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“The main goal is to create resilient communities”: Assessing the Role of Community Engagement Activities Across Global Nutrition-SBC Projects

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“The main goal is to create resilient communities”: Assessing the Role of Community Engagement Activities Across Global Nutrition-SBC Projects

By

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B.S The Pennsylvania State University, 2020

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An abstract of
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Abstract

"The main goal is to create resilient communities": Assessing the Role of Community Engagement Activities Across Global Nutrition-SBC Projects

By Katie Leite

Background: Community engagement (CE) methods are used in public health research to address how social determinants of health and stakeholders can be involved in project implementation. There is a need to explore how CE methods used with nutrition social and behavior change (NSBC) across global contexts might relate to improved dietary diversity and nutrition-related health outcomes. This information could support the effectiveness of NSBC strategies that use CE methods throughout design, implementation, & monitoring domains.

Methods: This project builds off of an ongoing study consisting of two aims- Aim 1, a systematic literature review on completed NSBC projects, and Aim 2, observing methodology of ongoing projects. Project documents detailing methods, key stakeholders, and impact on nutrition/diet were compiled by the parent study. Documents were used to evaluate the presence of CE using a qualitative codebook, a scoring system, and a pre-developed CE continuum (CEC). Projects were sorted into levels of the CEC after being coded and scored. Results will demonstrate how each project compares in their use of CE. Aim 1 effect ratios (ERs) were also calculated using existing effectiveness data.

Results: Analysis of Aim 1 and 2 projects exhibits the frequency and breadth of community engagement methods used throughout NSeA SBC projects. Aim 1 projects scored into the highest level of the CEC, demonstrating their reliance on CE methods throughout operation. Aim 1 ERs also shared a positive correlation with CEC score, where higher scoring projects demonstrated higher ERs. Aim 2 projects, which were subjected to a case study-style analysis, scored variably across the CEC and demonstrate the multitude of CE approaches that can be utilized across NSBC project domains.

Conclusions: Findings from this project support the use of CE methods in nutrition research by providing information that links project effectiveness with utilization of CE. Projects which used CE in their design, implementation, and M&E stages and scored higher on the CEC were found to have high effect ratios, as well as outcomes that aligned with their original objectives. These findings will be useful in future research aimed at bolstering NSBC projects and identifies which CE methods might be most useful in doing so.

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This thesis would not have been possible without the endless support of my friends and family, both here in Atlanta and at home. The past two years have been anything but ordinary in public health and throughout the world, so I appreciate those who have kept me grounded and motivated to do this work. I would also like to thank Odin for being a positive distraction when I am overwhelmed and for reminding me to enjoy life.

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Acronym List

ATSDR – Agency for Toxic Substances and Disease Registry

BCT – Behavior change techniques

CEC – Community Engagement Continuum

CDC – Centers for Disease Control and Prevention

CU2 – Children Under 2 years of age

DO – Direct observation

FAO – UN Food and Agriculture Organization

FGD – Focus group discussion

GAIN – Global Alliance for Improved Nutrition

IAP^2 – International Association for Public Participation

IYCF – Infant and young child feeding practices

KII – Key informant interview

LMIC – Low- & middle-income country

LNS - Lipid-based nutrient supplementation

M&E – Monitoring and Evaluation

NA&C -- Nutrition advocacy and communication

NSeA/NSA – Nutrition Sensitive Agriculture

PLW – Pregnant and lactating women

SBC – Social and Behavior Change

SNF – Specialized nutritious foods

TDF – Theoretical domain framework

UNAP – Uganda Nutrition Action Plan

USAID – United States Agency for International Development

VMF – Village Model Farm

WASH – Water, Sanitation, and Hygiene

WFP – UN World Food Programme

WRA -- Women of reproductive age

Chapter 1: Introduction

The 2020 Global Nutrition Report documented that due to the ongoing COVID-19 pandemic and the impact of other global forces, all diet-related non-communicable disease and malnutrition targets were off course at alarming rates (2020). It was projected that the probability of reaching most targets by 2025 was close to zero, even taking into consideration improvements in certain areas such as exclusive breastfeeding and increased dietary diversity. Many organizations who endorsed this report, such as the World Food Programme (WFP), The Global Alliance for Improved Nutrition (GAIN), and the UN Food and Agriculture Organization (FAO), work tirelessly each year and spend millions in grants and investment funds working to address nutrition and dietary issues, but these health disparities continue to persist globally.

Social and behavior change (SBC) methods are widely used across nutrition efforts because their multi-faceted nature can lend themselves to improving health, diet, income, and even gender empowerment at the end of a project (Kennedy et al., 2018). This systematic process has been used and trusted to better understand the range of factors that shape human behavior and facilitate a change process in areas across the field of public health. However, there is a growing evidence base for the effectiveness of SBC interventions in nutrition settings because most nutrition and health development programs involve behavior change, either at the individual or community level (Nutrition Now!, 2015).

An ongoing project through Emory University's Rollins School of Public Health seeks to describe how nutrition SBC design and implementation strategies are currently being applied across geographical regions and cultural contexts, specifically those involved with agricultural projects. This thorough review process, consisting of two main aims, will summarize current practices and create a resource for nutrition-sensitive agricultural (NSeA) projects moving

forward to better inform design, implementation, and monitoring of nutrition SBC in the context of agriculture projects.

Aim 1 of this multi-faceted venture consisted of a systematic review of peer and gray literature related to nutrition-sensitive agriculture projects that utilize SBC methods. This aim sets out to describe each intervention project's impact pathways, as well as to characterize contextual and implementation factors that contribute to project effectiveness. It also intended to map behavior change techniques (BCTs) being used in each intervention. These are techniques that focus on using "observable, replicable, and irreducible" (Michie et al., 2013) components to alter or redirect the causal pathways that are associated with behavior. A total of 56 projects comprising 186 publications were included in the systematic review.

The second aim of the project consisted of a landscape analysis of ongoing NSeA projects to document processes used and implementation guidelines. Insight as to how each project went about developing SBC materials, implementation strategies, training and support, and monitoring and evaluation practices was also considered during data abstraction. Projects were identified based on criteria such as geographical location and agro-ecological variation, type of NSeA being applied, project scale, and target population. Projects range in subject matter interest to include some that are focused on livestock production, home and school gardening, private-sector integration, and extension practices. Chosen projects had their documents subjected to a thorough desk review, and project staff was also asked to participate in interviews. The research team also set out to perform site visits, which would consist of field-based data collection and opportunistic observations. Site visits provided the opportunity to conduct staff interviews and focus group discussions among those involved in each project as participants.

Data collected from the desk review, interviews, and site visits were used to better understand the process of developing SBC materials and their delivery.

Both aims comprehensively assess SBC methodologies that are currently being used to improve nutrition outcomes and NSeA projects. While the abstraction tools applied to project documents take community involvement into consideration, there is no standardized approach in this project meant to describe community engagement processes and to assess how community engagement might impact project outcomes of interest. Community engagement has been defined by the Centers for Disease Control and Prevention (CDC) as, "the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people" (CDC, 1997, p 9). These methods are often used throughout public health in health promotion, policy creation, and in research settings because they directly address how the social determinants of health, environment, and local stakeholders can be involved in a project that is taking place in a given community. There is a need to describe and further explore how community engagement approaches used across projects in the parent study might facilitate health outcomes of interest and contribute to long-term impacts and project sustainability. This information could be used in the future to bolster the existing evidence base for the effectiveness of SBC strategies in NSeA and nutrition-focused programming, and to inform how community engagement in these projects may aid in their effectiveness.

Statement of Purpose

The purpose of this master's thesis is to evaluate the use of community engagement methods across SBC-based nutrition sensitive agriculture projects to document challenges, successes, and best practices.

Objectives

- Assess how community engagement approaches compare across a wide range of global nutrition-sensitive agriculture projects aimed at addressing nutrition, diet-related behaviors, and agriculture
- Describe the degree of community engagement practices used throughout nutrition-SBC project design, implementation, and M&E domains and, where relevant, their relationship to project effectiveness

Significance

This review and multi-series case study will inform future SBC programming focused on nutrition and nutrition-sensitive agriculture interventions and their use of community engagement methods to deliver training and produce desired results while engaging community stakeholders. Results will demonstrate how projects aimed at improving nutrition and livelihoods through NSeA methods may be impacted by the degree of community engagement methods that they employ. This information will also aid in better understanding current SBC approaches and some of their limitations in achieving desired health and nutrition outcomes, and how these could be addressed using various community engagement methods and models.

Chapter 2: Literature Review

This chapter will review relevant literature focused on the effectiveness of nutrition SBC approaches and the use of community engagement methods, as well as current viewpoints and strategies for nutrition and nutrition-sensitive agriculture approaches.

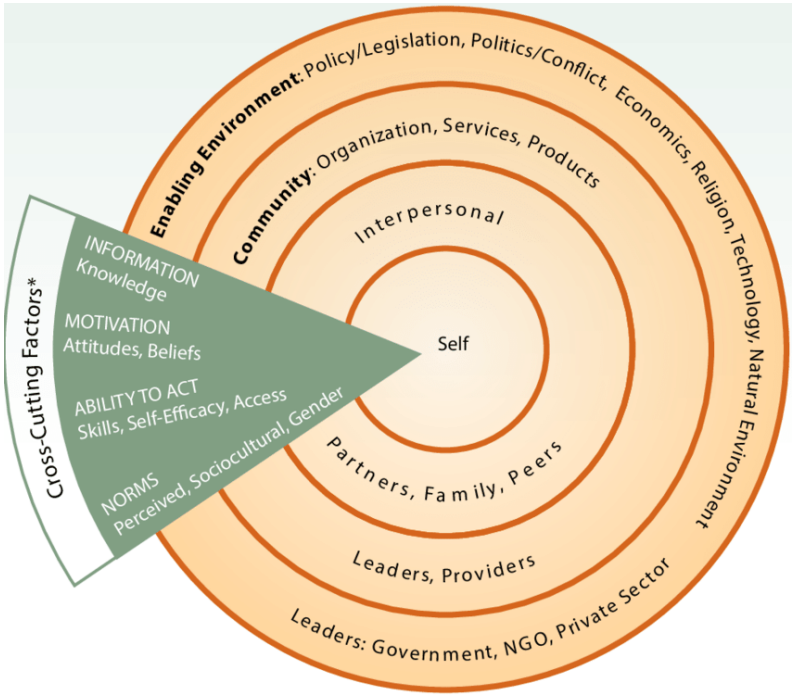
Background and Significance

Nutrition Social-Behavior Change: Approaches and Evidence

The United States Agency for International Development (USAID) defines nutrition SBC as "a set of interventions that systematically combines elements of interpersonal communication, social change, and community mobilization activities… to support individuals, families, communities, institutions, and countries in adopting and maintaining high-impact nutrition-specific and nutrition-sensitive behaviors or practices" (USAID, 2014). SBC programming has been implemented across a variety of sectors, by USAID and similar agencies, and has proven effective in nutrition settings because most nutrition and health development projects involve behavior change, either at the individual or community level (Government of Uganda, 2015). Nutrition SBC strategies are not only focused on promoting behavior change, but also on *how* behaviors change and the process involved to create more effective and lasting changes. Gaining improved understanding of the root causes of the issue being addressed, along with appropriate context of the community or individual being targeted, is an important first step when designing and implementing SBC interventions in low and middle income countries (LMIC) (Agaba et al., 2016). The socio-ecological model (Figure 1) is a foundational construct that is often used in tandem with SBC approaches because it allows for examination of an individual's socio-cultural and environmental contexts and a better understanding of how multiple layers of influence may impact behavior or current practices that will be targeted by the intervention. Formative research

can be conducted with the socio-ecological model in mind to identify how design can address the determinants that are having the most prominent effect on the behavior of interest (USAID, 2014; Kennedy, et al., 2018). Understanding how an intervention can reach multiple levels of the model can also help to further enable the individuals, households, or communities being targeted to adopt and maintain the promoted behaviors.

Figure 1: The Socio-Ecological Model for Change. Source: Agrawal, Adruldas, Khan, and Subrato, 2014



There is growing evidence on the enhanced effectiveness of nutrition projects when they are implemented using SBC methods and interventions. In 2018, Dr. Eileen Kennedy of Tufts University's Friedman School of Nutrition Science and Policy worked with a team of nutrition experts to review several projects and assess the effect of nutrition-specific and nutrition-sensitive strategies when combined with SBC methods to address diet and nutritional-status (Kennedy et al., 2018). Studies were identified using key words that highlight specific practices of interest and sorted into three categories according to three thematic areas - malnutrition,

micronutrient supplementation, and infant/young child feeding practices (IYCF). They were also considered based on their use of SBC strategies and sorted based on types of SBC approaches and activities used. Results of the literature review demonstrated that nutrition-specific approaches utilizing SBC methods are beneficial in contributing to improvement in diet and nutrition across a variety of topics and focus areas. Common themes that were present in effective projects included length of intervention, targeting of younger children who are not yet experiencing severe effects of malnutrition or stunting, activities that focus on participant engagement, and the use of culturally appropriate and sensitive strategies in SBC implementation. These characteristics were present across the projects that demonstrated effective SBC application to nutrition issues and achieved the desired outcomes. Reviewed projects implemented a wide range of SBC methods and were mostly focused on interpersonal, household, or group approaches for carrying out their activities, which was thought to have impacted project outcomes. Additional methods, including social networking, community events, and local radio/media campaigns demonstrated the potential benefits of combining methods to promote SBC messaging across various social, economic, and cultural planes.

