Development Goals (SDGs) Agenda is the idea that community members play a crucial role in achieving sustainable development [1]. Rather than seen as passive beneficiaries of development initiatives, stakeholders are centered to make active contributions to the development of their communities and to hold their governments accountable for progress. To this end, food security projects implemented in rural

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Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 2 of 21

areas of low-income countries increasingly adopt a community-based worker (CBW) model, where individuals in a project's target area are trained to provide specific services to their community [2]. By building stakeholder capacity to hold leadership roles and provide services to their communities, projects endeavor to improve sustainability of development impacts and activities post-project.

Implementation of CBW models varies across context and projects, and these models target a range of development areas, from model farmers and community animal health workers that support agricultural development initiatives to community healthcare workers who mobilize awareness of different health information and practices [2–4]. However, the different models have vastly different approaches and varied outcomes in terms of whether, and for how long, the CBWs will continue to provide the community services for which they were trained. Additionally, in most cases, minimal to no research is conducted in the years following a project's conclusion to assess the continued sustainability of CBW activities and impacts.

In this case study, we explore the sustainability of four different type of CBWs: agricultural producer leaders (PLs), village vaccinators (VVs), mother leader animators (MLAs), and community health workers (CHWs). All four CBWs were trained to contribute to the food security goals of the Victory Against Malnutrition (ViM) program, which was implemented in Burkina Faso between 2012 and 2018 by the international non-government organization ACDI/VOCA and collaborating partners. Two years after the program ended, we collected qualitative data in Kaya, one of the four communes served by the program to examine to what degree these CBWs continued providing the services as expected by the ViM program.[1] We employed a conceptual framework of sustainability and exit strategies [5–7] to assess what factors contributed to sustained activities and, where activities ceased, what caused them to stop. These findings offer substantive and instructive insights to improve the effectiveness and sustainability of the CBW approach in development interventions.

Community-based worker (CBW) models of service delivery

The CBW model has been harnessed by international development projects and supported by funders like USAID, the World Bank, and the World Health Organization (WHO) alike for several decades as an approach to catalyze community-driven development [8–10]. This approach aims to place power, decision-making, and resources in the hands of the communities being served to make them equal actors in their own development [11, 12]. While there are variations in implementation, the overarching objective of the CBW model is to recruit and train individuals from target communities to provide services to other community members that are unavailable within current systems [2, 3, 8, 13]. Services may include raising awareness of different development issues, providing training or extension services, or managing communal infrastructure. The facilitating organization typically coordinates technical education, support, and supervision to the CBWs throughout a period of training and as they begin to deliver services. When the project concludes, trained CBWs are expected to continue carrying out these activities to maintain progress in development impact outcomes.

The CBW approach differs across interventions. Many CBWs are trained as volunteers and receive no or limited remuneration for their services [13]. In lieu of financial payment, the facilitating organization may provide them with materials and financial reimbursement to attend trainings during the project. In other models, CBWs are paid a stipend for their work by the facilitating organization or by a collaborating local partner. There are also entrepreneurial business-based models, where CBWs are paid a fee for their services by community members or those using the services [2].

In their 2011 review, Boesten, Mdee, and Cleaver identify several assumptions that underpin the CBW model within institutional literature [13]. First, it is assumed that engaging local community members will extend the reach of services, thus increasing access to such services, especially for people living in remote areas. Second, the CBW model is considered a sustainable approach to development, as engaging beneficiaries transfers the responsibilities associated with planning and implementation to the people who are affected. Moreover, as CBWs are often volunteers or receive limited remuneration, this model is a cost-effective way to extend the network of services. Third, the relationship between CBWs and other community members is assumedly peer-to-peer, and thus less unequal than the development agency–beneficiary relationship. As members of the community, CBWs are assumed to have the sociocultural understanding necessary to effectively implement service delivery.

Types of CBWs
In the health sector, community healthcare workers (CHWs) are a common CBW role, wherein community members are recruited and trained to carry out

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[1] Both ViM and ViMPlus are part of USAID's Resilience in the Sahel Enhanced (RISE) and RISE II program, which supports vulnerable communities in Burkina Faso and Niger to effectively prepare for and manage recurrent crises and pursue sustainable pathways out of poverty.

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 3 of 21

healthcare activities in their communities, such as education, basic clinical care, growth monitoring, and vaccination [9, 14, 15]. More recent projects involve actors such as mother leader animators (MLAs) and entities such as care groups, who are tasked primarily with disseminating messages on key health, nutrition, and sanitation practices in order to promote social and behavioral change [16–18]. Pallas et al. [15] provide a systematic review of community healthcare worker literature in low and middle-income countries.

In agricultural development, projects have long used the model farmer or producer leader (PL) model [10, 19]. Here, the project identifies a "motivated farmer", trains them in improved agricultural practices, and typically helps them create a demonstration plot on their land to model the practices to community members. Once the project ends, the model farmer is expected to continue to use and demonstrate these practices and advise their community members on improved practices. Several scholars have reviewed the model farmer strategy including Franzel et al. [19] and Taylor & Bhasme [10].

A more recent agricultural CBW role is that of community animal health workers, sometimes referred to as para-vets, who are trained to provide basic veterinary care to livestock owners in their communities without being licensed within formal veterinary care systems [4]. Under the same scope, projects such as Burkina Faso's Village Poultry Development Project and the Bangladesh Poultry Model Production Chain (PMPC) used the role of "village vaccinator" (VV) to provide consistent access to vaccinations and competent vaccinators to sustain poultry activities [20, 21]. Unlike many of the other models outlined here, VVs often receive a fee from the users of their services. For an in-depth review of VVs, see Leyland et al. [4].

CBWs and sustainability in international development

Conceptualizations of sustainability vary, but a predominant perspective in international development defines sustainability as sustained delivery of services and outcomes past the end of a project's lifetime [15, 22–25]. From this perspective, the flow of benefits to beneficiaries continues "with or without the programmes or organizations that stimulated those benefits in the first place" [26]. Other scholars further underscore that the flow of benefits should continue beyond the investment of project funds [23].

CBWs are expected to play an essential role in sustainable development. But while there are myriad case studies on the effectiveness of CBWs during different programs, few studies assess the long-term sustainability of these roles through follow-up research post-project [8, 13,

27]. In their 2011 critique of the CBW models, Boesten, Mdee, and Cleaver argue that service delivery dependent on CBWs is unlikely to be sustainable long-term, especially if CBWs are expected to continue their work as volunteers. They note that often CBWs are motivated by the hope that their role will ultimately turn into a salaried job, and when that does not happen, they are likely to discontinue their activities. This idea is corroborated by other studies that find that while CBWs may be an excellent resource when the project provides them with consistent support and access to resources, project exit often results in high attrition rates [28–30]. Some argue that that community animal health worker approach may be intruding on government livestock extension agents who are professionally educated and licensed to provide care to livestock [31]. However, the demand for livestock technicians appears to outweigh this potential challenge and most professionally trained workers in these areas express support for the help that para-vets can provide to extend these services. Furthermore, the assumption that CBWs are better suited to reach people in their area ignores contextual power dynamics [32, 32, 33]. Influence of local leaders, gender relations, education and literacy levels, age, and social relations all impact the sustainability and effectiveness of CBWs [13].

In this study, we examine what happens to CBWs—or what CBWs do—once a program concludes and the funding agency leaves. We assess the strategies put in place during the program to create permanent CBW roles. Two years after the ViM program concluded in Kaya commune, we ask PLs, VVs, MLAs, and CHWs what activities they continue to implement. We further explore what factors are perceived to support their continued work and what their constraints are. This research fills an important gap of understanding of the long-term durability of the CBW approach.

Conceptual framework

This study follows research investigating what factors are associated with sustained impact of development initiatives in food security. Previously, USAID's FANTA II and III initiatives funded a team from Tufts University to conduct a multi-country study of sustainability and exit strategies of 12 Food For Peace (FFP)-supported development food assistance projects across four countries. This study developed a conceptual framework drawing on evidence from these 12 projects, identifying a set of factors essential for ensuring the sustainability of service provision, beneficiary demand, and continuation of benefits after donor funding ends.

As illustrated in Fig. 1, sustainable impacts of development initiatives depend on the continued use of services and sustained behaviors established by the initiative.

