Sustainable WASH Systems Learning Partnership

ETHIOPIA ENDLINE SOCIAL NETWORK ANALYSIS

LINC
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Acronyms

EWTI	Ethiopian Water Technology Institute
GTP II	Growth and Transformation Plan II
NGO	Non-governmental Organization
SDG	Sustainable Development Goal
SNA	Social Network Analysis
SWS	Sustainable WASH Systems Learning Partnership
UWSSP-II	Second Ethiopia Urban Water Supply and Sanitation Project
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WASHCO	WASH Committees
WUA	Water Users Association

Executive Summary

Overview: The relationships and interactions among water, sanitation, and hygiene (WASH) actors are critical for improving and sustaining WASH services. The Sustainable WASH Systems Learning Partnership (SWS) is a global United States Agency for International Development (USAID) cooperative agreement to identify locally driven solutions to sustain WASH services. This Social Network Analysis (SNA) is being applied to better understand the relationships and changes over time among WASH actors in the four locations in Ethiopia where SWS is operating: Tetra Tech facilitates two small towns focused on sanitation services, and IRC WASH facilitates two rural *woredas* (districts) focused on water supply. In each location, SWS is facilitating a learning alliance comprised of relevant stakeholders representing government, private sector, civil society, and academic institutions to improve efficiency, effectiveness, and sustainability of local WASH services through increased collaboration and sharing. Following a [Baseline](#) and [Midterm](#) SNA, this Endline SNA is the last of three conducted over the life of the SWS project, which allows changes to be observed in each network over the course of SWS's activities.

Methodology: All three SNAs (Baseline, Midterm, and Endline) used a roster-based, whole-of-network approach to assess relationships and structure of each learning alliance. LINC interviewed all alliance member organizations in person and asked about their organizations' services and other organizational attributes (e.g., type of organization, organizational mission) and their relationships with other members. This analysis considers three types of relationships: Information-Sharing, Coordination, and Problem-Solving, intended to encompass the range of important interactions among stakeholders within the context of SWS. For each type of relationship, the enumerator asked respondents about what other members they interacted with in the last period, and included a follow-up question gauging the quality of the interaction (specifically, frequency of Information-Sharing, type of activity coordinated, or status of problem-solving request). The enumerator uploaded the tablet-based survey data into the SNA platform Kumu. The result is a fully interactive, publicly accessible, user-friendly SNA tool that SWS and other stakeholders can use. The interactive maps allow users to "filter" actors and relationships to visualize and analyze sub-networks. These can be accessed for each of the four learning alliance locations: [Debre Birhan](#), [Woliso](#), [Mille](#), and [South Ari](#).

SNA Application: By analyzing SNA data and trends over time, SWS can quantify learning alliance dynamics to observe differences and commonalities among members based on their services, sectors, and relationships. The three SNAs conducted (Baseline, Midterm, and Endline) provide unique insight into the workings and relationships within the learning alliances that reinforce (and sometimes question) the findings and observations of the SWS Tetra Tech and IRC teams in the field. Through a draft version of this report, LINC incorporated the teams' feedback, contextualization, and findings that either support or run counter to the findings herein and sought explanations to aid the learning process.

Overall Learning Alliance Findings: Generally, LINC can observe that all the learning alliances continue functioning at generally healthy — albeit varying — levels of interaction, particularly when considering the COVID-19 challenges of 2020. In some cases, most notably in Debre Birhan (urban sanitation) and South Ari (rural water), the overall metrics improved, indicating increased sharing and

coordination in this period. Losing (and/or gaining) key members affected some alliances, notably NGOs and projects. All four learning alliances are, to some extent, struggling with common issues, including questions about their sustainability going forward, turnover of government officials and representatives, delays in delivering agreed-upon action items, and decision-making. This Executive Summary provides brief summaries of each of the four SWS Ethiopia learning alliances with more detail in the body of the report.

Debre Birhan: Urban Sanitation Learning Alliance, Tetra Tech

Learning Alliance: Debre Birhan, a town in central Ethiopia with 138,000 residents (and the highest-altitude town of its size in Africa), formed a learning alliance to improve the quality and sustainability of sanitation services by strengthening local systems to operate more effectively and efficiently. Learning alliance priorities are to facilitate consensus on fecal sludge dumping, formulate and operationalize plans for public and communal latrines, address industrial waste dumping, and strengthen the alliance to advocate for sanitation investments. Since its launch, the learning alliance has participated in meetings, training, and exchange visits and has implemented an action research agenda related to its goals. The town's sanitation sector is currently benefitting from the government-implemented, World Bank–funded Second Ethiopia Urban Water Supply and Sanitation Project (UWSSP-II), which is financing infrastructure, providing advisory services, and building local capacity.