Many projects aim to directly disseminate nutrition SBC messaging into communities and use a variety of methods to do so. An example of how nutrition SBC information might be spread through a community can be seen in an ongoing project being carried out in Badakhshan, Afghanistan, where the use of specialized nutritious foods (SNF) and SBC interventions are being implemented to reduce the prevalence of stunting in children under two (Soofi, et al., 2021). This stunting prevention program is being implemented by researchers from Aga Khan University (AKU) in collaboration with the World Food Programme (WFP) and Afghanistan Ministry of Public Health. SBC methods play a crucial role in the delivery of complementary

feeding strategies and nutrition messaging through pre-existing health systems, mobile health teams, and community health workers (CHWs) at the community level. Key SBC messages are focused on dietary diversity among both mothers and children, the allocation of Super Cereal for pregnant and lactating women (PLW), exclusive breastfeeding for infants in the first 6 months of life, continued breastfeeding up to 2 years of age, lipid-based nutrient supplementation (LNS) for children 6-24 months old, and improved hand washing protocols when preparing, serving, and eating meals (Soofi et al., 2021).

The project has been able to create awareness of nutrition practices at the community and household levels, among both male and female household caregivers. All SBC messages were developed using formative research focused on local knowledge, attitudes, practices, and barriers to optimal IYCF practices (Soofi et al., 2021). The project then formed male and female health committees in each of the two communities of interest that meet monthly for the dissemination of SBC messages focused on IYCF practices, child and maternal nutrition, and the use of nutritional supplements. Committee members then oversee the monthly distribution of SNF for PLW and children 6-23 months and the allocation of counseling for mothers and caretakers on how to use SNF.

Monthly monitoring, evaluation, and learning is conducted by AKU and site partners to assess supplement distribution, the number of mother/caregiver groups that had been formed, which key SBC messages had been delivered, and other impacts taking place at the community and household levels (Soofi et al., 2021). Focus group discussions (FGDs), key informant interviews (KIIs), and direct observations (DOs) of community and household activities are being used to collect information on maternal and child nutrition and the application of project methods into everyday practices. Although there are no published results available from this

currently ongoing study, its methods demonstrate the wide array of considerations that nutrition SBC programming must take to reach households and communities to attain desired outcomes.

Projects that do have results available provide evidence for the effectiveness of nutrition SBC approaches when employed at the individual, household, and community-levels. A strong example of the effectiveness and possibilities of nutrition SBC application can be seen in a 2020 cross-sectional survey that took place across the Eastern and Southern Highland zones of Tanzania. The focus of this project was to assess the association between monthly participation in community-level nutrition meetings on caregiver health and corresponding nutrition knowledge, attitudes, and practices among caregivers (Grant, et al., 2020). After taking part in monthly meetings in which nutrition SBC messages were disseminated, caregivers were tasked with carrying out learned nutrition practices among infants and young children in their communities to improve feeding practices and overall health outcomes. The aforementioned survey was developed to be delivered to caregivers to allow them to share their knowledge on nutrition, health and childcare, household and young child dietary diversity, and vitamin A intake. Caregivers were also asked to report the frequency at which they attended nutrition meetings, and these results were compared to survey answers using multiple regression analysis controlling for socio-demographic factors that could potentially impact caregiver response (age, education employment, household size, etc.).

Survey results from 547 caregivers demonstrated that only 49.7% of those surveyed had been regularly attending nutrition group meetings and receiving updated information on nutrition SBC, while the other 50.3% were not regular attendees (Grant, et al., 2020). Of those participating in the meetings, 28% of caregivers had a moderate level of nutrition knowledge, 62% had an elevated level of vitamin A knowledge, and 57% had high level of health and

childcare knowledge. Researchers found that there was a strong linkage between participation and attendance at nutrition group meetings and knowledge scores on health and childcare, household and young child dietary diversity scores, and vitamin A intake scores. Scores were higher across more topics for those who had attended at least four group meetings (Grant, et al., 2020). These findings display the ability of nutrition SBC messaging to impact caregiver knowledge and delivery of feeding and nutrition education practices at the household and community levels. The use of SBC methods, in this initiative and others globally, has helped to improve behavior change uptake and upkeep for communities looking to improve food intake and nutrition-related outcomes (Grant et al., 2020; Kennedy et al., 2018).

Nutrition-Sensitive Agriculture Interventions

Nutrition-sensitive agriculture (NSeA) interventions are those which seek to improve nutrition outcomes by addressing broader structures that impact nutritional well-being (Kennedy, et al, 2018). These may include individual, household, community, and nation-wide changes taking place that impact food access and nutrition procurement. In the last decade, many national governments, agencies, and development organizations have recognized the potential developmental gains to be made if more investment is funneled into NSeA projects. Past use of these strategies have demonstrated an ability to effectively improve maternal and child nutritional status in low- and middle-income countries (Ruel, Quisumbing, and Balagamwala, 2017). NSeA strategies work in direct contrast of nutrition-specific approaches, which are those that target the immediate causes of malnutrition.

Nutrition-sensitive projects or interventions might focus on agriculture, food security, caregiving and maternal support, nutrition education, improved access to health services, gender empowerment, or bettering environmental conditions that may be indirectly harming nutritional

status and health related to dietary intake (Ruel, Quisumbing, and Balagamwala, 2017). One of the most critical steps required in a successful NSeA intervention is baseline research in the community of interest that allows researchers to examine context and identify entry points where the project can be aimed towards addressing nutrition goals. A commonly used method to help determine what steps must be taken to connect agricultural interventions to desired nutrition outcomes involves the use of conceptual frameworks, much like the socio-ecological model (Figure 1) that is commonly referenced in SBC work. For this reason and more, SBC methods are inherently present in many NSeA interventions.

In a comprehensive review of nutrition SBC strategies, Kennedy et al. (2018) discuss nutrition-sensitive projects in various sectors, including agriculture, social safety net, and water, sanitation, and hygiene (WASH), and the various facets that go into planning and executing these types of intervention (Kennedy et al, 2018). Select nutrition-sensitive interventions were chosen by focus area and practices used, and then cross-referenced against the type of SBC approaches or activities were utilized. NSeA interventions featured practices such as crop/food production, home gardening, homestead food production, dietary diversification, improved food accessibility, and increased household income. Other areas that were examined, such as education, social protection, and WASH, included practices that were focused on female and young girl empowerment, micronutrient supplementation, early childhood development projects, school feeding and poverty reduction projects, and even sanitation projects.

Upon completion, the review could not conclusively determine whether nutrition-sensitive interventions were more or less effective when they included SBC methods to reach the desired nutrition outcomes, mostly due to differences in the types of interventions observed, SBC approaches used, and the primary goals of each project (Kennedy et al., 2018). However, it does

provide insight into what NSeA methods are commonly used across settings and evidence for their effectiveness.

Following a 2017 programmatic review, Ruel et al. further supports the effectiveness of NSeA interventions and their ability to improve nutrition outcomes (Ruel, Quisumbing, and Balagamwala, 2017). An earlier review that was conducted to examine the nutritional impact of NSeA programs across several sectors (agriculture and social safety nets) concluded that nutrition-sensitive interventions and programs across the sectors of interest can play an influential role in achieving large-scale and high coverage across households and individuals who are considered nutritionally at-risk (Ruel and Alderman, 2013). Programs accomplished this by carrying out processes focused on, "supporting livelihoods, food security, diet quality, and women's empowerment, and in achieving scale and high coverage of nutritionally at-risk households and individuals" (Ruel and Alderman, 2013). Both reviews have brought forth evidence for the effectiveness of targeted agriculture programs on maternal and child nutrition outcomes, although it was noted that both datasets were limited and would require stronger project goals and a more thorough effectiveness evaluation to be considered significant.

This work contributes to an improved understanding of the pathways, mechanisms, and contextual factors that play into how agriculture may improve nutrition outcomes (Ruel, Quisumbing, and Balagamwala, 2017). New evidence taken from impact evaluations focused on NSeA across several projects suggests that these methods are not only effective for long-term health impacts such as anemia, underweight and malnutrition, and stunting, but that these programs can also improve outcomes along impact pathways such as crop/food production, food security, IYCF, and other feeding practices, to name a few examples (Ruel, Quisumbing, and Balagamwala, 2017).

Community Engaged Programming

The CDC defines community engagement as, "the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people" (CDC, 1997, p 9). These practices can help contribute to local self-reliance, sustainability of practice, and self-determination by encouraging and enhancing local decision-making and strengthening local institutions. Oftentimes, interventions are implemented in communities using a 'top-down' approach, where leaders or government officials make decisions on behalf of a group of people and outside actors implement the changes (Holliday, 2018). While this model can be seen in projects throughout in low-and middle-income countries, Holliday also notes that it can lead to dependency, as well as health and wealth-inequalities, and thus is not always the most sustainable approach (2018). Community engagement practices turn this model upside-down and use bottom-up methods, where outside actors empower individuals and communities, having them identify needs to be addressed and desired outcomes. They then provide the tools for communities to participate in decision-making and activities that address the identified needs. These methods have become more commonplace over the past few decades for their usefulness and consideration of local culture and community needs (Holliday, 2018).

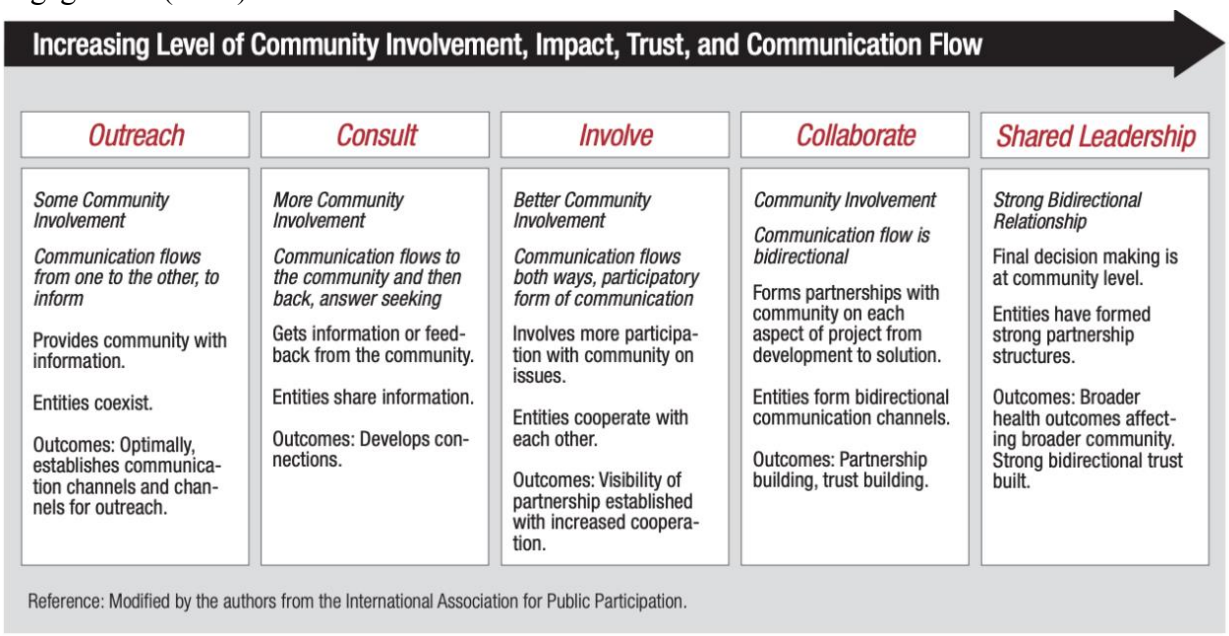
In practice, community engagement can take on a variety of forms dependent on the project type and purpose. Some projects choose to engage the community in planning and design stages to ensure that intervention protocols are direct reflections of community-identified needs (Holliday, 2018). Others may instead use implementation methods that rely on direct community participation. This could include building a community workforce to cascade training or deliver services, utilizing community knowledge, cultural norms, or local practices to bolster

programming, or using pre-existing community structures to disseminate information and bring about desired behavior change (Nuttavuthisit, Jindahra, & Prasarnphanic, 2014).

Community engagement practices can be geared towards individuals but can also consist of partnerships between community agencies, organized groups, or institutions (CDC/ATSDR Committee on Community Engagement, 2011). These collaborators may be involved in a variety of activities depending on their vocations or skillsets including health promotion, research, or policy-making. Central to community engagement are the relationships required, which maintain the integrity that is needed to keep people and groups engaged in initiatives (Wallerstein & Duran, 2006). When using community engagement methods, it is first important for partners to build trust and develop cultural humility in the given context to better understand where they are working and how the needs of the community can best be met while incorporating community participation and decision making. Before a project begins, it is important to invest time into building the implementer-community relationship, especially with community elders or leaders who have stake in the community and can provide insight as to how the community operates and how implementers may best introduce themselves and their desired approaches into the area (Wallerstein & Duran, 2006).

The International Association for Public Participation (IAP2) has developed a spectrum of public participation to be able to accurately portray the public's role or participation level in a given public participation process (IAP2, 2016). This model is made up of five levels of participation that might represent a community's role in a project or decision-making process. The CDC and the Agency for Toxic Substances and Disease Registry (ATSDR) have modified this spectrum slightly, creating a Community Engagement Continuum (Figure 2), which uses the same principles of the original model but applies them to community engagement activities.