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 4 of 21
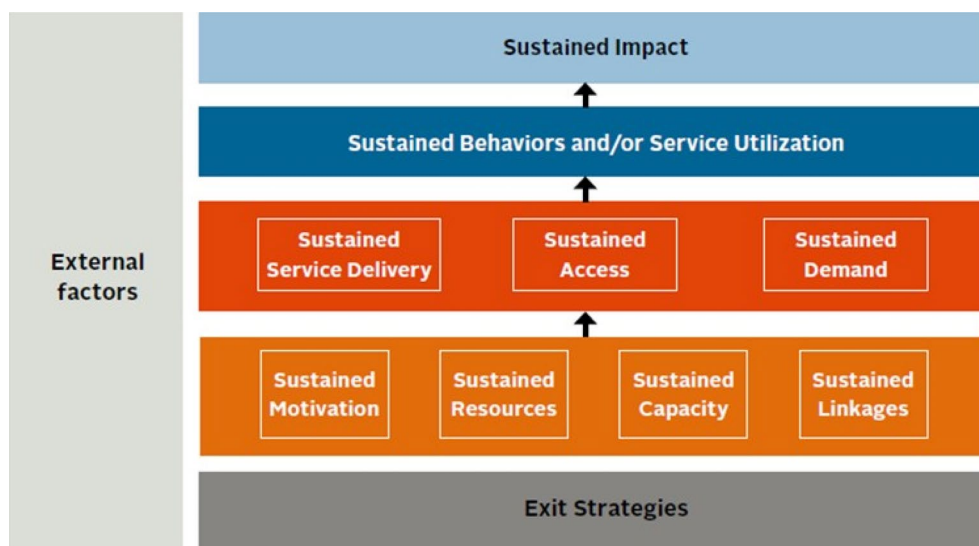
Fig. 1 Conceptual framework Note 1 Adapted from Coates et al. [5], Rogers and Coates [7]

These are supported by ensuring that service delivery mechanisms are upheld, that beneficiaries maintain access to these services, and that demand for these services remains. This requires a sustained source of financial and material resources, sustained capacity to provide services and to continue behaviors, sustained motivation on the part of beneficiaries and CBWs and, in most cases, established and continued linkages to relevant organizations.

The conceptual framework provided a starting point to evaluate the factors contributing to the sustainability of CBW activities. This framework also emphasizes how external factors can influence sustained impact. This may include external shocks like periodic droughts, political crises, conflict and terrorism, or global market fluctuations, as well as key contextual factors, such as governmental structure, other programs operating in the area, and/or cultural beliefs.

Materials and methods

This study examines whether and how four different CBW roles—agricultural producer leaders (PLs), village vaccinators (VVs), community healthcare workers (CHWs), and mother leader animators (MLAs)—all trained under the same project in Kaya, Burkina Faso, sustained their respective activities post-project. This research was a case study, "an empirical inquiry that investigates a contemporary phenomenon within its real-life context" [34]. Here, we present an in-depth analysis of the experiences and perspectives of CBWs and individuals who participated in their training. We collected

qualitative data between June and December of 2020, 2 years after the conclusion of the project.

Project background

The Victory against Malnutrition (ViM) program[2] was a United States Agency for International Development/Food for Peace (USAID/FFP—now Bureau of Humanitarian Assistance or BHA) funded Title II Multi Year Assistance Program (MYAP) implemented in four communes of Sanmatenga Province, located in the Centre-Nord region of Burkina Faso between August 2011 and September 2018.

ViM's overarching objective was to reduce food insecurity among vulnerable rural populations. ViM had three strategic objectives (SOs): (SO1) increase productivity and food availability through improved agricultural practices and technologies and enhance value chains of key agricultural products; (SO2) increase household income by improving value chains, stimulating links between producers and buyers, exploring alternative income opportunities, and facilitating access to credit; and (SO3) reduce chronic malnutrition among children under five years of age and pregnant and lactating women. The project also addressed cross-cutting issues on gender and the environment.

A major component of the ViM project was to develop CBW roles for community members. This included identifying and training producer leaders (PLs) in agriculture,

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[2] For more information on the ViM project, see https://www.acdivoca.org/projects/victory-against-malnutrition-project-vim/.

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 5 of 21

village vaccinators (VVs) for livestock, and mother leader animators (MLAs) and community health workers (CHWs) to support health, nutrition, and WASH activities.

ViM was originally a 5-year project, but was extended two additional years, concluding in September of 2018. In Kaya, ViM targeted all 70 of the commune's villages, reaching an estimated 57,136 beneficiaries. As the project ended, ACDI/VOCA was awarded a new activity, ViMPlus. While ViMPlus generally broadened its geographical target in the Centre-Nord region, Kaya commune was not included in the scope of the new activity. Kaya was thus selected as this study's target to evaluate the sustainability of the ViM program and the continued activities and results attained since the end of ViM, in an area where the new activity is not being implemented.

Setting and context

This study was conducted in Kaya commune of Sanmatenga province, located in the Centre-Nord region of Burkina Faso. Kaya is located in a semi-arid region of the country at the transition between the Sudano-Sahelian and Sahelian ecological zones, with a long dry season from October to May and a short rainy season from June to September. The population was 208,682 individuals as of the 2019 census. Most of the commune's population are of the Mossi ethnicity and speak the Mòoré language, although a minority of the 70 rural villages located within the commune but outside of Kaya city limits are of the Fulani (Peulh) ethnicity, and residents of these villages commonly speak Fulfulde in addition to Mòoré.

Similar to many areas in the region, Burkina Faso has experienced exponential spikes of terrorist activities in recent years [35]. Since ViM concluded in 2018, there have been multiple terrorist attacks, especially in northern Burkina Faso. While Kaya has principally served as a host community for internally displaced persons from nearby communes experiencing higher rates of violence, extremists have recently begun operating in several outlying villages of Kaya, perpetrating small-scale attacks and threatening residents.

Population and sampling

We used purposive sampling to recruit individuals with specific knowledge and experience with the ViM project in Kaya. First, to identify possible focus group participants, the implementing organization (ACDI/VOCA) provided a list of all CBWs, by type, who were trained through the ViM project in Kaya between 2012 and 2018 by ACDI/VOCA. The total number of each category of CBWs trained by ViM in Kaya was as follows: 599 MLAs, 39 VVs, 140 CHWs, and 424 PLs. Because the project was implemented in each village of Kaya, we

intentionally recruited participants from across the commune by dividing the list of each CBW role into four geographic areas and randomly selecting an even number of people from each area to invite to participate. We did not include the northwestern part of the commune as we were informed that traveling to and from that area could be subject to security problems. We conducted two focus groups with each CBW type (8 total), and each group had representatives from each of the four regional areas (as shown in Fig. 2). All participants began training within the first three years of the project. Table 1 provides a breakdown of the participant numbers, focus groups, and gender represented in all focus groups.

ACDI/VOCA also provided a list of suggested respondents to interview who either worked for them during the ViM program or worked for one of the local implementing partners. This list included individuals who worked in different sectors including agriculture, health, education, and micro-finance, reflecting the cross-sectoral focus of the project and therefore were central in each type of CBW training. We reached out to all suggested people and conducted a total of 20 interviews with project implementors and local implementing partners (Table 2).

Data collection

This study was approved by the Burkina Faso Commission of Information Technology and Freedom (CIL number 2020/378/CIL/SG/DAJC) and Tufts University Social, Behavioral, and Educational Research (SBER) Institutional Review Board (IRB number STUDY00000125) prior to data collection. We commenced this study by examining publicly available ViM documents, including quarterly and yearly reports, written by the project implementor throughout the duration of the project (from 2012 to 2018). This provided a comprehensive understanding of the intended sustainability strategies for the project overall and the different CBW roles, in addition to generally outlining project objectives, activities implemented to meet objectives, project partners, and external factors that emerged during the project.

We then collected qualitative data through focus groups with CBWs and one-on-one interviews with project implementers from January through June of 2020. Research instruments were developed based on ViM documents (described above), the conceptual framework (Fig. 1), instruments used in previous studies, and literature relating to sustainability in development projects. As instances of conflict and insecurity were growing in number at the launch of this study, we incorporated an investigation of what shocks and stresses participants were experiencing following guidance from the USAID's Resilience Evaluation, Analysis, and Learning efforts [36].

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 6 of 21
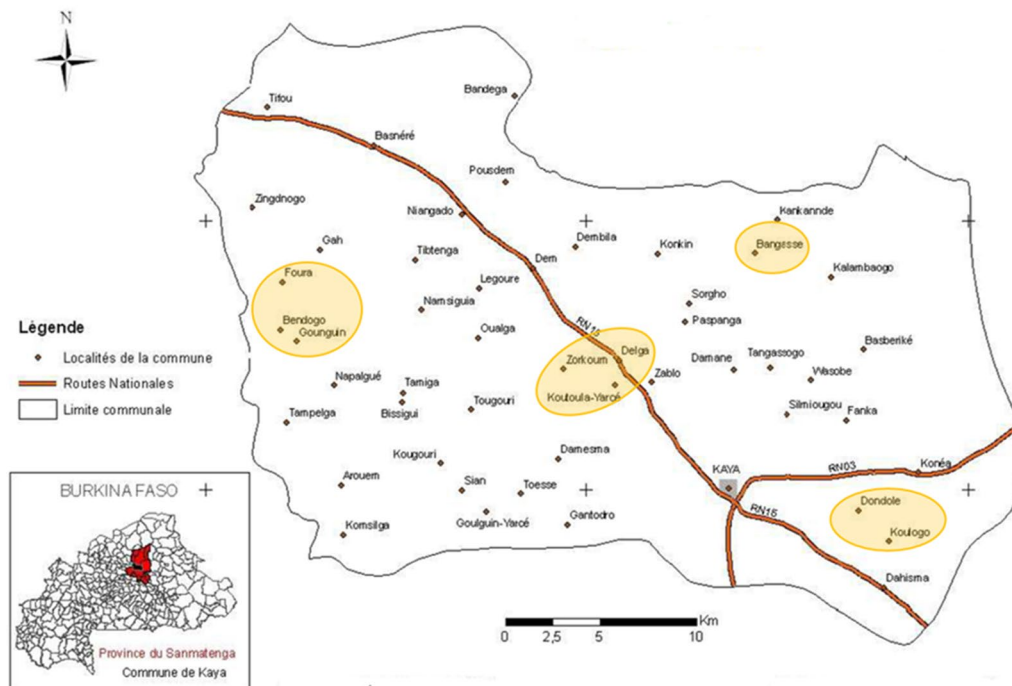
Fig. 2 Map of Kaya Commune, Burkina Faso, with target study areas circled in yellow. Note 2. Original map source: BNDT, DGRE, Kaya Municipal Government, 2010

Table 1 Focus groups by CBW type and gender

Role	N	# of focus groups	Female	Male
Mother leader animator (MLA)	12	2	12	0
Community health worker (CHW)	13	2	7	6
Producer leader (PL)	14	2	4	10
Village vaccinator (VV)	11	2	0	11
Total	*50*	*8*	*23*	*27*

Focus group protocols comprised participatory impact assessment methods which integrated rating and ranking activities into open-ended discussion [37, 38]. Questions targeted participants' work or the type of activity they engaged in with the ViM project and after its exit.