SNA Overview: The Debre Birhan Learning Alliance is one of the largest of the four learning alliances, currently with 20 members. The learning alliance is a positive example of inter-sectoral inclusion, with members representing public administrations, NGOs, private sector, donors, and academics, making it the most diverse of the four learning alliances. Its membership has remained consistent and committed, despite some turnover of representatives in public institutions. The strength and cohesiveness of the network increased successively from the Baseline to Midterm to Endline SNAs in all three types of relationships. The SWS team reports recent achievements related to decision-making, town sanitation budget, and stakeholder dialogue, much of which is observed in the SNA findings. Overall, the SNA shows significant network strengthening; observations of the SWS Tetra Tech teams back this up. Interactive SNA maps are publicly available and can be found here.

Key Network Actors: Key actors in the network include the Municipality, Town Health Office, UWSSP-II, and Water Supply and Sewage Enterprise, plus others in different contexts and relationships. Increasing trends in coordinating Service Provision might be attributed in part to financial resources from the Municipality and UWSSP-II, which also points to those actors' prominence in the network.

Conclusions and Recommendations: Numerous recommendations are offered in the narrative with respect to the SNA findings; broadly, these include:

- Stakeholders credited the SWS teams for their efforts, stating that within a relatively short time, the learning alliances brought institutions together toward common goals and strengthened relationships.

- The SWS teams and learning alliances can use the SNA findings to improve coordination and strengthen relationships around specific WASH objectives. For example, to improve

coordination among actors performing similar or complementary functions, but who currently lack strong relationships.

- The core network of members should look to facilitate more advanced coordination on priorities that require higher level collaboration, such as longer term objectives like waste disposal site planning. The learning alliance should seek opportunities outside of its core membership to strengthen roles and leadership and further involve some of the non-core members.

- Learning alliance leaders can build on a solid Information-Sharing network foundation to further strengthen relationships through formal and informal means such as new forums, venues, and sharing initiatives at learning alliance meetings.

Woliso: Urban Sanitation Learning Alliance, Tetra Tech

Learning Alliance: Woliso is a town of 119,000 near the geographic center of Ethiopia, 114 km southwest of Addis Ababa and a zone administrative center. The town has tourist offerings including natural hot springs and a nearby volcanic mountain with its crater lake. The Woliso Learning Alliance established working groups and priorities in two areas: management of communal and public latrine facilities and a sludge disposal and treatment site. In 2020, the learning alliance successfully advocated for funds to purchase land for the sludge disposal site, but lack of community involvement has delayed the process.

SNA Overview: In contrast to Debre Birhan, the Woliso Learning Alliance is one of the smaller of the four learning alliances, currently with 14 members. The alliance primarily includes only government actors, plus one informal public latrine committee, making it among the least diverse in terms of its membership. The SWS team stresses, however, that this is due to the lack of NGOs and private sector working in the sanitation sector here, and thus increased need for support from SWS. SNA metrics reflect inconsistent progress from Baseline to Midterm to Endline, due to an increase in network members at Midterm and a decrease in network members at Endline. This led to decreases in some metrics from Midterm to Endline, but overall increases from Baseline to Endline. The SWS team attributes the recent decreases largely to COVID-19 lockdowns and gathering restrictions. Despite those recent declining trends, the learning alliance appears healthy with reasonable metrics across functional areas and relationships. From Baseline, the learning alliance has shown slight decreases in connections and density for Coordination and Problem-Solving, but an increase in Information-Sharing Connections and Density as well as an overall increase in Connections and Density across all relationship types. The Kumu link for the Woliso Learning Alliance can be found [here](#).

Key Network Actors: The most central actors to the network include the Municipality, Woliso Town Health Office, Water Supply and Sewage Utility, and Town Environmental Protection and Climate Change Authority Office. The active participation of most of the *kebeles* (neighborhoods) is also noteworthy.

Conclusions and Recommendations: Some of the recommendations offered in the narrative include:

- The learning alliance should seek pathways to improve higher level coordination, perhaps through activities organized around key functional and priority areas like Monitoring, Hygiene Promotion, Capacity Building or Service Provision.

- The network findings and identified core actors can be used to engage certain members to take on more leading roles in learning alliance activities in different areas of coordination.