Figure 2. Community Engagement Continuum. Source: CDC/ATSDR Committee on Community Engagement (2011)



As pictured, this continuum consists of five basic levels which can be used to define various stages of a project or study. The first level, Outreach, is centered around the sharing of information from one entity to the other (CDC/ATSDR Committee on Community Engagement, 2011). In a project that is classified at the outreach stage of community engagement, community members serve as the passive recipients of information from the collaborator (IAP2, 2016). The information being shared is often objective and fact-based, with the intention of keeping the public informed of the decisions which are being made by leaders or collaborators. IAP2 (2016) also states in the spectrum guidelines that at this level, there is no obligation for those in the outreach stage to be fully transparent when sharing information or to provide unbiased information, which has the potential to cause harm in certain situations.

The next level, Consult, involves a feedback loop in which communication and information flow to the community members to obtain opinions or preferences and is then used by leaders to inform decisions (IAP2, 2016). This level allows for community member

viewpoints to be taken into consideration but does not guarantee that public feedback is accounted for. The IAP2 emphasizes the fact that the consultation process involves building relationships and connections among partners but does not necessarily consist of trust building between community members and decision-makers (2016).

The third level, Involve, emphasizes community participation directly throughout the project process that is taking place (IAP2, 2016). One of the main facets of this level involves engagement of community members in the decision-making process and ensuring that their inclusion is a priority of the project. There is an increased level of cooperation between collaborators, and community members are engaged from the start of the project through its conclusion. Level 4, Collaborate, is a process focused on building partnership between entities and working in a collaborative process (IAP2, 2016). The International Association for Public Participation also notes that at this level of work, community members and leaders are seen as equals within the project framework (2016).

The final level of the spectrum, Shared leadership, is focused on empowering community members and giving them full control of a project or process. This might be done by giving community members power over decision-making, identifying what actions or steps need to be taken to accomplish the goal of the research, or allowing them to fully oversee the project. There is an emphasis at this level on strong bonds of trust and partnership between collaborators, and a focus on constructing sustainable relationships between all involved entities (IAP2, 2016). Community members and public actors are seen as the lead decision-makers and are given the ability to make final decisions that outside actors will then implement.

Community engagement approaches are often noted in SBC projects because they provide effective methods to reach desired outcomes while ensuring sustainability and ownership

through and past the project period (Holliday, 2018). Community engagement methods, especially those involved in baseline and formative research, can help to better understand existing behavior patterns and how they contribute to the health outcome of interest, and to identify what groups may be high-risk. Early use of these methods can also help with strengthening networks and inform project design before it is finalized (CDC/ATSDR Committee on Community Engagement, 2011). Evidence suggests that community engagement can improve health promotion and health research across settings, but one could also hypothesize that the use of SBC methods could bolster these outcomes because of their proven success in changing behaviors and improving health practices at the individual, household, and community levels.

Research has demonstrated that community engagement can have other positive impacts on health and well-being across many topical applications. In addition, the use of community engagement strategies in public health projects has also proven to contribute to improved social capital, community cohesion, and empowerment compared to other methods (O'Mara-Eves et al., 2015). A 2015 meta-analysis was conducted of 131 studies that focused on various targeted health issues and that utilized community engagement in at least one of their public health interventions. The goal of this analysis was to examine the overall effectiveness of public health interventions that rely on community engagement strategies, and how this programming impacts health outcomes and what moderators may have contributed to the intervention effect. The results of the analyses demonstrated that, specifically when applied to disadvantaged groups, community engagement strategies are effective at impacting health behaviors, health consequences, health behavior self-efficacy, and perceived social support levels (O'Mara-Eves et al., 2015). O'Mara-Eves et al. also found that because community engagement methods

oftentimes do not take linear pathways to reach desired results, they can be more difficult to assess for causal relationships (2015). This may be why there is not a lot of data available on how community engagement is tied to reduced health equalities.

The information yielded from this meta-analysis suggests that interventions which engage community members in carrying out of project activities were especially effective compared with those that primarily used community members only in the design stages. Projects that were specifically aimed towards skill development or training in specific age groups, rather than the entire population, were also identified as having larger effect sizes compared to those using educational strategies to achieve expected behavior changes. While reviewers did emphasize several limitations of their analysis that might have some effect on the overall trends being reported, this information still provides a good foundation for the effectiveness of community methods and their potential to improve health behavior outcomes when applied in a public health setting. Limitations included difficulty in reviewing the topic due to its breadth of research, as well as the fact that projects examined crossed several sectors and domains that may have been confounded by other factors that were not examined.

Evidence Gaps

While community engagement practices have become integrated into public health interventions at multiple levels over the past few decades, there are still several unexplored areas in this realm regarding effectiveness and best practices. Community engagement in public health is a vast topic, consisting of many methods across multiple focus areas. The breadth of this topic has made it difficult in the past for analyses to examine its impact on public health outcomes across domains, especially because many of the evaluations that have been done on these topics have not been long-term enough to be able to explicitly speak to their direct effectiveness at

reducing health disparities or achieving desired outcomes (O'Mara-Eves et al., 2015). Most interventions utilizing SBC approaches involve some form of community-engaged methods due to the nature of the strategy, but the relationship between the use of SBC and community engagement methods has never been explicitly examined to determine how practices might contribute to behavior changes. Additionally, no systematic review has been done on projects that are specifically focused on nutrition-sensitive agriculture and their use of community engagement principles to achieve programmatic success.

The ongoing project, *Social behavior change strategies implemented in the context of nutrition-sensitive agriculture: A scoping exercise to identify current practice, gaps, and resource needs,* is looking to compile best practices for SBC success in nutrition settings through in-depth examination of several projects across a global context. Both Aim 1 and Aim 2 have compiled information on the latest NSeA SBC interventions being used in low- and middle-income countries and provide detailed information as to what methods are being applied, key stakeholders, and impact on nutrition and dietary intake across the populations of interest. This thesis will build off previous literature reviews, document abstractions, and interviews performed in this parent study to better understand how community engagement methods tie into the approaches being applied to participating projects, and how these impact health outcomes and project sustainability.

Chapter 3: Methods

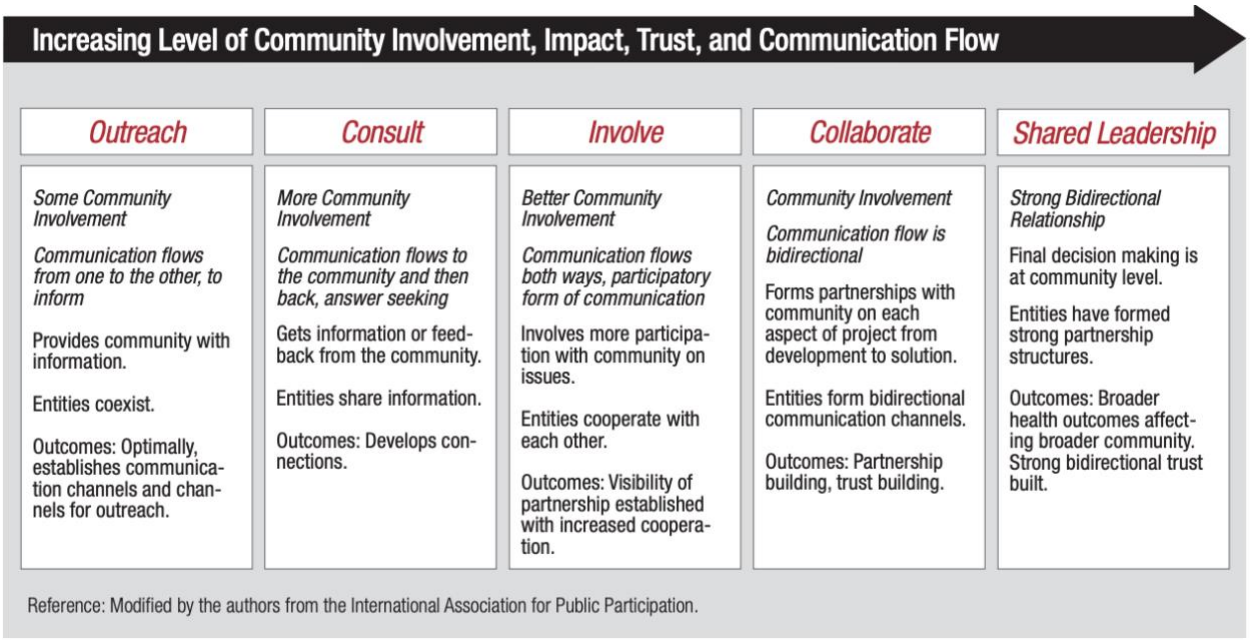
Project Selection

Projects from Aims 1 and 2 served as the sample for this thesis analysis, providing data from abstractions, interviews, site visits, and completed behavior change techniques (BCT) coding. Aim 1 projects were chosen for inclusion based on the type of data that they had available. Out of 56 Aim 1 projects, 23 had effectiveness data based on their designs. These were projects that used an experimental/quasi experimental design, had a counterfactual, and included both baseline and endline data. The document abstractions from these 23 projects were coded and scored using the codebook developed for this project, described below and detailed in Table 1 and Appendix A.II. The effectiveness data available from these projects was also used to calculate effectiveness ratios based on project's community engagement scores.

Three ongoing projects from Aim 2, taking place in Central America, East Africa, and West Africa, were used to inform case study analysis. These projects were chosen based on the completed document abstractions, site visit observational materials, and interview/focus group discussion (FGD) transcripts that were available for coding. These projects come from different regions of the world and contain diverse NSeA activities, so they provide a detailed look as to the spectrum of projects included in this Aim and how community engagement is being used with the SBC methods of each project. Aim 2 project materials available for CEC coding included interviews with community stakeholders, local government officials, project staff, and members of community groups. Several FGDs with community groups and project staff were also available for analysis. These materials as well as project documents describing SBC strategy, core project design, and monitoring and evaluation plans were coded with the CEC

Scoring Codebook (Table 1) to provide insight as to which, how and where community engagement methods were being utilized across the project.

Figure 3. Community Engagement Continuum. Source: CDC/ATSDR Committee on Community Engagement (2011)



Code Development and Coding

A codebook was developed to examine the presence of community engagement across the design, implementation, and monitoring and evaluation (M&E) stages of participating projects. Codes were developed by investigating the community engagement continuum (Figure 3; Appendix A.I) and identifying key facets that set levels apart from one another in the areas of involvement, impact, trust, and communication flow. These codes were selected and defined based on CEC-specific information provided by the International Association for Public Participation (IAP2) (2016) on the distinctions between each level of the Spectrum of Public Participation, as well as information taken from the second edition of 'Principles of Community Engagement,' where the community engagement continuum is introduced (CDC/ATSDR, 2011).

The codebook was split into three meta-codes defined by the stages of project operation: design, implementation, and M&E. Each meta-code contains four sections, which were chosen

based on the themes present across the community engagement continuum. An example of the 'Design' meta-code can be seen in Table 1. The final codebook (Appendix A.II) contained 19 codes within each of the three meta-codes (57 codes total with repetition). Codes repeat in each section but were applied separately across documents, abstractions, and interviews/FGDs depending on whether they were focused on the project design, implementation, or M&E stages. These codes help to represent the various processes of community engagement that were used throughout the interventions of interest, which will be flagged and used to score and sort projects into one of the five levels discussed above.

Table 1. Qualitative codes for Design stage, to be used in project analysis

	Section (definition)	Code	CEC Score
Design			
	Involvement (to what degree is the community involved in the design process and how is their input taken into account)		
		Involvement - low	+1 outreach
		Involvement - moderate	+1 consult
		Involvement - high	+1 involve; +1 collaborate; +1 shared leadership
		Coexisting entities	+1 outreach
		Community decision making	+1 collaborate
		Local support systems	+1 collaborate
		Community stakeholders	+1 consult; +1 involve; +1 collaborate; +1 shared leadership
		Community volunteers/workers	+1 shared leadership
	Impact (what is the influence or effect on community members of the activity/how is it a part of their everyday lives)		
		Empowerment	+1 shared leadership
		Engagement	+1 involve; +1 collaborate; +1 shared leadership
	Trust (what is the nature of the relationships between implementer and community members; how have those relationships formed)		
		Cooperation	+1 involve
		Bi-directional trust building	+1 collaborate; +1 shared leadership
		Local strategic partnership(s) - moderate	+1 involve;
		Local strategic partnership(s) - strong	+1 collaborate; +1 shared leadership
	Communication flow (how do entities communicate throughout design process and how is that communication used)		

		Communication flow - one-way	+1 outreach
		Communication flow - bidirectional	+1 involve; +1 collaborate; +1 shared leadership
		Community feedback	+1 consult
		Participatory communication	+1 involve
		Information/idea sharing	+1 consult

Each code and definition came directly from the five levels of the CEC and were used to visualize how criteria for each level was being met across projects. These codes are focused on increasing levels of involvement, impact, trust, and communication flow between communities and implementing organizations, and were useful in understanding the frequency and scale of community engagement methods used in each project of interest. In the project codebook, each code was also assigned a corresponding score based on which level of the continuum is tied to that code and its definition. For example, because low community involvement was a central facet in the first level of the CEC, outreach, the code 'involvement – low' was assigned a corresponding score of +1 for outreach categorization. Any project where the 'involvement – low' code was present would be given one point for 'outreach' each time the code was applied.