We conducted between two and three focus groups with each CBW type and 20 individual interviews with project implementers. Participants traveled from four separate areas of Kaya to participate in focus groups that were hosted in one of the four areas indicated on the map in Fig. 2. The goal of this approach was to take into account the possibility that different contexts may affect the sustainability of activities and impacts from the ViM program. Researchers traveled to these central locations to conduct focus groups in Kaya commune.

All research activities were carried out by the research team, of which all members are external to the implementing organizations and were not involved in any part of the project's implementation. All focus groups were conducted in-person in Kaya in Mòoré and interviews

Table 2 Interview participants organizational type and gender

Type of organization	Organization name	# of interviews
NGO	ACDI/VOCA; Save the Children; Technical Alliance for Development Assistance (ATAD); National Institute of the Environment and Agricultural Research (INERA); Farm Radio International (FRI); Netherlands Development Organization (SNV); Caisse Populaire	13
Government	Ministry of Agriculture, Animal Resources, and Fisheries (MARAH); Ministry of Education; Ministry of Health; Ministry of Women's Solidarity	7
Total		20

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 7 of 21

were conducted over Zoom or in-person in French.[3] All research activities were voice recorded following consent from each participant.

Analysis

Focus group and interview recordings were transcribed and translated into French for data analysis by independent transcribers fluent in Mòoré and French. Each transcript was cleaned and imported into Nvivo 12 software [39] for data analysis.

We used a hybrid coding approach to analyze the data that comprised an inductive thematic approach followed by a theory-driven deductive approach (Fereday & Muir-Cochrane, 2006).

First, two researchers conducted independent analyses using an inductive thematic approach [40]. For this process, we compared each independent analysis and discussed discrepancies until we arrived at consensus on a set of codes constructed from identified themes. The result was a set of theme-based codes that reflected the participants' own words.

We conducted an additional analysis using deductive coding, wherein a codebook was established a priori based on the conceptual framework described above. Following Crabtree & Miller's guidance, we followed a template of codes which facilitated data organization, matching excerpts to the predefined set of codes and clusters of codes [41]. The use of this template helped us apply the data within meaningful context of the conceptual framework, which is rooted in past studies and relevant literature on sustainability.

Each process of coding was done systematically, but was also iterative and reflexive. Following each coding, we scrutinized the organization of the code sets to ensure that the themes reflected the first round of coding, thus preserving the sentiments of the participants' own words.

To improve interpretation of findings and render them more actionable, we then shared findings in participatory workshops with individuals from the target population, including local implementing partners, CBW beneficiaries, and implementers of the current ViMPlus activity. Their feedback provided a more complete picture of the initiatives undertaken under the ViM program and helped us to identify key lessons pertinent to improving the CBW approach, particularly in this area of the world.

Findings

We start by presenting the program's overarching sustainability and exit strategy followed by a narrative of each CBW role and its current status. Next, we describe how each CBW role was incorporated in the program's sustainability strategy and the approaches used to enhance each role's sustainability. Finally, we evaluate these approaches in relation to the conceptual framework, particularly focusing on the four hypothesized factors of sustainability: capacities, resources, motivation, and linkages. We also assess the influence of external factors on the sustainability of post-project activities.

Sustainability and exit strategy

The ViM program's endline assessment report [42] articulates the program's planned exit strategy as focused on generating sustained technical and managerial capacities across beneficiaries, as implemented in the following three phases:

- Phase down: incremental decrease of programmatic support and provision of resources
- Phase over: transfer support duties to local and/or permanent institutions
- Phase out: conclude program interventions.

As noted in the project background, ViM was extended by two years. On one hand, this enabled program implementers to continue working with beneficiaries to enhance their capacity to take over once ViM ended. However, interviewees indicated that the process of waiting to see if they received the extensions was clouded in uncertainty for ViM personnel, resulting in considerable staff turnover.

The sustainability plan also emphasized two cross-cutting issues: gender and the environment. Gender integration and increasing women's empowerment and the use of environmentally sustainable agricultural practices were woven into several program activities and indicators.

Producer leaders (PLs)

To increase and diversify agricultural production, ViM worked with producer associations and established the CBW roles of PLs and VVs. These activities were supported by partners from the Burkina Faso government, local research institutions, and international non-government organizations [42].

Figure 3 illustrates the sustainability strategy and aims of the PL role. Starting in 2014, the project aimed to identify and train three PLs from each producer

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[3] Interviews were conducted on Zoom because participants for two reasons. First, participants were located in either the U.S. (ACDI/VOCA headquarters), Ouagadougou (where the Burkina Faso ACDI/VOCA project is based), or in Kaya commune (particularly the local implementing partners). Second, the Covid-19 pandemic broke out in March 2019, making it challenging to travel to do interviews as originally planned. Because Burkina Faso was relatively minimally impacted by Covid-19 in the spring of 2020, our research team was able to conduct focus groups in person in Kaya. We followed health and safety guidance from Burkina Faso government in addition to Tufts University IRB guidance when carrying out these in person focus groups.

SUSTAINABILITY STRATEGIES	ACTIVITIES	SERVICE TO COMMUNITY
Identify and train 3 PLs per producer group through farmer field schools (during project)	Provide training and leadership to producer groups	Improve market linkages for producers
Engage PLs explicitly as volunteers		
Establish model farms and train PLs to use and maintain them to demonstrate practices	Use model farms to demonstrate production practices	Increase adoption of improved agriculture practices
Help producer groups obtain official recognition	Facilitate farmer field schools to train producers in area	Improve agricultural productivity
Connect producer groups to local financing groups		
Provide literacy education to help PLs navigate official paperwork and markets (during project)	Provide technical support to producers in area	Diversify livelihood opportunities
Conduct farmer-to-farmer visits to catalyze peer support		
Equip PLs with production materials (during project)		
Invite PLs to input fairs to connect producers to input providers (during project)		
Create subsidies for inputs during program (during project)		

KEY ASSUMPTIONS
- Producer groups will value PLs leadership and continue meeting
- PLs will continue to provide training as volunteers past the conclusion of the project
- PLs will maintain demonstration plots
- Equipment provided will be durable and/or easily replaceable
- PLs will value inputs and want to/be able to purchase them without subsidies
- PLs will maintain connections to input providers

Fig. 3 Producer leaders (PLs) sustainability strategy

association. Over the course of the project, these volunteer PLs received technical training on improved agricultural practices, group management, and how to conduct trainings with farmers. Training practices included running farmer field schools,[4] establishing and maintaining

demonstration plots, coordinating exchange visits with other farmers, and conducting home visits to provide farmers with agricultural advice. During farmer field schools, PLs and their producer associations received basic agricultural inputs such as wheelbarrows and shovels. They also received cross-cutting training on gender and natural resource management and were provided literacy lessons if necessary. Project implementor interviewees explained that PLs were expected to continue to lead their producer associations and to provide technical

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[4] The Farmer Field School (FFS) model is based on the "learning by doing" principle, that direct experience, observation, and discussion are essential for effective learning. In practice, FFSs bring together farmers for regular meetings to experiment as a group with production practices and test new technologies on real fields [43].

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 9 of 21

support to them and other community farmers post-project as volunteers.

Some trainings targeted use of local inputs, such as producer seed production for crops and trees. To increase adoption and improve access of other inputs such as fertilizers or crop treatments, the project coordinated input fairs and established a voucher system to subsidize the costs. Neither the fairs nor the subsidies continued after the project concluded. Project implementer interviewees explained that input fairs were meant to generate relationships between input providers and farmers, but PLs reported that while they increased their awareness of where to access these inputs, they and the farmers with whom they worked felt they could not afford them.

PLs described how they continued to implement the agricultural practices they were taught during the ViM project and to work with producers to disseminate information. The most sustained practices were those that could be done with limited resources, such as producing and using compost, planting/seeding in rows, and improved harvest practices. In each area, PLs reported that they continued to follow these practices and to teach other farmers "to work effectively". That said, activities were largely discontinued. From the perspective of both PLs and project implementors, farmer field schools were implemented during the program to train farmers, but the general sentiment was that there was no further need for them to continue.