Mille: Rural Water Learning Alliance, IRC

Learning Alliance: Mille is a rural *woreda* (district) in northeast Ethiopia, 100 km west of the Djibouti border. Of the woreda's 120,000 inhabitants, fewer than 20,000 live in the towns of Mille and Eli Wuha; the balance are primarily pastoralists, moving with their livestock in search of pasture and water. Mille is flat and arid with low rainfall, and most woreda residents experience high water scarcity. In rural areas, only 5 percent of the population has steady access to water and the proportion of people with access to safely managed water is effectively zero. Lack of funding is a major constraint to development, as well as maintenance, rehabilitation, and capacity of water supply service providers. The Mille Learning Alliance is working to develop the woreda's water systems, coordinate toward Growth and Transformation Plan II (GTP II) targets and Sustainable Development Goals (SDGs), and improve functionality, finance, and maintenance of water supply schemes. According to respondents, the learning alliance has succeeded at facilitating cooperation among different sectors, improving responses to water system maintenance, and supporting public agencies to incorporate local sector plans into a long-term master plan, which remains ongoing.

SNA Overview: The Mille Learning Alliance is the smallest of the four learning alliances, with 11 current members, although previous SNAs included a larger set of actors (23 in total; the SWS team noted that some of those were stakeholders that did not ultimately participate in the alliance, while others were NGO projects that were completed during the life of SWS). Six NGOs had participated in previous SNA surveys, but the SWS field team notes that none of those NGOs had been members of the learning alliance. In any case, the remaining members of the alliance show among the highest cohesiveness of the four learning alliances, with high Density (routinely 70 percent to 90 percent for various attribute-based sub-networks, although this is also likely in part because of the small number of members). The Kumu link for the Mille Learning Alliance can be found here.

Key Network Actors: Key network actors, according to various metrics and analyses, include the Regional Water Resource Bureau, Woreda Water Office, and Woreda Administration Office, which are core members of the network in all three types of relationships. The Mille Woreda Maintenance and Spare Part Enterprise, formed by unemployed youth, emerged during the previous period supplying spare parts for water supply and distribution in the area. The enterprise's launch can be attributed at least in part to SWS and the learning alliance, as SWS facilitated training at the Ethiopian Water Technology Institute, followed up on the construction of the enterprise shop and parts storage, and facilitated dialogue with various stakeholders throughout the process. Another new addition to the alliance is the actor noted as WASHCO (a network actor comprised of two separate WASH Committees in Mille surveyed together). This bears mention as the alliance is attempting to work with WASHCOs to improve their management schemes, tariff collection, and basic banking functions.

Conclusions and Recommendations: Some of the recommendations include:

- The SWS team might use some of the SNA results and findings to guide learning alliance members toward a pathway to sustainability, pointing out which organizations appear best positioned within the network to take on designated roles. The fact that most of the members appear prominently in various sub-networks provides an opportunity to motivate learning alliance members through positive feedback and reinforcement.

- The issue of turnover in government offices appears to be most prevalent in Mille and is one reason why agreed-upon action items are sometimes not completed between meetings.

- The learning alliance should examine opportunities to facilitate cooperation between different groups of actors, such as in key functional areas like Monitoring and Regulation, Service Provision, and/or Maintenance.

- To the extent practical, providing support to the Mille Woreda Maintenance and Spare Part Enterprise, the newly added alliance member founded by unemployed youth, would help better integrate its services into water management systems.

South Ari (Rural Water Learning Alliance, IRC)

Learning Alliance: South Ari is one of 11 woredas in the South Omo zone in the southwest corner of Ethiopia. The woreda has 46 rural kebeles, four small urban town kebeles, and a total population of about 263,000. The entirety of South Omo zone suffers from acute and severe water supply problems. Prior to the SWS project, water coverage in South Ari served only an estimated 12 percent of the area's population. The goals of the learning alliance are to gain a better understanding of the woreda's water systems; coordinate to achieve the national GTP II targets; share best practices; and improve functionality, finance, and maintenance of water schemes. Due to the nature of the region, the structure of the South Ari Learning Alliance is different from the other three: here they formed a zone-level and woreda-level alliance, with the woreda alliance subsequently split into three sub-groups, all of which conduct their meetings jointly at a single location and time. For the purposes of the SNA, however, they are treated as a single entity. Like Mille, the South Ari Learning Alliance benefitted from the USAID Lowland WASH activity (Lowland WASH), which closed before the end of SWS.

SNA Overview: The South Ari Learning Alliance has the highest number of members (23) of the four alliances (though its structure is unique), is diverse in membership, and has lost the fewest members over the life of SWS. The numbers of reported connections between members also stayed roughly constant and healthy from the previous period. At the same time, there is concern over the alliance's future due to the closeout of both SWS and Lowland WASH. The present plan, although it remains to be concluded, is that the Woreda Administration Office and/or the Woreda Water, Mine and Energy Office will take over facilitation of the alliances. The Kumu link for the South Ari Learning Alliance can be found here.