The first of the codebook's four sections was involvement, which accounts for the degree to which the community is involved in the design process and how their input is taken into consideration. The next was impact, which features codes that describe the influence or effect that project activities have on community members. The third section was trust, which contains codes relating to the nature of the relationships between the implementer and community members, and the process by which those relationships are formed. The fourth section was communication flow, which involves how entities communicate throughout the design, implementation, and M&E processes and how that communication is utilized.

Each of these four sections contain codes which help to better describe the processes taking place in each stage and their varying degrees. For example, housed under the 'involvement' section are the codes: 'involvement- low,' 'involvement- moderate,' and 'involvement-high.' These codes were used to determine the degree of community involvement taking place within the design, implementation, and M&E processes of each project. All codes were given a definition to allow differentiation between them, since many are similar in nature but vary in degree (i.e., 'low,' 'moderate,' and 'high'). The full codebook with descriptions and criteria for each selected code can be found in Appendix A.II.

Several codes such as, "community decision making," "communication flow-bidirectional," and "community volunteers/workers," were created by combining some of the main facets of SBC approaches and methods laid out by the community engagement continuum. In contrast, the codes, "participatory communication" and "bi-directional trust building," were created after looking at the community engagement continuum and considering some of the direct criteria that set each level apart from each other. The codes which consider SBC methods and community engagement were useful while analyzing project documents in identifying where projects used SBC methods that were put into place specifically to engage community members.

Analysis

Scoring

Data from coding of Aim 1 and Aim 2 documents was used to sort projects into one of the five levels of the engagement continuum, which include: "outreach, consult, involve, collaborate, and shared leadership" (CDC/ATSDR Committee on Community Engagement, 2011). After projects from each Aim were completely coded, the frequency at which each code occurred throughout projects was calculated and totaled using the 'CEC Score' column of the

codebook (Appendix A.II). Because some projects had more documents available for coding compared to others, many ended up with more codes overall and an uneven distribution of scores. For this reason, scores from each project were summed for each level of the CEC and then averaged using the number of documents available from that project. An example of the scoring and averaging process can be seen in Table 2, using fictional data to demonstrate how a project subjected to this coding scheme would be scored into a level of the CEC if it had 10 documents available for coding. Based on CEC scores following the averaging process, Project X would have been categorized into the 'collaborate' level of the CEC since that score was the highest.

Table 2: Project Scoring Example Using Fictional 'Project X'

Code	Corresponding CEC Score	Total Code Occurrence for Project X
Involvement - low	+1 outreach	0
Involvement - moderate	+1 consult	+6 consult
Involvement - high	+1 involve; +1 collaborate; +1 shared leadership	0
Coexisting entities	+1 outreach	0
Community decision making	+1 collaborate	+2 collaborate
Local support systems	+1 collaborate	+1 collaborate
Community stakeholders	+1 consult; +1 involve; +1 collaborate; +1 shared leadership	+10 -- +3 involve, +5 collaborate, +2 shared leadership
Community volunteers/workers	+1 shared leadership	+2 shared leadership
Empowerment	+1 shared leadership	+5 shared leadership
Engagement	+1 involve; +1 collaborate; +1 shared leadership	+7 -- +1 involve, +6 collaborate
Cooperation	+1 involve	0
Bi-directional trust building	+1 collaborate; +1 shared leadership	+5 collaborate
Local strategic partnership(s) - moderate	+1 involve;	+8 involve
Local strategic partnership(s) - strong	+1 collaborate; +1 shared leadership	+1 collaborate

Communication flow - one-way	+1 outreach	+4 outreach
Communication flow - bidirectional	+1 involve; +1 collaborate; +1 shared leadership	+4 -- +1 involve, +3 collaborate
Community feedback	+1 consult	+12 consult
Participatory communication	+1 involve	+6 involve
Information/idea sharing	+1 consult	+9 consult
CEC Level	# codes in project / # documents available	Final CEC Score
Outreach	4 / 10	0.4
Consult	18 / 10	1.8
Involve	19 / 10	1.9
Collaborate	23 / 10	**2.3**
Shared Leadership	9 / 10	.9

Several codes could be tied back to multiple levels of the CEC. Where these codes were applied, a separate scoring guide was created to evaluate which level of the CEC fit best. Scoring guides were directly informed based on CEC level criteria from the International Association for Public Participation's overview of the CEC. An example of this methodology for the code "Communication flow – bidirectional," can be seen in Table 3, where the code corresponded with three levels of the CEC but could be differentiated based on situational use.

Table 3: Scoring Guide for Code with Multiple Corresponding CEC Levels

Code: "Communication flow – bidirectional"		
Consult, if:	Collaborate, if:	Shared Leadership, if:
Communication flows between entities as answer/information seeking	Emphasis on establishing and maintaining bidirectional communication channels	Relationship is bidirectional and trusting, with open communication lines
Community information or feedback sharing		

Theme Development

Within both Aim 1 and 2, final project scores were compared to better understand how projects scoring into various levels of the CEC varied in methodologies and outcomes. For Aim 1 projects, effectiveness ratios were calculated using existing effectiveness calculations and CEC scoring outcomes. This data was examined to determine how project effectiveness ratios might be related to CEC level scoring and the presence of community engagement across projects. This analysis method was not used with Aim 2 data as these projects are ongoing and do not have effectiveness, impact, or outcome data available.

Themes were established by examining trends across projects, their CEC categorizations, and common approaches that they shared. Information regarding code frequency was also assessed to look at methods or approaches that were used across projects, even those with varying objectives. Codes which were used recurrently across projects were further inspected to see what activities led to the application of those codes, and how they could impact community engagement and outcomes within each project. Similarities and differences between project design, implementation, and M&E stages were analyzed through a community engagement lens in order to better understand which community engagement approaches, and how their corresponding CEC level, might be associated with stronger and more effective projects.

Chapter 4: Results

Document coding and analysis were completed to determine the degree to which community engagement methods were used across each project. Document abstractions corresponding with 23 projects in Aim 1 of the parent study were coded using the CEC Scoring Codebook (Appendix A.II) in order to better visualize what aspects of the project utilized community engagement methods and whether these played a significant role in project outcomes or effectiveness. Interviews, focus group discussions, and project document abstractions pertaining to three projects from Aim 2 of the parent study were coded and analyzed for community engagement methods using the CEC Scoring Codebook, looking specifically at documents and testimonial focused on design, implementation, and M&E strategies.

Table 4: Commonly Used Codes Across Aim 1 & 2 Projects
Numbers listed represent the number of Aim 1 and Aim 2 projects that used the specific code at least once.

Outreach	Consult	Involve	Collaborate	Shared Leadership
"communication flow – one way" (4) "involvement -- low" (1)	"information/idea sharing" (14) "involvement – moderate" (7) "community feedback" (6)	"participatory communication" (23) "local strategic partnerships -- moderate " (3)	"engagement" (17) "local support systems" (7) "community decision making" (5) "bidirectional trust building" (4)	"community workers/volunteers" (14) "empowerment" (13) "communication flow -- bidirectional" (5)

Aim 1 – Results from 23 Literature Abstractions

Abstractions from 23 Aim 1 projects were coded using the CEC Scoring Codebook in order to identify how community engagement methods may have been present across the projects' core design, implementation, SBC activities, and M&E protocols. Table 5 below provides an overview of each project, their corresponding community engagement activities, and

where they scored the highest on the CEC. Some projects ended with a tie between scores for two or three levels, but generally could be categorized to one level of the CEC. Overall, this table demonstrates that the majority of these 23 projects scored in the mid to high levels of the CEC and included various activities that used community engagement within key design components.

Table 5: Aim 1 Projects with NSeA Activities and CEC Categorization

Project Reference Number (see Appendix B.I for reference list)	Project Location	Project NSeA Activities/Approaches	Project CEC Categorization	Examples of Project Community Engagement Activities
1	Malawi	• Community agricultural demonstrations • Training on agriculture techniques • Village savings and loans groups • Organization of farmers into collectives • BCC/training around nutrition for young children	Collaborate	• Provision of savings/loans to households that operate CBCC gardens • Community members prepare/maintain/own CBCC gardens, with nutrition trainings provided • Engagement of parent groups in cooking demos/meal preparation events • Local government stakeholders engaged through child nutrition training modules • Farmer collectives organized to increase purchasing/selling power
2	Ethiopia	• Food demonstrations & IYCF-focused nutrition counseling • Promotion of NSeA activities • Priests delivered sermons about child feeding during religious fasting periods • Enhanced community conversations about IYCF led by community-based organizations	Collaborate	• Health extension workers (HEWs) from community conduct trainings, home counseling, and food demonstrations • Local community stakeholders (priests) involved in dissemination of child nutrition messages and community mobilization activities • Community-based organizations run IYCF trainings/conversations
3	Nepal	• Trained women in villages on home gardening and poultry rearing practices • Establish Village Model Farms as a meeting place for women • Monthly meetings for nutrition education, cooking demonstrations, promotion of routine public health services (immunization, growth monitoring, vitamin A supplementation, deworming) and agricultural practices	Shared Leadership	• Use of community-run Village Model Farms for agriculture trainings, cooking demos, nutrition education • Homestead poultry rearing and gardening training to empower female farmers • Mothers and Trained Family Community Health Volunteers (FCHVs) educated on MNP sachet use and how to track compliance • Community training on ENA framework • Collaboration with existing health services to integrate key nutrition practices
4	Burkina Faso	• Nutrition education sessions • Counseling sessions for women pursuing agricultural activities • Establishment of village model farms (VMFs) and family farms for women to lead • Mother group trainings with village model farms	Shared Leadership	• Women provided with nutrition counseling, agricultural training, home garden development training • Mother groups gather for activities such as working on village model farms and for transfer of ag, health, nutrition, and hygiene related knowledge through SBC

		• Community-focused activities to develop land-use agreements to promote women's access to land for agricultural use		• Utilization of Older Women Leaders (OWLs) and Health Committee members (HCs) to carry out check-ins and trainings • Use of community theater activities in villages to spread essential nutrition action (ENA) messaging
5	Sierra Leone	• Cash crop intervention • Community-level gender sensitization activities • Nutrition education and awareness creation campaign on benefits of dietary diversity	Shared Leadership	• Promotion of women's empowerment through gender sensitization activities and trainings • Activities and trainings encouraging participation of women in household financial and nutrition-related decisions • Nutrition and cash-crop trainings at community-level
6	Tanzania	• Nutrition counseling • Farmer field schools	Consult/Involve	• Community farms established as farmer field schools to be used for nutrition and agricultural education sessions • Model farmers hold ag classes with female farmers from the community • Project staff and extension workers complete home visits and carry out trainings as needed
7	Tanzania	• Community-elected mentor farmer program • Women's empowerment activities • Participatory engagement through theater and role-play activities • Climate change and agroecology curriculum dissemination • Nutrition education	Collaborate	• Farmers from community (chosen by peers) lead agroecological trainings on topics including sustainable ag, nutrition, women's empowerment • Mentor farmers form a savings and loan group for community members • Community theater methods used to illustrate messages on agroecology, climate change, nutrition, and social equity
8	Thailand	• Community nutrition education sessions • Agricultural training sessions • Poultry rearing training sessions • Enhanced homestead food production • Home visits to provide IYCF & agricultural advice	Outreach/Consult	• Project staff provide community education sessions focused on nutrition, IYCF practices, and dietary diversity • Project staff complete home visits for 6 month period to support training and provide counseling
9	Ghana	• Community nutrition education sessions, including food demonstrations and overview of IYCF strategies • Community gender/diversity workshops	Involve	• Weekly nutrition education sessions carried out by project staff using pre-developed curriculum • Community-wide food demonstrations with built-in nutrition education messages • Collaboration with local government stakeholders to disseminate trainings/education • Community-wide mother-to-mother support groups • Community-wide discussions on gender and diversity

10	Kenya	• Workshop series of community farmer empowerment and training strategies • Promotion event for farm diversification activities • Skills building & training • Nutrition education	Shared Leadership	• Community workshop serious focused on autonomizing agricultural activities to improve nutrition • Development of community action plans and budgets for community farmer use • Direct beneficiaries receive training in gardening/homesteading and poultry rearing • Engagement of community organizations and local Ministry of Agriculture in curriculum development and dissemination • Community Health Workers assist in design and implementation of curriculum and workshops
11	Bangladesh	• Gender sensitization training • Agricultural production trainings • Nutrition education	Shared Leadership	• Local agriculture extension agents carry out nutrition and agricultural production training modules in communities • Participatory activities applied at community-level to discuss gender, equality, and communication skills in casual settings • Project and collaborating NGO staff involved in delivering trainings throughout community • Curriculum focused on gender empowerment strategies and improving dietary diversity spread at community level
12/13	Cambodia & Malawi	• Skills building and training sessions surrounding nutrition and agriculture education, as well as business practices and agricultural fairs • Farmer Field Schools used to disseminate nutrition and dietary diversity messaging • Community-based food security activities	Shared Leadership	• Farmer field schools incorporate nutrition education while also teaching business and trading practices to local farmers • Participatory cooking demonstrations and facilitated, community based IYCF nutrition education sessions for mothers/caregivers • Community nutrition promotors trained and used to carry out messaging throughout project stages and activities • Community nutrition reporters (including CHWs and farmers) trained to deliver nutrition education messages
14	Timor-Leste	• Market systems development activities • Community nutrition education • Women's empowerment trainings (specifically focused on social, economic, and political strategies)	Involve	• Community-wide nutrition events, including cooking demonstrations • Women's participation in community events aimed at gender empowerment education
15	Cambodia	• Gender empowerment trainings • WASH training • Nutrition education • Homestead food production training and enhancement • Business, marketing, and financial literacy training modules	Collaborate	• Use of Village Model Farms for project staff to train households on nutrition and dietary diversity • Establishment of diversified homestead farms/gardens to improve dietary diversity at household-level, with associated food production trainings • Project staff lead meetings on positive and equitable gender practices • Project staff lead health and nutrition education sessions