PLs were expected to maintain infrastructure that ViM helped them procure. For example, in Koulogo village, PLs and the producer groups of which they were members focused on rice production, and the project helped them develop infrastructure such as lowland rice plots, irrigation systems, and stone bunds. The project also helped PLs and the producer groups of which they were members build storage buildings to store their harvests. Participants asserted that it was a challenge to maintain their infrastructure without external support, as they lacked resources to rent the equipment needed to repair infrastructure when damaged. Moreover, while they used the storage facilities that were constructed during the program, they felt they did not have enough storage space overall, and they lacked resources and capacity to build more storage facilities. This theme was echoed among PLs in other areas as well. In Koutoula-Yarcé, bean and millet growers lamented that the materials they received from ViM, such as shovels and wheelbarrows, were now damaged and did not feel they could replace them on their own.
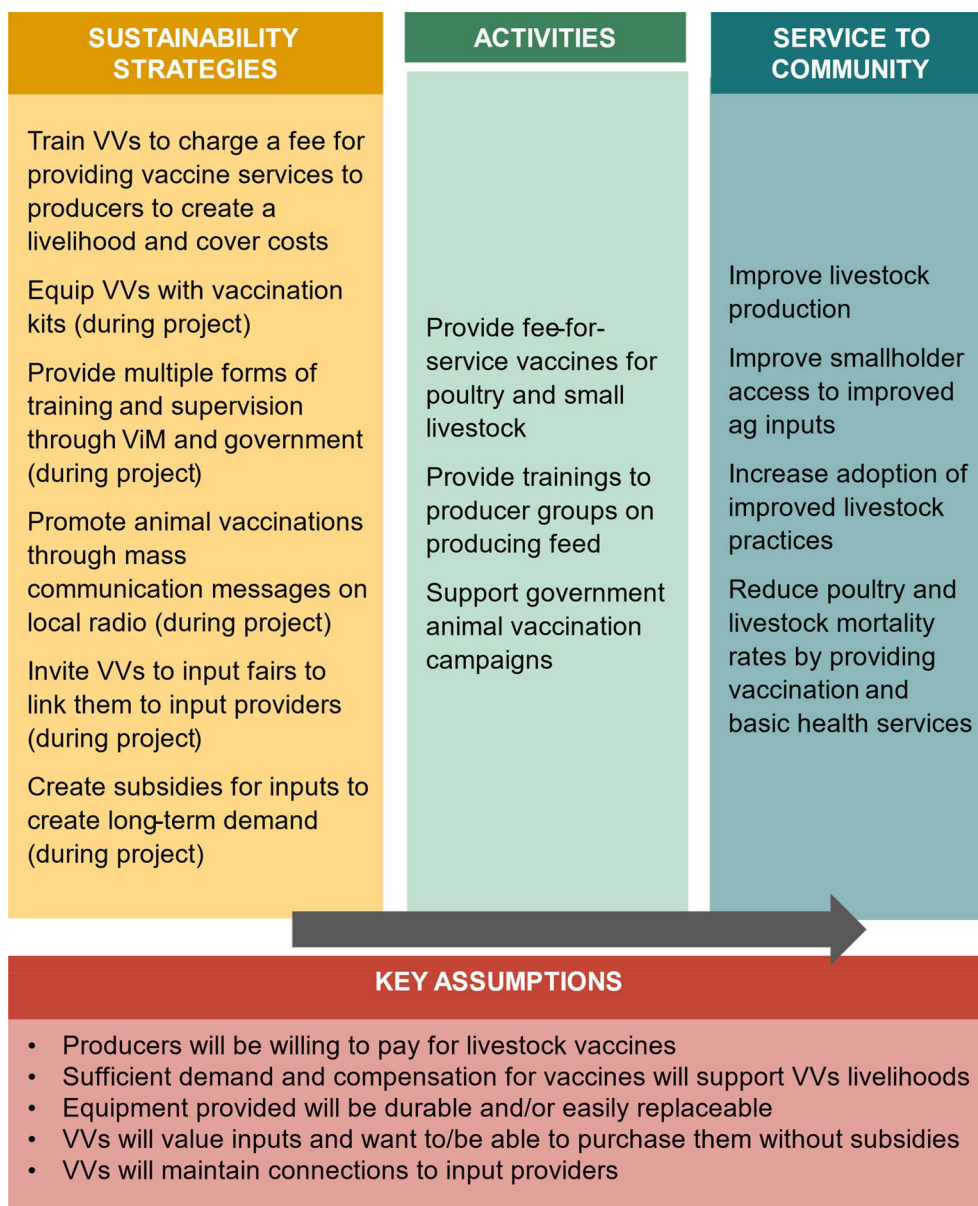
Village vaccinators (VVs)

VVs were trained to administer vaccines to poultry and to provide basic veterinary extension services to livestock owners (Fig. 4). This role responded to an identified need within the area for veterinary care. As part of their training, they participated in government-organized animal vaccination campaigns where they received direct supervision from ViM partner organizations. The ViM program equipped them with materials necessary to carry out this work, including syringes, needles, and coolers to transport vaccines. They also received seed for livestock forage crops and molds to conduct trainings on feed conservation practices. These trainings and materials were supplied to help VVs establish their own businesses as vaccinators and livestock experts. During the program, VVs thus began their work of administering vaccines and training farmers on how to conserve livestock feed. From the start, VVs charged a fee for these services to cover the costs of inputs and travel and to generate income, although these costs were partially subsidized by ViM at the outset. Reports from the last year of the program indicate that the average cost of a vaccination was 60 XOF ($0.11 USD at the time of data collection) per chicken, and VVs were earning approximately $3,180 US per year on average. This model was meant to help sustain activities once the project concluded by ensuring that fees provided both motivation and resources, and continued application of skills would maintain capacity.

There were mixed responses pertaining to VVs' sustained work. One VV described how his clientele has grown from six villages during the ViM project to 19. All others said that they have continued working but faced challenges that impeded their growing businesses. Although their work included a remuneration process, once the ViM project ended, they were on their own to identify business opportunities and had no systematic support.

Mother leader animators (MLAs)

The role of MLAs was integrated into ViM's care group model and was part of strategic objective 3: to reduce chronic malnutrition among children under five years of age and pregnant and lactating women. During the program, ViM coordinated neighborhood care groups which each elected one individual to serve as the group's MLA (Fig. 5). These women were trained to disseminate information on nutrition, health, and WASH practices and to conduct home visits with community members. While their main responsibility was to provide educational support, they also assisted community health workers (CHWs) in their areas in managing malnutrition and diarrheal disease in their

SUSTAINABILITY STRATEGIES	ACTIVITIES	SERVICE TO COMMUNITY
Train VVs to charge a fee for providing vaccine services to producers to create a livelihood and cover costs	Provide fee-for-service vaccines for poultry and small livestock	Improve livestock production
Equip VVs with vaccination kits (during project)	Provide trainings to producer groups on producing feed	Improve smallholder access to improved ag inputs
Provide multiple forms of training and supervision through ViM and government (during project)	Support government animal vaccination campaigns	Increase adoption of improved livestock practices
Promote animal vaccinations through mass communication messages on local radio (during project)		Reduce poultry and livestock mortality rates by providing vaccination and basic health services
Invite VVs to input fairs to link them to input providers (during project)		
Create subsidies for inputs to create long-term demand (during project)		