Key Network Actors: Three actors served as core members in all three relationship types: Zone Water, Mine and Energy Department; Woreda Water, Mine and Energy Office; and Gazer Town Water Utility. Lowland WASH was a core actor in Information-Sharing and Problem-Solving, illustrating its key

role in supporting the network together with SWS. Other prominent actors appearing in the various analyses include three new NGO members: Action for Development, which will pilot sand dams in the region; World Vision's Area Program, which will intervene in WASH, education, livelihoods, health, and emergency response; and Arkisha Kebele Federation Head, a water users association (WUA). Other key actors include Zone Finance and Economic Development Department, Zone Education Department, and Woreda Agriculture and Natural Resources Office.

Conclusions and Recommendations: Some of the recommendations offered in the narrative include:

- The SNA can be used to show members how coordination might be enhanced in the water supply sector through the introduction of effective coordinating partners from other WASH service areas.

- The apparent health and cohesiveness of the learning alliance suggest that even a modest effort on the part of a few members can help the learning alliance to sustain its efforts going forward.

SNA Lessons Learned

In addition to the findings related to each of the four learning alliances, LINC used this opportunity to assess use of the SNA tool itself. To this end, numerous lessons learned on the tool and its implementation throughout the process are outlined below.

- **Involving Field Teams and Alliances:** LINC recognizes one of the greatest challenges in conducting the SNAs was how best to involve the SWS field teams and learning alliances in the data analysis; the field teams seconded this notion. Changes to better integrate the SNA into SWS activities could likely have improved the process from all perspectives, and while perhaps no single "correct" solution exists, this issue should remain at the forefront as the application of the SNA process is further evaluated.

- **Self-Reporting Consistency:** LINC asked organizations to self-report the sectors and functions their organization works on, as well as other attributes. The SWS field teams raised concerns about the accuracy of some of those responses; in particular, they felt that some actors inaccurately portrayed their own sectors and functions of work. In this report, SWS field teams modified those Sector and Function designations provided by respondents. A lesson learned is to consider carefully at the outset how the most accurate data can be collected. Oftentimes, that means strict reliance on survey results, which may not consider how different respondents might interpret the question, even something as simple as what activities they engage in.

- **Network Membership:** The agreed upon network boundary for these studies was "all actors involved in the learning alliance." However, SWS field teams conducted the Baseline SNA before forming the learning alliances, with the intention to use the results not only as a baseline, but also to identify potential members. This created some challenges in comparing network metrics over time and, according to the SWS field teams, inaccurate representations of network dynamics: first because network cohesiveness metrics are likely to reflect lower if non-members

are included in the analysis; and second, the decreasing number of survey respondents makes it appear that certain members dropped from the alliances, even though they may have attended some meetings but were not formally included as "members."

- **Data Interpretation:** Even on SNAs like this with limited actors and attributes, a tremendous number of ways to filter and analyze the data exist, allowing practitioners to sort and combine attributes to consider additional findings and recommendations. This report by no means provides an analysis of all possibilities but emphasizes the improvement that can be gained if field teams work closely together to make the SNA process useful for their project and beneficiaries.

Introduction

Global Sustainable WASH Systems Partnership: The Sustainable WASH Systems Learning Partnership (SWS) is a global United States Agency for International Development (USAID) cooperative agreement to identify locally driven solutions to developing robust local systems capable of sustaining water, sanitation, and hygiene (WASH) service delivery; SWS approaches are being delivered and evaluated in three countries. More information about the global partnership can be found at SWS Learning Partnership.

SWS in Ethiopia: In Ethiopia, SWS is using Social Network Analysis (SNA) to understand the relationships, interactions, and changes over time among WASH actors in four locations.

> **Small Town Sanitation:** Towns of Debre Birhan and Woliso, facilitated by Tetra Tech;

> **Rural Water Supply:** Woredas (districts) of Mille and South Ari, facilitated by IRC.

Learning Alliances: In each of the four locations, the SWS (Tetra Tech and IRC) team invited organizations (public institutions, NGOs, academic institutions, and private sector) involved in WASH systems to participate in a learning alliance. The goal of the learning alliances is to increase collaboration and knowledge sharing among stakeholders to improve efficiency, effectiveness, and sustainability of local WASH services. Local SWS facilitators support each learning alliance to develop and implement specific action plans to advance priority WASH goals and activities.