16	Democratic Republic of Congo	• Literary and business trainings • Mother care groups with behavior change education worked in, aimed at improving IYCF • Agricultural trainings/farmer field schools	Shared Leadership	• Community members receive training from project staff to become farmer field school leaders • Farmer field schools provide knowledge on agricultural techniques and nutrition/dietary diversity among local farmers • Female farmers are empowered through weekly meetings regarding literacy, numeracy, and business training
17	Kenya	• Nutrition education • Community Health Workers used to conduct health-related trainings and demonstrations • Women's nutrition/health counseling • Agricultural trainings/demonstrations	Shared Leadership	• Nurses and/or community health workers provide improved maternal, infant, and child nutrition counselling • Community field days used to introduce new food production practices to farmers and community members • Community health workers trained to implement community health clubs • Community farmers conduct on-farm training/demonstrations • Project-hired fieldworkers and trained female community members carry out most activities
18	Mozambique	• Maternal/child health education and training • Nutrition education • Market development training • Community theater activities	Involve	• Trainings focused on building capacity of community-based volunteer promotors • Community-based volunteer promotors carry out education and training on MCH and nutrition • Participatory community theater activities to educate and create demand for vitamin A-rich foods • Farmer group education sessions focused on vitamin A food production
19	India	• Women's nutrition/NSeA education groups • Women's self-help groups • Women's agricultural extension groups • Participatory Learning Approach groups • Community engagement training	Shared Leadership	• Women's groups view participatory videos and discuss NSeA behavior change topics • Pregnant women and mothers involved in participatory learning and action meetings to discuss nutrition and IYCF • Women in rural areas involved in Participatory Learning Approach (PLA) groups to go through nutrition curriculum and identify strategies/solutions for change relevant to their own communities • Community service providers trained by project staff to carry out group activities and educational trainings
20	Mozambique	• Nutrition trainings • Community theater sessions • Women-specific nutrition education • Agricultural extension training sessions	Consult/Collaborate	• Farmers and mothers participate in group training sessions focused on nutrition education • Nutrition extension workers train nutritional promoters selected from each village to deliver nutrition-related messages • Women's groups receive nutrition education messaging

21	Tanzania	• Promotional/demand creation activities (i.e., road shows, cooking demos, nutrition sensitization/awareness campaigns) • Health & nutrition education	Consult/Involve/ Collaborate	• Project staff carry out promotional/demand-creation activities aimed at increasing consumption of traditional African vegetables • Distribution of health and nutrition fact to consumer household, directed at children under 5 and women of reproductive age
22	Zambia	• Enhanced homestead food production • Gender awareness/women's empowerment programming • Promotion of IYCF knowledge/practices • Promotion/education of practices that lead to increased dietary diversity	Shared Leadership	• Women's groups established to strengthen the role of women in the community and provide platform for promotion of home food production and nutrition education BCC • CHWs trained by country's Ministry of Health to extend health and nutrition services throughout rural areas of activity • Health and nutrition counseling provided by CHWs at women's group meetings, with follow-up visits to individual households
23	Nepal	• Participatory community development activities • Livestock management training • Nutrition education • Self-help group development	Collaborate	• Livestock management training with goal of poverty alleviation, citizen empowerment and community development • Project-wide emphasis on optimization of livestock management for community members • Self-help groups led by project staff

Aim 1 Code Prevalence

Codes from the 'collaborate' level of the CEC were the most widely used throughout Aim 1 coding. 'Collaborate' codes were present in almost every project that was examined, appearing 73 times total throughout the 23 projects. Overall, 7 projects from Aim 1 scored the highest in the 'collaborate' level. Among these 7 projects, the most used codes were "engagement" and "local support systems". These codes were seen across projects with various objectives and proved to be integral parts of the SBC approaches. An applicable use of the code 'engagement' was within one project which mobilized community members in council and group meetings to make decisions (Projects 16) and another where a community mentorship program was established between farmers and trainees in order to give community members a direct role in the activities being conducted (Project 7). An example of the use of the code, 'local support systems,' can be seen in Project 10, where local government health workers and the country's Ministry of Health were directly involved in project activities, including the dissemination of training modules and M&E data collection.

The code, "participatory communication," was applied to 20 of the 23 Aim 1 projects during coding. The code was most frequently used in projects which utilized arts-based methods to deliver their SBC communications or those which relied on community group meetings or focus group discussions to collect data directly from community members. This code was most widely used throughout project implementation compared to design and M&E domains. The code, "community feedback," was also widely used across projects, specifically when focusing on M&E strategies and how they took community viewpoints into account.

Only one code associated with the lowest level of the CEC, 'outreach,' appeared throughout the analysis of all 23 project documents. This code, 'communication flow-one way'

was applied to Project 8 in a document abstraction that described activities which carried out more traditional, one-way educational initiatives that were not participatory in nature. Despite this, Project 8 also scored high in the 'consult' level, with community-engaged activities and considerations indicated during the early planning and design stages of the project. This demonstrates that, although it was lacking in community engagement in certain areas of operation, Project 8 still worked to involve community members and get their feedback in other areas.

Aim 1 Community Engagement Continuum Scoring

When sorted along the CEC, Aim 1 projects were distributed towards the higher levels of the continuum, suggesting utilization of higher level community engagement methods. Of the 23 projects included in this analysis, 10 scored high in the 'shared leadership' level of the Community Engagement Continuum, demonstrating their substantial use of community engagement methods throughout project design, implementation, and M&E stages. Several projects relied on community leaders nominating community members or farmers to fill project positions or utilized specific populations of interest when looking for people to fill roles (i.e., women living in rural areas). Scores in this category also came from efforts in the projects to empower community members with the work being done. This was especially seen in projects that were focused on bolstering community farmer capacity or pre-existing farm systems to implement their approaches, including the establishment of Village Model Farms (VMFs) and farmer field schools to serve as educational platforms (Projects 3, 4, & 16). VMFs are a unique training tool that focus on utilizing existing farms and community farmers as training tools for community members to learn improved growing practices, nutrition education, and business skills related to farming (BFN, 2018). Similarly, farmer field schools are focused on using

participatory training methods to help farmers become better at decision making while improving their agricultural practices (Godtland et al., 2004).

Four Aim 1 projects scored highest in the 'involve' level of the CEC. This level, which falls in the middle of the continuum, is specifically focused on participation of community members and moderate degrees of local partnership building but differs from the two levels above it because there is no emphasis on community ownership of projects or programming. The projects that scored highest for the 'involve' level did so because they utilized the community in activities and allowed for participatory communication flow from all entities. However, these specific projects did not place importance on community members engaging in collaborative efforts to ensure project ownership or sustainability over time.

Aim 1 abstractions for 3 projects had high scores in the 'consult' level of the CEC that also tied with scores from higher levels. These scores came from the use of the code, "information/idea sharing," which was prevalent among projects whose implementation strategies featured training or educational components which were not participatory or engaging in nature. The 'consult' level of the CEC places a moderate emphasis on community involvement within activities, but is characterized mostly by answer-seeking communications, sharing of information between entities, and the forming of connections- not necessarily relationship building- between collaborators.

The lowest level of the CEC, 'outreach,' only had one code appear throughout the analysis of all 23 project abstractions. This code, 'communication flow-one way' was applied to Project 8 in a document abstraction that described activities which carried out more traditional, one-way educational initiatives that were not participatory in nature. Project 8 ended up scoring high in the 'consult' level, with 'involvement - moderate' and 'information/idea' sharing

indicated during the early planning and design stages of the project. This led to the project receiving a final categorization in both the 'outreach' and 'consult' levels, demonstrating that while it falls lower on the CEC it does make efforts to engage community members in several of its activities.

Aim 1 CEC Scores Across Project Domains

Throughout Aim 1 projects, most of the community engagement activities present were within the implementation stages. Each of the 23 Aim 1 projects examined had community engagement codes applied to some aspect of their implementation strategy or activities. Participatory community activities such as theater and role play, as well as educational trainings that depended on community member involvement, were widely used throughout projects to disseminate a variety of educational materials (Projects 1, 3, 4, 5, 9, 11, 12/13, 17, 19, 20). Another example of community engagement in implementation was the utilization of community members, including farmers and trained community health workers, as instruments to carry out training sessions and meetings (Projects 2, 3, 4, 6, 7, 10, 11, 12/13, 16, 17, 18, 19, 22).

Many projects that scored within the highest level of the CEC, 'shared leadership,' showed an elevated level of community engagement across both implementation and M&E activities. For example, Project 19 relied heavily on community service providers to deliver monitoring activities throughout the communities of interest and invest in training for these providers to be well-versed in the monitoring and evaluation process. Most projects in the 'shared leadership' category also relied on community members as volunteers or workers in each project domain. Specifically, these projects selected community members during project design stages and trained them to be actors who are directly involved in implementing activities and sharing messages. In addition, many of the 'shared leadership' projects demonstrated a larger

degree of community stakeholder engagement in project design compared to other Aim 1 projects. Higher scoring projects relied on community member input in setting project priorities and creating activities that were community- and culturally-appropriate (Projects 3, 10, 12/13).

Projects that scored into lower levels of the CEC did not display aspects of community engagement in their design or M&E domains to the same extent as those with higher scores. These projects mostly involved engagement in their implementation stages, in the form of community-based training sessions and various types of nutrition and agriculture education activities. Lower scoring projects tended to have less community involvement in designing activities and carrying them out and instead relied on community members to serve as passive participants.

Throughout all Aim 1 projects, only 4 demonstrated community engagement strategies in their M&E domain (Projects 3, 10, 19,). Most of these projects did this by using trained community staff who were hired by the project to carry out evaluation activities and report back their findings. Some of these projects also had trained community members assist with monitoring activities by carrying out regular home visits to evaluate the use of trained behaviors and their ongoing impact on health outcomes. For example, Project 3 relied on mothers and trained Family Community Health Volunteers (FCHVs) to track program compliance through monthly meetings and check-ins. These meetings served as educational gatherings but were also used to promote the use of health services and bolster learned health behaviors, including immunization, routine child growth monitoring, vitamin A supplementation, and deworming.

Comparing Aim 1 Effect Ratios to CEC Scores

Effectiveness ratios for CEC category were estimated for four dietary indicators including household dietary diversity (HHDD), minimum dietary diversity (MinDD), child

dietary diversity score (CDDS), and women's dietary diversity score (WDDS) (Table 6), Where relevant, effect sizes were also calculated for other outcomes of interest ("Effect_Other"). Table 6 provides a detailed look at how ERs compare across each level of the CEC among various indicators of interest, specifically giving information as to the overall effect of projects scored within each level. Effectiveness ratios specific to dietary diversity indicators were calculated for projects which listed those indicators among their target objectives or outcomes of interest and had the necessary data available.

The data demonstrate that projects which had an overall effect on the health outcome of interest tended to be those which were concentrated towards the higher end of the Community Engagement Continuum, specifically in the 'collaborate' and 'shared leadership' levels. This information is not fully conclusive since there are several other factors in each project that could have impacted their overall outcomes, but it does provide a crude estimation of the possible impacts that higher levels of community engagement in a project's design, implementation, and M&E stages might have on health outcomes and indicators of interest at the project's completion.

Table 6: Aim 1 Project Effect Ratios for Five CEC Categories.

Engagement Category	Overall Effect	Household Dietary Diversity (HHDD) Effect	Minimum Dietary Diversity (MinDD) Effect	Child Dietary Diversity Score (CDDS) Effect (6-24 m)	Women's Dietary Diversity Score (WDDS) Effect	Effect_Other
Outreach	0	--	0	0	--	--
Consult	.75	0	0	0.67	1	1
Involve	0.8	0	1	0.5	1	--
Collaborate	0.86	0.67	0.67	0.6	0.67	1
Shared Leadership	0.7	0.5	0.71	0.71	0.5	1

*Boxes with "--" in place of an effect indicate that this indicator was not of interest and/or was not relevant to project focus/objectives

Effect ratios for the 10 projects which scored into the 'shared leadership' level of the CEC were consistent with improvement in the projects' target indicators (Table 6; Table 1, Appendix B.II). These projects were those which relied on high levels of community member involvement and communication between collaborators in order to be successful. Specifically, many of these projects stated that community member empowerment was among their main goals and worked to build community ownership over projects during their design and implementation, as well as after the project concluded. Most of these projects also had community volunteers or employed community members to support SBC activities and involved them throughout the design and M&E processes. The ERs of specific indicators for projects in the 'shared leadership' category seemed to be consistently on the higher end, demonstrating that these projects showed improved dietary diversity scores across the various populations of interest. Similar to the trend seen within the 'shared leadership' category, projects sorted into the 'collaborate' category had a high rate of positive effect ratios. Within the specific indicators, these projects showed overwhelmingly positive ERs as well.