KEY ASSUMPTIONS

- Producers will be willing to pay for livestock vaccines
- Sufficient demand and compensation for vaccines will support VVs livelihoods
- Equipment provided will be durable and/or easily replaceable
- VVs will value inputs and want to/be able to purchase them without subsidies
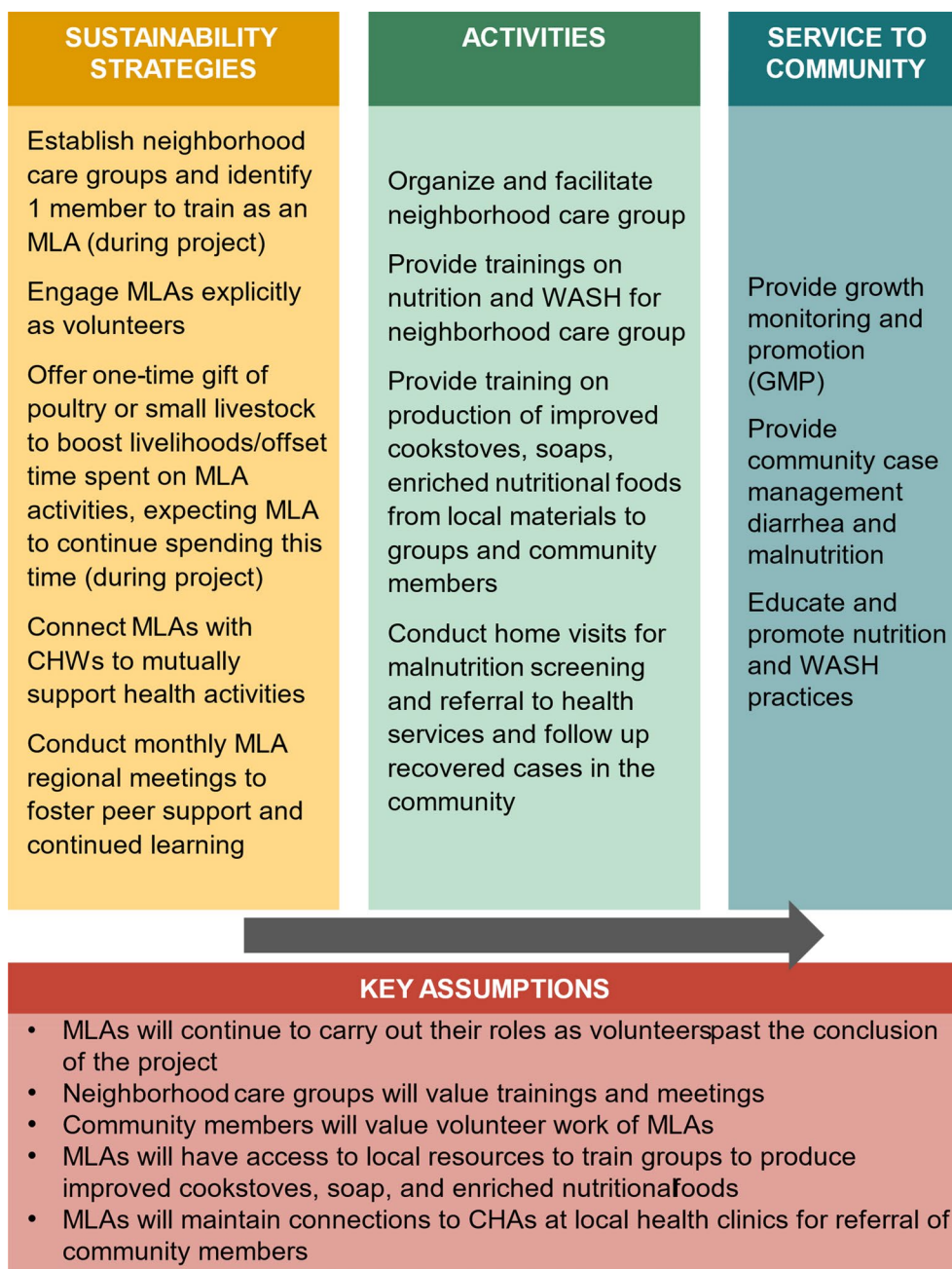- VVs will maintain connections to input providers

Fig. 4 Village vaccinators (VVs) sustainability strategy

communities. MLAs also participated in a monthly or bi-monthly meeting with program implementers and other MLAs from their commune to discuss their work and to receive continued training. During the project, MLAs received compensation for travel and materials to implement activities. They were not financially remunerated for their work; instead, they received agricultural inputs or livestock to support their livelihoods. As part of their sustainability strategy, ViM coordinated with the Burkina Faso Ministry of Health and Public

Hygiene to ensure that CHWs would continue working with MLAs in their areas.

MLAs were also involved in cross-cutting activities, such as engaging community members in discussions about women's rights, which they were expected to continue post-project with support from the Burkina Faso Ministry of Women, National Solidarity, and Family/ Ministry for Promotion of Women and Gender. In the vein of environment, they were trained to build improved cookstoves that reduce wood charcoal usage and improve
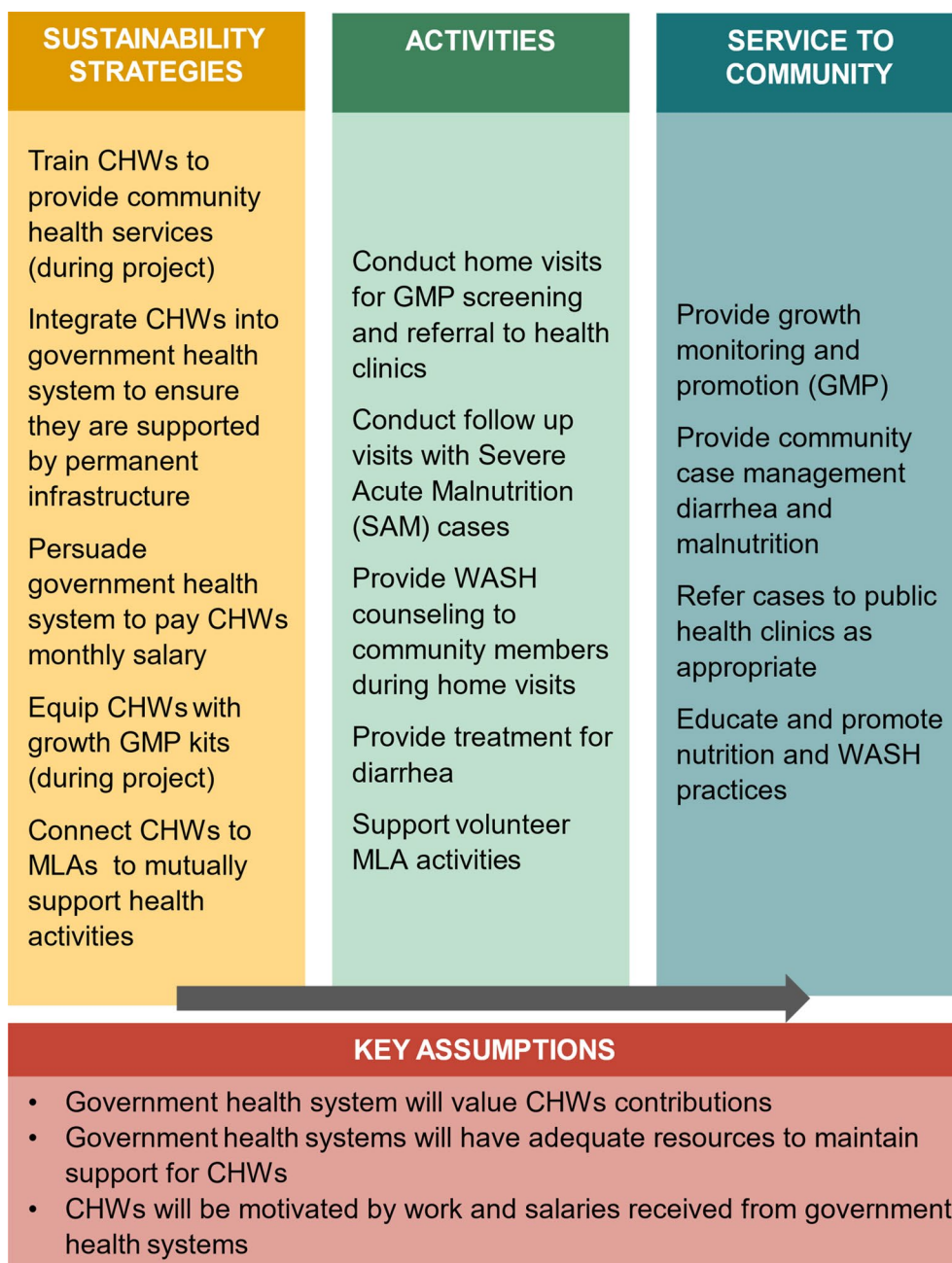
SUSTAINABILITY STRATEGIES	ACTIVITIES	SERVICE TO COMMUNITY
Establish neighborhood care groups and identify 1 member to train as an MLA (during project)	Organize and facilitate neighborhood care group	Provide growth monitoring and promotion (GMP)
Engage MLAs explicitly as volunteers	Provide trainings on nutrition and WASH for neighborhood care group	Provide community case management diarrhea and malnutrition
Offer one-time gift of poultry or small livestock to boost livelihoods/offset time spent on MLA activities, expecting MLA to continue spending this time (during project)	Provide training on production of improved cookstoves, soaps, enriched nutritional foods from local materials to groups and community members	Educate and promote nutrition and WASH practices
Connect MLAs with CHWs to mutually support health activities	Conduct home visits for malnutrition screening and referral to health services and follow up recovered cases in the community	
Conduct monthly MLA regional meetings to foster peer support and continued learning		

KEY ASSUMPTIONS
- MLAs will continue to carry out their roles as volunteers past the conclusion of the project
- Neighborhood care groups will value trainings and meetings
- Community members will value volunteer work of MLAs
- MLAs will have access to local resources to train groups to produce improved cookstoves, soap, and enriched nutritional foods
- MLAs will maintain connections to CHAs at local health clinics for referral of community members

Fig. 5 Mother leader animators (MLAs) sustainability strategy

indoor air pollution. Post-project, they were expected to continue providing training on how to build these cookstoves and to make sure that built stoves were working and being used properly.

MLA participants spoke positively of the skills and knowledge cultivated through ViM. But outside of continuing to use practices related to health, nutrition, and WASH themselves, their implementation of activities to train others appears to have diminished. MLA participants in Gounghin and Koulogo explained that when someone comes and asks to learn from them, they happily train the person from their home. However, they no longer conduct community trainings or attend regular neighborhood care groups or monthly MLA meetings.

SUSTAINABILITY STRATEGIES	ACTIVITIES	SERVICE TO COMMUNITY
Train CHWs to provide community health services (during project) Integrate CHWs into government health system to ensure they are supported by permanent infrastructure Persuade government health system to pay CHWs monthly salary Equip CHWs with growth GMP kits (during project) Connect CHWs to MLAs to mutually support health activities	Conduct home visits for GMP screening and referral to health clinics Conduct follow up visits with Severe Acute Malnutrition (SAM) cases Provide WASH counseling to community members during home visits Provide treatment for diarrhea Support volunteer MLA activities	Provide growth monitoring and promotion (GMP) Provide community case management diarrhea and malnutrition Refer cases to public health clinics as appropriate Educate and promote nutrition and WASH practices

KEY ASSUMPTIONS
- Government health system will value CHWs contributions
- Government health systems will have adequate resources to maintain support for CHWs
- CHWs will be motivated by work and salaries received from government health systems

Fig. 6 Community health worker (CHW) sustainability strategy

Community health workers (CHWs)

Figure 6 illustrates the CHW strategy. The creation of the CHW role was a collaborative effort between multiple NGO projects and the Burkina Faso Ministry of Health. CHWs were trained to screen for acute malnutrition, diarrheal disease, and in growth monitoring and promotion. Along with MLAs, CHWs helped to deliver nutrition and health messaging through ViM's mass messaging initiatives through local radio stations and theater groups. The ViM program advocated to incorporate and standardize the CHW role into a new community health national policy. At first, the government wanted CHWs to conduct activities on a volunteer basis, so ViM decided to begin paying them a monthly stipend for their work. In 2016, two years before the end of the ViM program in Kaya, the Ministry of Health officially recognized their role and began paying them a monthly salary of 20,000 XOF ($36 US at the time of data collection).

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 13 of 21

Unlike the other CBW roles, CHWs continued to receive training and support post-project because they were integrated into formal health systems during the program, and they continued to receive a monthly salary. Post-project, they continued their community-level activities, including raising awareness of prenatal care practices, reducing malnutrition among children, and giving vaccinations. They also continued to support health center activities such as child weighing days, where they come to raise awareness on health topics among women at the clinic and sometimes also help weigh children.

Assessment of key factors

Where activities continued after the project, the four hypothesized factors of sustainability—capacities, resources, motivation, and linkages—remained present, albeit weakened, two years after the project ended. Where activities did not continue, one or more of these factors was missing. While we will outline key themes that emerged for each factor separately, these factors were often inextricably interconnected.

Capacities

Most project implementer interviewees considered capacity-building to be the chief approach to sustainability, and over half of respondents referenced it as key to the exit strategy. During the project, CBWs were provided training and practical opportunities to develop skills that enabled them to implement activities on their own once the project concluded.

In focus groups, all CBW types lauded capacities cultivated through their engagement with the program. MLAs felt that the knowledge they gained was invaluable for themselves, their households, and to help develop their communities. They underscored how the program helped raise their awareness and knowledge on health-related issues that they maintain to this day, as illustrated by the following interactions:

> *Participant 1: During the project we were learning, but after the project we mastered the whole process.*
> *Participant 2: Yes, the advising provided by (name of ViM trainer) encouraged us to continue the activities after the project.*
> *Facilitator: Does (name of ViM trainer) continue to come after the project ended?*
> *Participant 1: No, she does not come anymore. We use her lessons to continue our activities. Because these are achievements, and it is difficult to forget important things.*

PLs described a variety of skills that they developed through ViM. In a focus group that comprised women

PLs from different producer groups, participants discussed how they learned and continue to train other farmers to make compost:

> *Participant 1: During the project we were taught how to make fertilizer and apply it. Indeed, it was beneficial to us. Today we continue to do the work: every seventh day we start making a new hole with fertilizer; on the 14th day we turn [the compost pile] and water the previous ones...this has helped us consistently produce fertilizer and we bring it to the field with us.*
> *Participant 2: Yes, in terms of making compost, each year we train 27 people. We choose a certain number of people to participate and when they arrive, each one puts his fertilizer in front of them and digs a hole, removes the water, and pours the ash. After all that they help each other: some pour the water, others pour the ash, so on the third day another group comes back, and we continue like that until we reach 27 people in a year.*

VV participants also felt they gained capacity to provide services to livestock owners. However, most VVs lacked the access to resources, linkages, and perhaps know-how to feel confident about their efficacy as entrepreneurs and to generate new clients.

CHWs described how their maintained capacities from ViM are exemplified throughout the communities where they work, as explained here:

> *When you go into our community, and you come across a woman with a child, and you ask her the question about when to weigh a child, she is able to explain everything from pregnancy to delivery and even the newborn's first vaccine and prenatal visits. All this is thanks to the VIM project, so we continue with sensitization efforts, and today our way of life has changed a lot.*
> *If you go to the courtyard of most women in our communities, it is kept clean now. Some did not know how to make nutritious porridge to feed their children, but we provided trainings on preparing nutritious porridge for their child. Even concerning vaccinations; today we continue doing vaccinations and child weighing. If you see a pregnant woman today, she follows the weighing practices and the appropriate vaccination schedule for her children.*

Aside from CHWs, other CBW types lacked a channel to obtain new relevant information. One VV expressed a sense of abandonment by the project in this sense:

> *The biggest change since the project left is there are*

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 14 of 21

no more trainings and follow-up. We are left to our own devices to continue carrying out our tasks. So it is very difficult, but we continue according to what we had learned. We strive to continue being available whenever people need our services, but the work goes slowly, as if it may soon come to an end.

Resources

At different points of the project, CBWs received materials to conduct activities from ACDI/VOCA. PLs were given a range of agricultural inputs, such as improved seeds and tree seedlings, and equipment including shovels and wheelbarrows. Working with associations, many also received project support to construct larger infrastructure. For example, for those engaged in ViM's lowlands improvement project, the project provided the equipment to construct irrigated perimeters and install water catchment devices.

MLA's and CHWs received supplies such as picture books and flip charts to help them conduct group health/nutrition sessions with their neighborhood care groups. CHWs received measuring tapes to conduct growth monitoring activities. Each CBW type was also given shirts or fabric wraps to distinguish them in their role.

When asked where and how they accessed resources needed to do their tasks post-project, most participants said they did not have a sustained source of financial or material resources. This is well-reflected in an excerpt from a PL focus group in Koutoula-Yarcé. After listing the materials needed for their work, the facilitator asked:

Facilitator: During the project, did you have access to these resources? If you needed to replenish a resource, how would you do so?
Participant 1: It was the project.
Participant 2: Yes, it was the project which came to Kaya and called us so that they could deliver the materials.
Facilitator: And since the end of the project, how do you access these materials?
Participant 3: Since the end of the project, we have not had any new materials to work; we do not have the means to buy new materials for work.

This theme raises an issue of simply handing out materials and resources during a project. This practice created expectations of free handouts, and participants expressed feelings of abandonment and broken promises when the project ended, given that they were no longer receiving free materials. One PL lamented:

They promised to help us with fertilizer and with breeding cattle and how to work with them so that we can use the manure in our fields. But they were

not able to do all of this before leaving; they just told us about it. I know that if all these promises were kept today, we would have seen the benefits.

In each CBW role, participants felt they lacked sustained access to needed materials. Without what had been presented as the necessary materials during the project, CBWs reported that they were blocked from conducting trainings. MLAs explained that without some form of remuneration or sustained linkages, they could not purchase materials to conduct certain trainings like constructing improved cookstoves:

After the end of the project, our activities diminished because if it is not with the health centers; we do not have linkages and have no more help. We have the knowledge to show women how to do things, but we are missing the materials.

Lack of resources also created a challenge to recruiting and training new community members or group members. For example, MLAs were uncertain how to train new MLAs as they did not have additional picture books and could thus not replicate how they had been trained. Even the provision of t-shirts or fabric wraps was considered essential to their CBW positions.

Resources provided were also seen as non-local, or even "white people" materials, further contributing to perceptions of non-accessibility. This was a recurring theme in multiple project activities. For example, MLAs explained that women who received food rations that comprised imported flour during the project were skeptical about using a local substitute afterwards. This unintended consequence was created by stipulations placed on project implementers by the funding agency: the food made available to distribute as food rations was limited to a list of commodities given to implementers by USAID.

The program did make efforts to promote local resources and improve access. From the first year of the program, ViM implemented input fairs to introduce PLs and VVs to different inputs and to create linkages with agricultural input providers. In tandem with these fairs, ViM coordinated input subsidies to make them more affordable to farmers. Alas, neither the input fairs nor subsidies continued post-project, and participants did not feel that the program had helped to build lasting relationships with providers.

Upon further probing, it seemed that the problem was not necessarily that the materials were not available, but that participants felt they lacked the financial resources to purchase materials on their own. This is an important nuance to explore further, as there are many possible contributing factors to this challenge. While it may be true that beneficiaries and CBWs do not have the financial

resources to purchase materials, it may also imply that the resource of interest is not considered a worthwhile expense, either at the household level or for conducting CBW activities.