The single project that scored high in the 'outreach' and 'consult' levels of the CEC had an ER calculation of 0, which demonstrates that target diet goals were not met, though this result should be interpreted cautiously given only one project contributed data to this ER. Other projects which scored within the second level of the CEC, 'consult,' showed mixed results, as overall effectiveness calculations were positive but several indicator-specific values were negative (Table 1, Appendix B.II). These projects, while still demonstrating a degree of community engagement at certain points throughout design, implementation, and M&E stages, did not necessarily involve community members throughout or demonstrate patterns of bi-directional communication flow. While this may not have had an impact on the overall

effectiveness of the projects at endline, lower levels of community engagement that led to these projects being classified at the 'involve' and 'consult' stages may be related to the lack of improvement seen across specific impact indicators of interest such as HHDD and CDDS.

Aim 2 – Results from Three Participating Projects

Table 7: Aim 2 Projects and Final CEC Scores by Project Domain

Project #	**Project Region**	**# of Documents Available for Coding**	**Project Score for each CEC Level By Project Domain**				
			Project Design				
			Outreach	**Consult**	**Involve**	**Collaborate**	**Shared Leadership**
Project 1	Central America	1	0	7	6	10	1
Project 2	East Africa	1	1	15	4	9	4
Project 3	West Africa	3	0	3	10	3	55
			Project Implementation				
Project 1	Central America	5	3	14	10	9	5
Project 2	East Africa	4	3	15	18	22	14
Project 3	West Africa	11	2	31	46	64	35
			Project M&E				
Project 1	Central America	1	1	7	3	4	3
Project 2	East Africa	1	2	5	11	6	4
Project 3	West Africa	1	0	2	9	28	21
			CEC Code Final Score Across Domains for Each Project				
Project 1	Central America	7	0.57	**4**	2.7	3.3	1.3
Project 2	East Africa	6	1	5.8	5.5	**6.2**	3.7
Project 3	West Africa	15	0.13	2.4	4.3	6.3	**7.4**

Project 1 Coding & Scoring

Project 1 used for this multi-series case study is a non-profit social enterprise focused on distributing biofortified maize seed in a Central American country and engaging local farmers in its production, sale, and distribution. By doing this, not only does the project have the opportunity to involve farmers and local stakeholders in economic activities, but they can also improve the nutrition of the areas where they are working by increasing consumption of biofortified maize. This project's specific objectives are: to identify existing biofortified seeds with high commercial potential in specific market segments; to produce the seeds with subcontracted farmers and seed companies; to promote the seeds through demonstration parcels, field days, and a brand highlighting increased incomes and improved taste; to incentivize sales by providing high margins to distributors and agrodealers who sell the product throughout the country.

Project 1 relies on several types of SBC methods to share its nutrition messaging with community members and stakeholders. Commonly used methods include community partnership, coalition building, and farmer training sessions on promotion and processing of the biofortified maize. The project also focuses on involving community members in trainings focused on the benefits of purchasing and consuming the biofortified maize seed and making it a part of their household and individual dietary intake.

Project 1, which is specifically focused on building local enterprise and engaging with farmers, scored highest in the three middle levels of the CEC- 'consult', 'involve', and 'collaborate'. This was due to the high frequency of codes that specifically tie to these levels, such as: "involvement – moderate," "community stakeholders," and "community feedback." These codes are cornerstones of the middle levels of the continuum, which feature moderate

levels of community involvement across various project stages and communication flow that is typically bidirectional but information seeking. Codes from the communication flow section of the codebook that were prevalent across Project 1 documents were "participatory communication" and "information/idea sharing," which highlight the nature of the communication occurring between entities involved in the project. One specific area where participatory communication was seen to be involved was in an interview with a member of the project staff, who recalled, "As far as communication with the community, they do a good job. When things aren't working… they aren't very tech savvy, it's a challenge, we can't use Google Drive or Excel… so we switched to paper tools which make things easier." This demonstrates the way that project tools were adapted to be more user-friendly for community members by taking their needs and preferences into account.

Overall, Project 1 scored highest in the 'consult' level of the CEC with a score of 4. Codes contributing to the score the most include, "involvement – moderate," "community feedback," and "information/idea sharing." These codes are inherent to the 'consult' level because they involve some degree of community involvement and are answer-seeking in nature. Another main code that bolstered this high 'consult' scoring was "community feedback" because at the consult level, the community has the chance to provide feedback through project stages and activities. While this does not mean that they are necessarily having their feedback implemented or making key decisions, there is still space for them to provide feedback in the communication channels present.

The CEC level 'outreach' scored the lowest for project 1, with codes adding to a score of 0.57. The second lowest score was in the 'shared leadership' level, which yielded a score of 1.3. The only code used that contributed to the score for 'outreach' was "communication flow- one

way" which was present four times throughout project documents and was tied mostly to the implementation stages of the project. An example of where this code felt appropriate to be used was in an interview with project staff, where the process of selling biofortified maize seed was being described: "We tell the farmer what to sell and consume- encourage them to eat it. They do, and they like it. In the long term, it will spread by word of mouth" (Project 1_Staff Interview 1). This quote is representative of a one-way communication channel and establishes the basis by which farmers are told to cultivate and consume biofortified maize. There is not an emphasis on back and forth between farmers and project staff regarding the maize, but moreso they are being told to cultivate it; less emphasis is placed on consumption.

Shared leadership codes within Project 1 were concentrated in the implementation and M&E stages of the, with discussion focused on the use of community workers and leaders being involved in the roll-out of project activities and engaged in several initiatives. However, these approaches were minimally discussed which is what led to codes only being used a few times.

Project 2 Coding & Scoring

Project 2 takes place in East Africa and is largely focused on addressing root causes of malnutrition among mothers and children in rural villages through home gardening, cooking demonstrations and nutrition education, and WASH trainings focused on improving household health and hygiene practices. SBC methods are widely used across the project to educate families on healthy diets, gardening, and childhood/maternal nutrition while promoting the activities of interest. One of the main facets of the project is its reliance on partnerships- local and with the national government and ministry of health- in order to spread its mission. The project also partners with existing government health clinics as a way of reaching a wider audience of both community members and relevant organizations for partnerships and promotion.

Coding of project document abstractions, as well as remote interviews and the focus group discussion, categorized the project in the middle three levels of the CEC- 'consult,' 'involve,' and 'collaborate.' Project 2 scored the highest in the 'collaborate' category, with a total score of 6.2. These were mostly from the use of codes such as, "community decision making," "local support systems," "community stakeholders," and "communication flow-bidirectional." These specific codes are indicative of the 'collaborate' level of the CEC because they place emphasis on partnership forming on multiple levels of a given project, as well as a moderate-high amount of community involvement in decision-making and project implementation. Some of the most frequently used 'collaborate' codes were especially present within the project's core design documents, which detailed project design and implementation strategies and an overview of the SBC being used. The project's strong connection to local government systems particularly led to the presence of these codes, as seen in the quote, "We work in close partnership with the government… by teaming up with community health workers, delivering trainings at local health clinics, and advising policy… and it can be helpful to invite someone from those teams to these (project) conversations so that they can include the data in upcoming communications and grant reports."

Throughout design documents for Project 2, there are several areas where empowerment is a central theme of project activities and it is inherent to the project's objective: "To tackle the root causes of malnutrition, we equip families with seeds, skills, and knowledge to create vegetable gardens, prepare balanced meals, and keep children healthy" (Project 2_Core Design abstraction). Despite its use of community engagement within its design stages, many of Project 2's scoring across documents reflected low levels of community involvement in project implementation and decision making. Community members were less likely to be involved in

project activities as stakeholders, leaders, or workers/volunteers, and instead were mainly viewed as participants receiving the training or SBC communications. Monitoring documentation available for Project 2 demonstrated that community members were not heavily engaged in monitoring activities either. Instead, they were mostly relied on throughout monitoring as sources of information. Despite low involvement with the community in these domains, Project 2 did maintain strong and intentional communication channels with the communities of interest throughout its operation and placed an emphasis on relationship building. This approach correlates with its high scores in the 'collaborate' level of the CEC.

Project 3 Coding & Scoring

The third project takes place in West Africa and operates with a main objective of increasing dietary diversity, safety, and nutrition of food products for women of reproductive age (WRA) and children under 2 years of age (CU2) in communities of interest. The project focuses on achieving its desired objective through a variety of methods, including: promoting and strengthening regional resource partnerships to provide services and trainings; promoting and strengthening local government capacities to support key components of the project; strengthening capacity of women's groups in order to empower and aid in solving household problems related to malnutrition; and making innovative technologies accessible to the entire food system chain in order to improve operations and access.

Project 3 goes about accomplishing these goals by relying heavily on partnerships and strategic local planning in its activities. The project also focuses on building connections with local government structures to promote post-project sustainability. SBC communications within the project are mostly used at the household and individual levels, with a focus on skills training surrounding nutrition practices and income-generating activities, as well as household hygiene

and sanitation practices. The use of SBC methods in project 3 can be seen mostly in nutrition-related practices through community outreach and social mobilization. Specific activities include strengthening capacities of agro-entrepreneurs through trainings and quality checks, organization of women's groups, and stakeholder mobilization to support nutrition-focused activities.

Project 3 scored highest on the top level of the CEC, 'shared leadership,' with a score of 7.4. Codes such as "community stakeholders," "community volunteers/workers," and "empowerment" were prevalent throughout documents and contributed to the high achievement at this level. More specifically, the code "empowerment" was present 53 times throughout project documents which was the most it was used across all three projects.

Project 3 reflected a high degree of community engagement across all three of its project domains. In project design stages, community input and local stakeholder engagement were paramount in building project implementation strategy. The project places a strong emphasis on building and maintaining strong partnerships with local government systems and stakeholders. An example of this is its utilization of existing business entities to produce and sell nutritious food products as part of their business ventures after receiving project training. Project 3 also set a precedence in its design stages of maintaining strong communication between entities, and for community members/stakeholders to have the final opinion in most project decisions. One specific part of Project 3 design that exemplified these characteristics was the creation of community working groups (CWGs) that were to participate in local council meetings and supported the facilitation of nutrition activities with their annual budget and agenda. These groups became a main facet of project operation and gave community members a certain control over project activities as overseers and decision makers.

Project 3 also demonstrated a high degree of community engagement methods in its implementation stages. Since this project approached its activities through a community empowerment lens, many of its methods were focused on investing in the community- whether through financial means, education, training, or tools. The project was focused on allowing community members to be the leaders of activities and worked to keep project staff in the background to provide assistance as needed. This model was reflected in an interview with a project staff member, where they remarked, "We're really just facilitators of linkages, we're not driving the agenda, we try to make the client the owner of the agenda – we have the access and the relationships but they own the activities" (Project 3_Staff Interview 5). This methodology, used throughout project operation, reflects why this project had such a high degree of community engagement present throughout implementation and was categorized into the 'shared leadership' level of the CEC.

In Project 3 M&E documentation, a project staff member states that, "individual beneficiaries and households are the primary sources of the data" (Project 3_M&E Abstraction), demonstrating the importance of community feedback and input in the activities taking place within the monitoring domain of Project 3. While community members are not the ones directly carrying out monitoring activities, they are the main focus area of data collection and their input has a direct linkage to project changes moving forward. Project 3 involves local government institutions and community organizations in monitoring activities in an effort to create effective collaborating relationships and to make the monitoring of activities more sustainable. By equipping these entities to plan, implement, and monitor the various nutrition-focused objectives of the project, their capacity is being strengthened while ensuring that the project can be carried out even after outside collaborators are no longer present.

Chapter 5: Discussion

This chapter will review relevant themes observed throughout project analysis and the implications that these may have in global nutrition SBC programming. It will also discuss limitations of the approaches used and recommendations for future research in the areas of interest.

Aim 1: Effectiveness of 23 Projects and CEC Classification

Project Scores & Themes Present

The sorting of 23 Aim 1 projects into the five levels of the CEC based on the community engagement methods present in their activities yielded a pattern that can help to understand how community engagement methods might be useful in NSeA and SBC settings. A final trend exhibited that most of the projects were concentrated towards the upper levels of the continuum, with high scores in the top two categories of 'shared leadership' (10 projects) and 'collaborate' (7 projects). Although each project examined was unique in its objectives and approaches, there were similarities across projects that could be linked to their use of engagement methods and final CEC scoring. As demonstrated in Table 5, projects with more community-based activities, such as demonstrations, training sessions, and regularly occurring meetings/check-ins were associated with higher levels of the CEC. This can be seen throughout the table but specifically on the first page, where projects 1-5 were each sorted into either the 'collaborate' or 'shared leadership' levels and exemplify a variety of activities that utilize community member engagement and a high degree of involvement. These projects were intentional in working sustainability practices into their methods, so that community members could have a sense of ownership in the activities and programming taking place and make them a part of their daily routines. Examples of this included the establishment of village model farms in various projects,

gender activities aimed at increasing female involvement and ownership of various parts of the project, and the formation of collectives/community groups to share information and advice regarding the ongoing activities. These projects worked to empower community members and each had community workers and/or volunteers involved in the implementation stages of the project, and occasionally in the design and M&E domains as well.

In contrast, many of the projects that scored in the lower three levels of the CEC used methods that may have been one-time training sessions or events that did not include follow-up activities to bolster what was being taught. Many of these projects also had objectives that were broader in nature and the associated activities were not as in-depth as higher scoring projects. For example, Aim 1 Projects 6, 8, 9, and 14 scored into either the 'outreach,' 'consult,' or 'involve' level of the CEC. Their activities were comprised of predominantly one-way educational events where information was being disseminated but community members were not being directly engaged or involved in setting priorities, identifying or shaping interventions, or participatory activities. Other activities present in these specific projects included training, counseling sessions, and workshops. These methods are useful in spreading awareness and promoting different activities and practices but may not have had aspects that were participatory and engaging towards community members, leading to their lower scores on the CEC.