VVs were set up from the beginning to be remunerated for their work so that they could purchase materials such as vaccines and to generate a livelihood. Still, they felt they lacked certain resources necessary to perform their work successfully post-project, especially a refrigerator –and the gas or electricity needed to run it—to store the vaccines that they must purchase as inputs. Having the resources to store vaccines is essential in this context because one vial of vaccine is sufficient to vaccinate approximately 200 chickens, but most clients have small flocks, so the vaccine may spoil before it is used up. Unless the VV sets up multiple vaccinations immediately after purchasing the vaccine—which ViM helped them coordinate during the program—they cannot make up for the costs of inputs. One VV explained:

Higher vaccine prices are a challenge for us, but even if they lowered the prices, we would still have an issue. They should decrease the doses per bottle to say, 50 doses. For example, someone asked me to come and vaccinate his 20 hens, but I have not gone yet because with 20 hens, you will open the bottle and vaccinate [the 20 hens], and then where do you store the rest of the product? You have to tell the person that you are coming and then look for more hens to vaccinate until you find enough hens to use up all the vaccines in the bottle. But all this is tiring, and you are wasting your own gasoline to travel around.

MLAs and CHWs also contended that a key barrier to performing their duties was not having a means of transport, like a bicycle. This challenge was cited in several of the program's quarterly and annual reports as exemplified by the following excerpt from a 2014 quarterly report:

The project has been discussing with the Health District to find the best way of providing growth monitoring and promotion sessions at the health centers, as most of the CHWs do not live in the village where the health center is located. The CHWs have to walk for about 5 to 7 km to reach the nearest health center to provide a growth monitoring and promotion session (FY2014 Quarter 1 Report).

Not only was the lack of transportation a constraint for reaching health centers, but for some it made it difficult to attend refresher trainings. One MLA gave an example:

For example, if we are called to come to Kaya to do a training course, we must find a way to get there. If it is one day, we can ask to borrow a motorcycle from a neighbor. But if it is two days, it is not possible. But if you have your own means of transport, it is easier—even if you want to spend a week [in the city], you can do so because you have your own motorcycle.

CHWs also felt that they would benefit from having a community-based physical location to meet and conduct activities.

Participant 1: For example, during the project we had a meeting place. But since the end of the project everything has come to an end, so we do not have a fixed place for our meetings.
Facilitator: So, you are saying that after the project leaves you do not have a fixed location to meet and discuss, and in your opinion, if you gain a place like that for the group, and everyone knows that this place belongs to the group, do you think that today, even after the project left, that it would have improved the transition and your ability to continue activities?
Participant 2: Yes, at this time we could continue to meet to give each other advice and encouragement so that the work progresses.
Participant 3: If you have an association that does not have a home, it is not called an association!

Participants further underscored how even just having benches or chairs would help them.

Often when we go out to meet with a woman, we do not have benches to sit on during our meetings. So sometimes you have to run to the neighbors to ask for something to sit on. Then I have experienced that you borrow the bench from the neighbor and the children are playing on it and the bench breaks, and people complain that a whole association does not have something to sit on. This is really a constraint.

Discussing their resource constraints accentuated a feeling that they lacked recognition and respect for their work. Participants felt that having their own means of transport, a fixed place for their work, and even just benches to use during home visits would help to professionalize their role as community leaders.

Motivation

Recognition of the value of activities learned under the ViM program was one of the most-cited sources of motivation that cut across CBW types. Participants saw the benefits of activities for themselves and for community development more broadly and were motivated to share these benefits. MLAs and CHWs felt inspired and responsible to continue working to decrease child

malnutrition and to educate communities of the importance of vaccinations. PLs felt that they and members of their producer associations had increased their production capacity due to their training and support from ViM.

Another principal motivating factor for all CBWs was knowledge and skills acquisition offered through ViM's activities, or as one MLA described:

The motivation for us is the awakening of consciences, the knowledge.

This motivation was especially strong during ViM, when they were regularly receiving trainings and participating in activities. After the project, CBWs were still motivated to continue to learn in their respective fields, but inadequate linkages restricted the degree to which they felt they had a source for new information. While CHWs reported benefitting from further training and support due to their maintained linkages with health centers, unfortunately MLAs did not feel they had linkages to form or new sources of information or training.

When discussing their motivations, one PL exclaimed that even if they had to pay for the cost of travel themselves, they would gladly travel to receive further training. This reflects how the motivation to strengthen capacity coincided with another frequently cited motivation: enjoyment or interest in the work itself. Each CBW type emphasized how they were motivated "for love" or "enjoyment" of the work. Several participants described how they felt proud doing this work and were motivated by the respect it garnered from their community.

These motivations were sustained even two years after the program, although they did not necessarily translate into action. For example, while MLAs said they were motivated by community development and enjoyment/ interest for the work, their decreased activity level suggests that this may not be motivation enough. While ViM had strategically incorporated a sustained payment system for VVs and CHWs post-project, PLs and MLAs were expected to continue activities without remuneration, as volunteer work. While some project implementers felt that the volunteer approach was good for sustainability, most saw it as a flawed approach, as articulated by a project implementer from the health sector:

To tell the truth, the biggest challenge was the volunteer expectation. People are no longer ready to sacrifice their time, their energies, and their resources for the community without, in return, benefiting from them, either the beneficiaries, or in their own households, or from the development agent partners. This is one of the shortcomings that played a role in sustainability. While we were there, all were engaged,

but after our departure some say, 'the supervisors are no longer here, why should I bother?'

As noted in the description of roles, CHWs were integrated into formal health systems during the ViM project and began to receive a monthly salary for their work, which was deemed a motivating factor for them. VVs were motivated by remuneration, but for the most part did not feel they were able to sustain a livelihood once they were on their own (without the support of the project).

Linkages

Apart from CHWs, both project implementers and CBWs felt that vertical linkages were not well-established to help activities continue. CHWs reported sustained linkages to the health centers where they worked; these linkages were deemed essential to sustain activities, to access needed inputs, and to receive consistent trainings. Meanwhile, though MLAs worked with CHWs and health agents from local health centers during the project, nearly all participants reported these linkages had not continued and lamented the lack of stronger, more formal connections. As previously noted, this affected their access to new information, training, and resources.

There were some contradictions when discussing linkages. Project implementers discussed several activities implemented to establish vertical linkages, such as the input fairs, where producers were introduced to input providers to enhance their access to key resources once the project concluded. Despite multiple input fairs implemented during the project, they do not seem to have built lasting relationships or linkages. A few project implementers recognized the lack of attention to bolstering linkages to support CBWs' sustained activities. One project implementer reflected on this as a particular challenge for MLAs:

[With] the mother leaders, there has not been an institutionalization allowing them to be integrated into the health system. Since then, mother leaders have not been recognized by health facilities as a resource that can support them to promote activities in health, nutrition, hygiene, and sanitation.

Another theme that emerged in the vein of linkages was participants' feeling that the project had abandoned them. This feeling of abandonment underscores participants' feeling that they lacked a strong network and supportive linkages.

Although vertical linkages were not seen as well-established, the project appeared to have more successfully bolstered horizontal, or peer-to-peer linkages. Multiple participants pointed to increased social cohesion as

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 17 of 21

a positive impact from the project that carried over and was a motivator to sustain activities. In an MLA focus group, one participant described how the project helped diminish the fear of talking to new people.

Before, if we saw strangers, we would quickly go home. If a meeting was called, even some men would not go out. Now we are sitting and discussing together. Nowadays, when a meeting is called, the village chief himself will come.

This point was further emphasized in focus groups with PLs and a different group of MLAs:

This work made us closer to older people. Before, young women like myself would say, 'I want to get closer to the mother (older, respected women in the village), but I am afraid of them'. Now we share the same fields and work in the same groups together. We laugh together.
The project united us women. Coming together to work is itself a motivation for us. First, it is a motivation. Second, we are able to share our experiences together and we feel united together no matter what the circumstance. Third, it creates peace among us.

Impact of external factors

Since the conclusion of the project in 2018, residents of Kaya commune experienced numerous shocks and stresses that likely affected the sustainability of CBW activities. CBWs reported several shocks related to ongoing insecurity from terrorist activity in the area and the region generally. The prevailing shock was the surge of internally displaced persons, refugees coming in from other areas to flee violence, which constrained resources. Participants lamented shortages of resources including food, water, limited spaces for their children in local schools, and reduced cultivatable land. Further, the terrorism and influx of internally displaced persons created a state of unrest and uncertainty, and participants described feeling consistently wary that they might need to pick up and leave as others had come into their areas. CBWs also felt that these issues were constraining their work. Participants described barriers to mobility which affect their ability to conduct or participate in certain activities. A notable change in activities across CBW type was the reduction in regular meetings. One project implementer interviewee explained:

I think that the major challenge surrounds the question of security that has emerged with time and derailed almost all of the field activities...People cannot move around freely for activities that they want to implement, and the populations are being displaced, so it is truly a major problem.

The COVID-19 pandemic also impacted mobility, especially for MLAs and PLs, who are expected to continue holding meetings with their neighborhood care groups or producer group associations.

Whereas shocks refer to external short-term deviations that negatively affect a population's well-being, stresses are the long-term trends that jeopardize stability [44]. Climate change was the most cited stress affecting participants, especially as it affects agricultural production. In particular, participants referenced the persistent drought in their area. A few participants also expressed how the shocks and stresses of insecurity and climate change led to greater food insecurity.