In a review of effective NSeA SBC methods, Kennedy et al. (2018) discuss the relevance of using group-based approaches and community/social mobilization tactics towards improving IYCF and nutrition outcomes (Kennedy et al., 2018). After examining projects that used a variety of SBC methods and variable amounts of community engagement, the study concluded that projects which emphasized the use of culturally-appropriate SBC methods, as well as group-based and household-approaches to carrying out activities, seemed to be those which reported

progress on indicators such as maternal and child malnutrition and IYCF (Kennedy et al., 2018). This information helps to support results from Aim 1 project scoring which suggest that community engagement, group training/educational sessions, and the formation of community groups and partnerships can positively impact health outcomes of interest. Similarly, in 2017 Ruel et al. reviewed numerous NSeA strategies and discussed major lessons-learned from successes and failures of these approaches, including their uses of community engagement (Ruel, Quisumbing, and Balagamwala, 2017). One major conclusion of this review is that NSeA interventions which utilize nutrition SBC methods and women's empowerment activities are particularly effective at achieving desired outcomes. This finding aligns with results from Aim 1 project analysis. Most Aim 1 projects had some sort of gender-focused training or empowerment strategy, even those that scored low on the CEC. However, those which had more engaging gender empowerment approaches that were heavily prioritized in project implementation also tended to score higher on the CEC. This supports the claim that NSeA interventions are made more effective by integrating gender empowerment strategies, but points towards a need for prioritization of higher order community engagement approaches for interventions to be impactful and sustainable.

Another major takeaway from SBC literature that ties directly to Aim 1 project results is the notion that nutrition SBC projects which are intensive, locally adapted, and utilize multiple approaches, have a greater effect on improving knowledge and practices compared to single-approach programming (Ruel, Quisumbing, and Balagamwala, 2017). The projects that scored highest on the CEC from Aim 1 are not only those which rely heavily on community engagement and local support systems to support implementation, but also involved local leaders and beneficiaries in the design and M&E stages of project roll-out. The use of these community

engagement strategies across the project cycle, and not simply in a single stage, allowed for more profound programming that can deliver a greater impact on health outcomes of interest.

Discussion of Effect Ratios and CEC Scores

Table 6 displays the effect ratios associated with Aim 1 projects scored into each of the five CEC levels. These values demonstrate the rate of effectiveness each project had across various nutrition/dietary diversity indicators when divided into the five CEC categories. The data show a trend that effectiveness increased, and remained positive, with the increase of CEC level. Although only one project s/cored into the 'outreach' level of the CEC and contributed to its effect ratio, an ER of 0 across each indicator for this level implies that the project which resembled 'outreach' did not influence health outcomes of interest.

The ERs that were calculated for each level across indicators show the degree of community engagement in projects impacted community dietary diversity scores in various populations of interest. For example, Household Dietary Diversity (HHDD) effect was 0 for the 'consult' and 'involve' levels, signifying that there was no impact on this indicator by the projects scored into this level. However, the HHDD ER was positive for the top two levels of the CEC, 'collaborate' and 'shared leadership,' pointing towards a possible positive correlation between the approaches and methods used in the high-scoring projects that gave them an advantage in contributing to improved household diet and nutrition practices. A similar trend was present for the indicator for Minimum Dietary Diversity (MinDD), where projects categorized into the two lowest levels of the CEC ('outreach' and 'consult') had an effect of 0, but higher scoring projects in the top three levels of the CEC had positive ERs. The other two indicators of interest, Child Dietary Diversity Score (CDDS) and Women's Dietary Diversity Score (WDDS), showed similar outcomes. It was noted, however, that for these indicators the only CEC level

that did not achieve a positive ER was 'outreach.' The positive ER across each of the top four CEC levels for CDDS implies that most of the projects scored into these four categories had a positive effect on this indicator, and that community engagement may not have played as significant of a role as it could have for other effect indicators.

Aim 1 Limitations

Results from coding and sorting Aim 1 projects along the CEC may have been different if the methods used and projects chosen to evaluate had been altered. Because Aim 1 analysis from the parent study had effect ratio calculations for only 23 of the 56 total projects, half of the projects that were compiled for the Aim 1 systematic review were not considered in this analysis and did not have their methods or activities assessed for community engagement. Incorporating additional projects to this analysis would have altered the dataset by introducing different methods and trends to the coding and CEC scoring. Also, depending on their effectiveness scores, they could have had an impact on the CEC ERs that were calculated as part of this analysis, and changed the way that the data was interpreted to account for community engagement methods' impact on health indicators of interest.

Another potential limitation of this analysis that could have changed the dataset are the approaches that were chosen to assess the breadth and depth of community engagement methods across each project's design, implementation, and M&E domains. The CEC Scoring Codebook and corresponding coding and analysis, as well as the evaluation using effectiveness ratios across indicators, were not the only methods that could have been used to assess the use of community engagement across the chosen projects. Other methods, including a meta-analysis of projects and their specific methods and outcomes, may have brought forth additional information that impacted scoring and CEC categorization. However, since projects were very heterogeneous a

meta-analytical approach may have been limited by that heterogeneity. Additionally, a mixed-methods approach that used more quantitative analysis methods may have allowed for better visualization of project impacts and outcomes and a clearer picture of how CEC scoring was or was not correlated with them.

One other potential limitation was the type and number of documents used for this review. Project documents included project evaluations, design protocols, baseline/midline/endline evaluations, process evaluations, communication and gender strategy plans, curriculum development plans, evaluation documents, implementation manuals, outcome reports, and SBC strategy guides. Projects varied in the number of documents available for abstraction. While researchers contacted all authors to request additional project documents, not all authors responded or were able to provide additional documentation. The number of documents and the detail in those documents impacted coding and scoring because some projects ended up with more codes, thus giving them a more obvious categorization on the CEC compared to others. Several projects were also missing design, implementation, or M&E documents which meant that the degree of community engagement present throughout project stages could not be thoroughly deduced based on the data that was available. If each project had the same number of documents, or had similar details present across abstractions, there would have been more continuity between project coding and CEC scoring.

Furthermore, Aim 1 analysis depended on project documents only. No key informant interviews with project staff, leaders, and beneficiaries, or focus group discussions, were used to inform Aim 1 data for these projects. Direct testimonies from those involved in the project's planning, implementation, and evaluation stages may have provided further details as to what methods were being used to engage community members and stakeholders across project

activities. Project documents provided detailed overviews of the core plans and impacts of each project but may not have captured the direct experiences of those involved in the projects or being impacted by them, hindering the richness of data present.

Aim 2: Comparing Three Projects and CEC Classifications

NSeA SBC Activities Associated with Higher CEC Scoring

Three projects from Aim 2 of the parent study were subjected to rigorous analysis to identify how they used community engagement methods in their design, implementation, and M&E stages. Each project ended up scoring differently across the CEC, demonstrating that the types of community engagement used and their breadth across projects had an impact on how project activities were carried out and how objectives were met. Across projects and within their domains, community engagement was used in a variety of ways based on project goals and the receptiveness of the community which had an overall impact on how projects scored along the CEC and their coding outcomes.

Project 1 used in Aim 2 analysis, which took place in Central America, scored highest in the second level of the CEC, 'consult,' and had high scores in the middle categories of 'involve' and 'collaborate'. Project 1 had some community engagement intertwined throughout its SBC methodology, but took a traditional approach to carrying out most of its educational and programmatic initiatives. For example, many of the training and information sessions involved in Project 1 consisted of project staff and professionals entering communities of interest and presenting them with pre-developed curriculum, rather than taking cultural context and community input into account when designing specific programming. This may have made sense in the context of the project's goals and the information that was being shared with community members but contributed to lower scores in the top levels of the CEC across design and

implementation stages. In contrast to this approach, Project 3 had a high degree of community stakeholder involvement in its design stages and scored high in the 'shared leadership' category across domains (demonstrated in Table 7).

Another stark difference between project scoring results was the community engagement present across domains in each project. Project 3 had notably more codes in the M&E stages compared to Projects 1 and 2. Project 3 relied heavily on community stakeholder involvement in developing and carrying out monitoring activities and allowed community members to share feedback and make decisions regarding how the project could be adapted to better suit community needs. These M&E methods contributed to the high concentration of scores in Project 3's M&E domain, and its overall high scores for the 'collaborate' and 'shared leadership' levels of the CEC. In contrast, Projects 1 and 2 had less codes present in design and M&E domains and had the bulk of their community engagement methods present in their implementation stages. This points towards lower community member involvement and participation in design and M&E stages of projects, perhaps impacting overall outcomes and objectives. Project 1 scored especially low in the M&E domain across all levels of the CEC, with fewer codes present compared to the other two projects. This could be due to the fact that most of the evaluation work done with this project was carried out by project staff and field staff who were employed by a large national partner institution, rather than using local stakeholders, leaders, or community members to complete these steps.

Aim 2 Limitations

Using other approaches to assess Aim 2 projects might have yielded different results regarding their community engagement practices and how these influenced project operations. This analysis used a qualitative approach but could have also been done using numeric methods

to quantify community engagement activities and assess their effectiveness with statistical analysis. Also, because effectiveness and effect ratios were not calculated for Aim 2 projects, conclusions cannot be made regarding how the CE activities and approaches used may have impacted project outcomes or health indicators. This analysis instead provides a detailed overview of the methods being applied over time and how those are contributing to ongoing project practices and successes.

The use of interviews and FGDs with project staff, stakeholders, and beneficiaries from Aim 2 provided a strong basis for how the projects are impacting communities on the ground and how community members are engaged. However, some projects had more of these materials available for analysis than others, which led to differences in quantity of coded documents and amount of project data available. Project 1 ended up having significantly less scores across the CEC because there were less project documents, KIIs, and FGDs available for its analysis. This impacted the amount of relevant data available for coding Project 1 and could have contributed to its lower overall CEC scoring. In qualitative data analysis, typically quality of data is more important compared to quantity available, but in this case the data sources that were available were not as detailed compared to those for Projects 2 and 3 and may have impacted the coding and CEC scoring process.

Aim 2 of the parent study consists of 17 unique projects that met inclusion criteria and included NSeA SBC practices across their design, implementation, and M&E domains. Only three of those projects were included in this case study analysis which leaves out 14 other identified projects that may differ in their uses of community engagement methods. Applying similar methods to assess the depth and breadth of community engagement methods employed

across other Aim 2 projects may have yielded different results and could have added alternative viewpoints to this project.

Closing Thoughts

This project contributes to a larger body of research that examines the various intricacies involved in nutrition SBC and NSeA projects globally. Previous reviews and analyses have not examined these practices through a community engagement-focused lens in order to assess the impact that these methods may have. Results from Aim 1 project analysis indicate that the degree of community engagement used across various types of projects, as well as the breadth of methods used, can have an impact on overall project effect ratios. The use of these strategies can also be related to how projects compare when scored along the Community Engagement Continuum and provide insight as to which of these methods may improve project design, implementation, and M&E strategies, and which may hinder progress.

Chapter 6: Public Health Implications & Recommendations

Implications

The findings gleaned from the analysis of several global NSeA SBC projects demonstrate the significant impacts that community engagement methods can have when included in research design, implementation, and M&E domains. Using the Community Engagement Continuum to score projects and better understand how they use different engagement techniques, conclusions could be made regarding how these approaches may impact health outcomes, project effectiveness, and sustainability. Based on analysis of Aim 1 and Aim 2 projects, it is evident that the use of community engagement methods that are consistent with the top two levels of the CEC ('collaborate' and 'shared leadership') are correlated with improved outcomes and health behavior changes, as well as increased project uptake in the community of interest.

A 2015 meta-analysis looking at the added effectiveness that community engagement methods can have in public health interventions concluded that, while the types of community engagement methods may not be significant, their presence within a project can have an impact on health outcomes across a variety of focus areas (O'Mara et al., 2015). This foundational research provided evidence for the effectiveness of community engagement in research settings but does not explicitly identify SBC- or nutrition-based projects as more or less suitable for these approaches. O'Mara et al. (2015) also focused largely on interventions that took place in the United States, with less than 15% of data coming from internationally implemented projects (O'Mara et al., 2015). This thesis examined a multitude of studies across global contexts and could provide further evidence for the use of community engagement methods in international settings. Altogether, this information provides insight as to how the integration of community

engagement methods can help nutrition SBC projects be successful across different socio-cultural settings.

Moving forward, NSeA and SBC projects should place emphasis on the engagement of community members throughout all of their domains. Particularly, this data has demonstrated the importance of involving community leaders and stakeholders in the design and M&E stages of project development. Each of the projects examined across Aims 1 and 2 used community engagement in some regard, typically within the implementation stages. However, those which utilized community feedback, local knowledge systems, or existing community structures to plan and carry out formative research and planning stood out with higher-scoring CEC results and overall more favorable feedback in interviews and focus group discussions with community members and workers. Similar trends were seen in projects which took local considerations and input into account when carrying out M&E activities and making relevant adaptions to the project. This information provides insight as to how future NSeA and SBC projects can best infuse community engagement methods into their methods to create more productive and sustainable programming.

Several projects from Aims 1 and 2 that scored high on the CEC had commonalities in the methods that they chose, and the corresponding codes that were frequently applied. These codes included ‘empowerment,’ ‘community workers/volunteers,’ ‘community stakeholders,’ and ‘bi-directional trust building.’ This trend could provide insight as to what community engagement methods yield the most success when employed in nutrition SBC and NSeA areas. Future projects in these disciplines that are interested in health outcomes related to nutritional status, dietary diversity, agricultural promotion, IYCF, gender empowerment, and/or

the creation of economic opportunities may benefit from using community engagement strategies that tie to activities related to these specific codes.

Recommendations & Next Steps

This project brings forth considerable evidence supporting the use of community engagement methods across nutrition SBC and NSeA-focused public health projects. Future projects that have goals which align to those analyzed in this review would benefit from enacting more engagement activities throughout their design, implementation, and M&E stages. Specific methods that seem to be especially useful include onboarding of community workers and volunteers to be involved across project domains, the involvement of local knowledge and stakeholders in decision-making processes regarding the project, and the employment of project goals that are specifically looking to empower the community of interest throughout project activities. Specifically, Aim 1 and Aim 2 projects with objectives related to empowerment and gender scored higher on the CEC, pointing towards a relationship between the nature of a project's objectives and its use of community engagement methods in practice. Future projects in these areas should aim to have their objectives align with empowerment, equality, and project ownership if they are looking to adequately engage community members and have a lasting impact in the areas where they are taking place.

Another recommended method that can help promote public health projects in these focus areas is an emphasis on partnerships and relationship building, specifically in the formative programming stages. Across the various projects examined for this project, strong, bi-directional communication and partnership building were cornerstones of project success and uptake by community members. Prioritizing these relationships should be foundational to any project looking to enact permanent changes in targeted communities.

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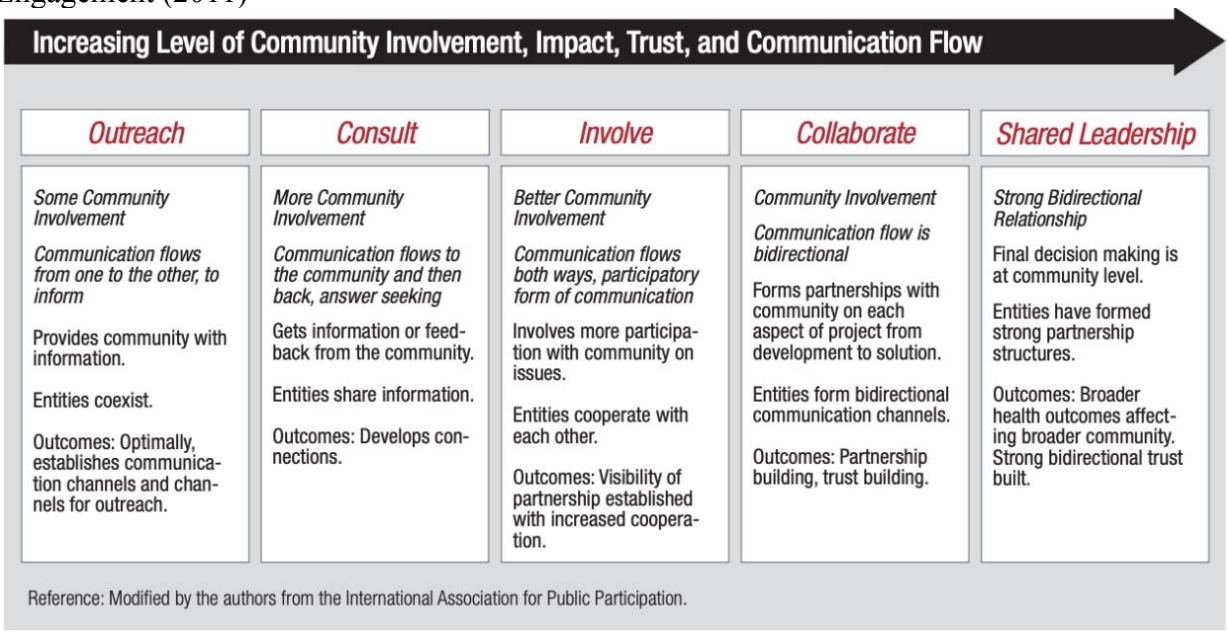
Appendix A: Codebook /Project Scoring Materials

I. Community Engagement Continuum. Source: CDC/ATSDR Committee on Community Engagement (2011)



II. Full project codebook with scoring criteria (3 sections)

Community Engagement Continuum (CEC) Codes				
	Theme (definition)	Code	Full Code Definition	Community Engagement Continuum Scoring
Design				
	Involvement (to what degree is the community involved in the design process and how is their input taken into account)			
		Involvement - low	little/no community involvement in project design	+1 outreach
		Involvement - moderate	some community involvement in project design	+1 consult
		Involvement - high	some community involvement in project design	+1 involve; +1 collaborate; +1 shared leadership
		Coexisting entities	entities have little/no partnerships or connections built during design process	+1 outreach
		Community decision making	community is involved in decision making and choices impacting project	+1 collaborate; +1 shared leadership
		Local support systems	community coalitions and collectives built for project support and conversations	+1 collaborate
		Community stakeholders	community involvement and perspective are principle to design methods	+1 consult; +1 involve; +1 collaborate; +1 shared leadership
		Community volunteers/workers	central to activities, including community members playing direct roles in project as staff, volunteers, CHWs, etc.	+1 shared leadership
	Impact (what is the influence or effect on community members of the activity/how is it a part of their everyday lives)			
		Empowerment	Community members own the project and define what they want throughout design process; collaborator(s) offer support but leave lead decisions and actions to community	+1 shared leadership
		Engagement	Community members informed, directly involved, and/or participating in planning and design	+1 involve; +1 collaborate; +1 shared leadership
	Trust (what is the nature of the relationships between implementer and community members; how have those relatonships formed)			
		Cooperation	visible partnership has been established with cooperation from all entities	+1 involve
		Bi-directional trust building	built trust between entities is among main objectives	+1 collaborate; +1 shared leadership
		Local strategic partnership(s) - moderate	established partnerships among collaborators and communitiy entity(ies)	+1 involve;
		Local strategic partnership(s) - strong	maintaining strong partnership structures throughout project life	+1 collaborate; +1 shared leadership
	Communication flow (how do entities communicate throughout design process and how is that communication used)			
		Communication flow - one-way	communication flows from one entity (collaborators)	+1 outreach
		Communication flow - bidirectional	communication flows both ways between collaborators & community members	+1 consult; +1 involve; +1 collaborate; +1 shared leadership
		Community feedback	community provides information or feedback to be used towards designing/improving project	+1 consult
		Participatory communication	Emphasis on community-centered conversations,	+1 involve
		Information/idea sharing	entities share information from opposite sides	+1 consult

Community Engagement Continuum (CEC) Codes				
	Theme (definition)	Code	Full Code Definition	Community Engagement Continuum Scoring
Implementation				
	Involvement (to what degree is the community involved in the implimentation process and how is their input taken into account)			
		Involvement - low	implementation	+1 outreach
		Involvement - moderate	implementation	+1 consult
		Involvement - high	implementation	+1 involve; +1 collaborate; +1 shared leadership
		Coexisting entities	entities have little/no partnerships or connections built during implementation process	+1 outreach
		Community decision making	community is involved in decision making and choices impacting project implementation	+1 collaborate; +1 shared leadership
		Local support systems	community coalitions and collectives built for project support and conversations	+1 collaborate
		Community stakeholders	community involvement and perspective are principle to implementation methods	+1 consult; +1 involve; +1 collaborate; +1 shared leadership
		Community volunteers/workers	central to activities, including community members playing direct roles in project as staff, volunteers, CHWs, etc.	+1 shared leadership
	Impact (what is the influence or effect on community members of the activity/how is it a part of their everyday lives)			
		Empowerment	Community members own the project and define what they want throughout implementation process; collaborator(s) offer support but leave lead decisions and actions to community	+1 shared leadership
		Engagement	Community members informed, directly involved, and/or participating in implementation	+1 involve; +1 collaborate; +1 shared leadership
	Trust (what is the nature of the relationships between implementer and community members; how have those relatonships formed)			
		Cooperation	visible partnership has been established with cooperation from all entities	+1 involve
		Bi-directional trust building	built trust between entities is among main objectives of implementation	+1 collaborate; +1 shared leadership
		Local strategic partnership(s) - moderate	established partnerships among collaborators and communitiy entity(ies)	+1 involve;
		Local strategic partnership(s) - strong	strong emphasis on building partnerships and maintaining strong partnership structures throughout project life	+1 collaborate; +1 shared leadership
	Communication flow (how do entities communicate throughout implementation process and how is that communication used)			
		Communication flow - one-way	communication flows from one entity (collaborators) to other (community), mostly for the purpose of informing/providing information	+1 outreach
		Communication flow - bidirectional	communication flows both ways between collaborators & community members	+1 consult; +1 involve; +1 collaborate; +1 shared leadership
		Community feedback	community provides information or feedback to be used towards implementing/improving project	+1 consult
		Participatory communication	Emphasis on community-centered conversations, consideration of community perspective in outside planning, and needs taken into account	+1 involve
		Information/idea sharing	entities share information from opposite sides	+1 consult

Community Engagement Continuum (CEC) Codes				
	Theme (definition)	Code	Full Code Definition	Community Engagement Continuum Scoring
Monitoring & Evaluation (M&E)				
	Involvement (to what degree is the community involved in the implimentation process and how is their input taken into account)			
		Involvement - low	little/no community involvement in project M&E	+1 outreach
		Involvement - moderate	some community involvement in project M&E	+1 consult
		Involvement - high	strong community involvement in project M&E	+1 involve; +1 collaborate; +1 shared leadership
		Coexisting entities	entities have little/no partnerships or connections built during M&E process	+1 outreach
		Community decision making	community is involved in decision making and choices impacting project M&E	+1 collaborate; +1 shared leadership
		Local support systems	community coalitions and collectives built for project support and conversations	+1 collaborate
		Community stakeholders	community involvement and perspective are principle to M&E methods	+1 consult; +1 involve; +1 collaborate; +1 shared leadership
		Community volunteers/workers	central to activities, including community members playing direct roles in project as staff, volunteers, CHWs, etc.	+1 shared leadership
	Impact (what is the influence or effect on community members of the activity/how is it a part of their everyday lives)			
		Empowerment	Community members own the project and define what they want throughout M&E process; collaborator(s) offer support but leave lead decisions and actions to community	+1 shared leadership
		Engagement	Community members informed, directly involved, and/or participating in M&E	+1 involve; +1 collaborate; +1 shared leadership
	Trust (what is the nature of the relationships between implementer and community members; how have those relatonships formed)			
		Cooperation	visible partnership has been established with cooperation from all entities	+1 involve
		Bi-directional trust building	of M&E	+1 collaborate; +1 shared leadership
		Local strategic partnership(s) - moderate	established partnerships among collaborators and communitiy entity(ies)	+1 involve;
		Local strategic partnership(s) - strong	strong emphasis on building partnerships and	+1 collaborate; +1 shared leadership
	Communication flow (how do entities communicate throughout M&E process and how is that communication used)			
		Communication flow - one-way	communication flows from one entity (collaborators) to other (community), mostly for the purpose of informing/providing information	+1 outreach
		Communication flow - bidirectional	communication flows both ways between collaborators & community members	+1 consult; +1 involve; +1 collaborate; +1 shared leadership
		Community feedback	community provides information or feedback to be	+1 consult
		Participatory communication	Emphasis on community-centered conversations, consideration of community perspective in outside planning, and needs taken into account	+1 involve
		Information/idea sharing	entities share information from opposite sides	+1 consult

Appendix B: Aim 1 Analysis Materials

I. Aim 1 Project Document Reference Numbers

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II. Table 1: Aim 1 BCT Effectiveness Scores and Project CEC Categorization

Project #	Overall Effect	Household Dietary Diversity (HHDD) Effect	Minimum Dietary Diversity (MinDD) Effect	Child Dietary Diversity Score (CDDS) Effect (6-24 m)	Women's Dietary Diversity Score (WDDS) Effect	Effect_ Other	Final CEC Categorization
1	1	--*	--	--	--	1	Collaborate
2	0	--	0	--	--	--	Collaborate
3	1	--	1	--	--	--	Shared Leadership
4	0	0	0	0	0	--	Shared Leadership
5	1	1	--	1	1	--	Shared Leadership
6	1	--	--	--	1	--	Consult/Involve
7	1	--	1	1	1	--	Collaborate
8	0	--	0	0	--	--	Outreach/Consult
9	1	--	1	--	--	--	Involve
10	1	--	1	1	1	--	Shared Leadership
11	1	--	--	1	--	1	Shared Leadership
12/13	1/1	--	1/1	1/1	--/--	--/--	Shared Leadership
14	0	--	--	0	1	--	Involve
15	1	1	--	0	0	--	Collaborate
16	1	--	1	1	--	--	Shared Leadership
17	0	--	--	--	0	--	Shared Leadership
18	1	--	1	--	--	--	Involve
19	1	--	1	--	1	--	Shared Leadership
20	1	--	--	1	--	1	Consult/ Collaborate
21	1	0	--	1	1	--	Consult/Involve / Collaborate
22	0	--	0	0	0	--	Shared Leadership
23	1	1	1	0	--	--	Collaborate

*Projects with "--" in place of an effect indicate that this effect was not of interest and/or was not relevant to project focus/objectives