Discussion

This qualitative research underscored the importance of ensuring that all four key factors—capacities, motivation, linkages, and resources—are sustained post-project. In addition, the influence that external factors such as terrorism, internally displaced persons, and climate change had on sustained activities underpins the need for purposeful resilience-building initiatives targeting context-specific shocks and stresses. The CHW approach, which most successfully secured each factor, was the most effective. A notable difference was establishing a permanent linkage by creating a professional role for the CHWs. This strategy provided long-term motivation (monthly salary), access to resources (through health clinics), and access to information and learning opportunities, by working for the government. In addition, the project transferred supervision to the government health system—a permanent structure—two years prior to the project ending, allowing a gradual transition.

We conclude by highlighting five key lessons to inform future initiatives using the CBW approach, along with an outstanding question on resources to catalyze further research.

Transition gradually to independent operation during the project lifetime

For CBWs to transition effectively to independent operation, either on their own or within permanent structures, projects must gradually transfer responsibilities during the project lifetime with ample time prior to project exit [7]. This is necessary to observe whether CBWs feel confident in their abilities to provide services without the support of the project and to identify potential challenges while they can still be corrected. In cases where supervision of CBWs is transferred to another entity, such as CHWs' integration into health clinics, the project can

assess the efficacy of the new supervision and work to improve its capacities to support CBWs or seek an alternative entity.

Project implementers highlighted that while gradual transition was a part of the sustainability strategy during ViM, the time waiting to hear about whether the project would receive an extension resulted in substantial staff turnover that, in their eyes, was a major disruption. This uncertainty is unfortunately not atypical to development projects, who depend on an external awardee to determine the amount of time a project will be implemented. This perspective further underscores the importance of planning for exit at multiple stages from the beginning of the project. Further research is needed to identify bottlenecks surrounding the project extension process to limit these challenges.

Integrate CBWs into permanent—and functional—systems

CBWs need and want to be integrated into permanent systems that have capacity to support them long-term. As past research also observed, integration into permanent systems is necessary to establish a persistent enabling environment for CBWs [13, 20, 45]. In this study, CHWs were formally integrated into the government health system, and as a result, their role was the most sustained of all CBWs at follow-up. They had sustained support networks, which helped them continue to build capacities, provided access to materials and a steady paycheck, and helped to professionalize their role, an important motivation. In contrast, MLAs worked with local health centers and CHWs during the program, but no formal linkages were established between either group to ensure that the relationship continued. This left MLAs, a well-trained crew of health and social change agents, without support and resources needed to continue their duties, resulting in a dramatic decrease in activities. PLs were similarly left without formal linkages to permanent systems such as, for example, government extension. Their activities likewise declined to what could be accomplished without personal investment. VVs were trained with the assumptions that they would be self-sufficient as entrepreneurs, but left without formal connections, many of them found it challenging to generate enough clients to cover costs of materials and make a living. Integrating CBWs into permanent systems would also limit the feeling of abandonment that many participants expressed and would strengthen social capital.

Importantly, the institutions into which CBWs are integrated must be functional and have the capacity to support CBWs long-term. This can present challenges in resource-poor regions, where government institutions may be weak, do not have a strong presence, and have insufficient resources. The gradual transition, where the Ministry of Health took over payment of CHW salaries two years prior to ViM ending, allowed the project to see whether the institution could effectively absorb CBWs, and it appears to have worked. Here, we see a need for further research to generate data to build frameworks for assessing preparedness of institutions to take over CBW supervision. Perhaps more importantly, research should examine how to best support institutions in developing their preparedness within their context.

Professionalize the CBW role (re-think the volunteer approach)

Many projects embrace the CBW approach as a low-cost way of stimulating participatory development, depending on community members to volunteer their time for these roles. But as some scholars underscore, CBWs want to be professionals (both paid and recognized as such) rather than eternal volunteers [8–10]. Professionalizing could refer to a range of things. Remuneration would go a long way towards sustaining activities, but participants also wanted to be seen as professionals within their communities. Additionally, participants felt that lacking a physical space to meet, or even just benches to bring to home visits, could make them appear unprofessional. CBWs also underscored the need for a means of transport to conduct activities and to conduct trainings. Projects often will coordinate spaces to provide trainings in villages and will provide per diem for individuals to travel to training sites. Without these elements, the burden falls to the CBW to figure out how to conduct activities. These elements were also seen as important signifiers of their role, without which several CBWs felt their communities did not always recognize them.

When the volunteer approach is combined with a lack of integration into permanent systems, CBWs are further challenged by a dearth of supervision that holds volunteers accountable in their role and also provides continued support. Past scholars observe a common—and problematic—assumption that volunteer CBWs will be held accountable by their community, but this can result in unequal provision of services and can reproduce social hierarchies [12, 13, 46].

What to do about resources?

In theory, community-driven development draws from assets and resources that exist or can be established in a community rather than bringing in external agents and materials [11]. Unfortunately, providing outside materials to participants as part of development trainings is a

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 19 of 21

ubiquitous, almost expected practice in development initiatives. We found this to be detrimental to sustainability and to CBWs' sense that they could replicate activities after the project ended. While distributing paper handouts may seem simple enough to someone working in an office in a city, often CBWs live in rural areas without electricity, let alone computers and printers. This project integrated a few culturally relevant training materials, including commonly worn fabric wraps with nutrition and WASH-related pictures on them for MLAs and CHWs to use as instructional aids in their communities. However, participants felt that these were a necessary part of becoming an MLA, and thus inhibited them from training other community members to become MLAs.

The issue of resource access is more complex, of course, than a decision to use local materials. Sometimes communities need access to resources that do not currently exist in their area, such as food or agricultural inputs, and it is the project's objective to increase access. Implementing organizations can also face stipulations from funding agencies that require them to use certain materials over others, as was the case of the imported flour given in food rations that beneficiaries preferred over the local substitute. Since the establishment of US food aid programs in the 1950s, there has been sporadic literature considering how US food aid is tied to US agricultural interests and policy (e.g., Awokuse [47]; Barrett & Maxwell [48]; Diven [49]). While food aid, particularly emergency food aid, has certainly helped people around the world, relying on non-local imports inhibits sustainable development. The subsequent ViMPlus program altered this practice to distribute unconditional cash transfers, rather than food rations, to allow beneficiaries to choose how they spend the money [50]. More research is needed on the efficacy of cash transfers in development initiatives and how that impacts sustainability. For CBWs, being part of a food rations– program that will conclude when the project ends is likely going to be a motivation during the project that expires along with the funds. The importance of cementing these roles into more permanent roles and structures is thus all the more important to finding solutions to building up local resources and improving access.

Co-develop endogenous definitions and indicators from the project onset

These findings point to the persistent issue of who defines sustainability and how it will be measured. This conceptual framework provides guidance on what categories of factors should be planned for and how, based on an endogenous description, they should be tracked over time. In recruitment of CBWs, are we asking them what motivations, resources, capacities, and linkages would enable and incentivize them to engage long-term (past the project lifetime) in their role. Considering that the CBW approach centers the idea of empowering community members, the notion of empowerment should likewise be locally defined.

This process should not be an afterthought, but a central and iterative part of the project. Moreover, the definitions and process will be different in each context, which means that qualitative research methods are important to draw out nuances. Again, this must happen from the beginning, not as a "contextualization" check on quantitative monitoring and evaluation data [51].

Conclusion

We used qualitative methods to assess from participants' own words how they felt that their capacities, resources, motivation, and linkages were sustained. While there may be specific, more universal components of each (e.g., being motivated through remuneration), the context in which the CBW is meant to provide services can alter the relevance of different approaches. For example, one might be motivated enough by factors besides remuneration (e.g., seeing advantages for their community) if they have alternative (and stable livelihoods) and have time to volunteer. In rural areas of low-income countries, especially in places where the majority of adults are subsistence farmers and there are minimal options for other jobs, paid CBW roles offer a unique opportunity that may improve sustainability. This might not be evident during the project if activities are providing resources and materials during the training process, thus incentivizing CBWs to participate during that time. Examining best approaches to sustain capacities, resources, motivation, and linkages should thus be a key part of project implementation from the beginning of a project, as the approach may need to be honed. Importantly, this framework should be used from the beginning of the project in partnership with CBWs and the communities served to iteratively develop a sustainability strategy.

Wilson *et al. Agriculture & Food Security*   (2023) 12:30

Page 20 of 21

Availability of data and materials
Data and coding from data analysis will be made available upon request to the corresponding author.

Declarations

Ethics approval and consent to participate
This study was approved by the Burkina Faso Commission of Information Technology and Freedom (*Commision d'Informatique et de Libertés*, CIL number 2020/378/CIL/SG/DAJC) and Tufts University Social, Behavioral, and Educational Research (SBER) Institutional Review Board (IRB number STUDY00000125) prior to data collection. We followed all guidelines for both boards regarding participant consent to participate.

Consent for publication
All authors approve this submission of this manuscript.

Competing interests
The authors declare no competing interests that could inappropriately influence (bias) this work. Data and coding from data analysis will be made available upon request to the corresponding author.

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