Social Network Analysis: SNA is a tool being applied in the international development field to better understand and work with networks of stakeholders, and importantly, the relationships between them. SNA provides a quantitative, objective means, using visuals ("maps"), combined with figures ("metrics") to better understand the relationships and dynamics within a system, identify opportunities to improve how actors cooperate or share information, and develop network capacity and leadership in ways that serve the system. SNA characterizes networked structures in terms of "nodes" or "actors" within systems and "connections," or the relationships and interactions that connect them. The ability to combine numerous node and connection "attributes," or descriptions, provides a powerful analysis tool, allowing practitioners to examine networks and sub-networks. They can do this by incorporating an array of properties of the actors (e.g., organization type, mission, geography) and their relationships (e.g., coordination, financial, frequency) within the system. The publicly available Kumu maps for the four locations can be found at the following links: Debre Birhan, Woliso, Mille, and South Ari.

SNA in SWS: Strengthening the underlying structure and relationships of learning alliance participants is a critical part of the approach, relevant to the program's effectiveness and sustainability. From the outset of SWS, LINC has conducted a Baseline (Feb. 2018), Midterm (July 2019), and Endline (this report) SNA of local WASH stakeholders in each of the four learning alliances. The objective of these analyses is to understand the nature and effectiveness of relationships between participating stakeholders, identify strengths and build new opportunities, and compare the state of the networks over the SWS period of performance. This report documents the results and findings of the Endline analysis and compares the results to those of the Baseline and Midterm.

Methodology

Survey Methodology

Data Collection: All three SNAs — Baseline, Midterm, and Endline (this document) — used a roster-based, whole-of-network approach to assess relationships and structure of each learning alliance. In this approach, *all* learning alliance members (as opposed to a sample) are interviewed and asked about their relationships with the other members. LINC engaged local enumerators to conduct in-person surveys and interviews and record data in tablets.

Participation: By the completion of this survey, 100 percent of the currently active learning alliance stakeholders in all four locations had been reached and interviewed. It should be noted that in all learning alliances, some turnover and fluidity has taken place, both in terms of new organizational members and institutional staff turnover, common in Ethiopia and elsewhere. In some cases, this influenced the process in terms of identifying appropriate respondents to participate; in such cases, that process is described herein.

Survey Content: The enumerator surveyed learning alliance members to ascertain certain attributes about their organizations and the nature of their relationships with other members. They considered three types of relationships: Information-Sharing, Direct Coordination, and Problem-Solving. Respondents used a list to select which current and former members they had a relationship within the past six months, which type of relationship, and several attributes about the relationship. A summary of the survey used for this analysis is presented in Table 1; the complete survey form is included in Annex 1. The enumerator recorded responses on a tablet, and uploaded responses for analysis.

Table 1: SNA Survey Overview	
Organization Attributes	**Relationships and Attributes**
Focus Sectors ☐ Water Supply ☐ Sanitation ☐ Hygiene ☐ Institutional WASH ☐ Indirect WASH Support	**Information-Sharing:** Frequency of Sharing ☐ </= once per month ☐ > once per month
Missions and Functions ☐ Monitoring and Regulation ☐ Capacity Building ☐ Advocacy ☐ Coordination ☐ Financing ☐ Community Mobilization ☐ Hygiene Promotion ☐ Research ☐ WASH Service Provision ☐ WASH Maintenance Support ☐ WASH Infrastructure Development ☐ Other (Specify)	**Direct Coordination:** Coordinated Activity Types ☐ Service Provision ☐ Maintenance and Rehabilitation ☐ Monitoring ☐ Capacity Building ☐ Community Engagement **Problem-Solving:** Status of Assistance Request ☐ Requested, Not Provided ☐ Provided, Not Resolved ☐ Provided, Resolved ☐ Support Ongoing

Endline Survey Modifications: LINC analysts made several minor changes to the survey between the Midterm and Endline based on discussions with the SWS project team and the enumerator:

- The Endline only asked new learning alliance members organizational attribute questions, assuming their data remained consistent with previous surveys.

- The Endline simplified Information-Sharing relationships, with respondents asked only about the frequency of relationships (more or less than once per month). The Baseline and Midterm asked respondents whether or not the requested information was used, which in 94 percent of cases was "Yes."

- The Endline also simplified problem-solving relationships. The previous surveys asked respondents to differentiate between requesting and providing support. The Endline eliminated this "directionality" so that requests to and from were considered together.

- In the Midterm report, participants recommended including a distinction between formal versus informal communication on the Endline survey to reduce confusion over the presence of Information-Sharing relationships between organizations that do not have formal working relationships with one another. LINC analysts considered this recommendation through two alternatives: either to phrase the relationship questions to ask about relationships "outside of formal learning alliance meetings," or to include a fourth relationship type of "Reporting" relationships. Following some discussion, a consensus emerged to phrase the question as follows: "From the list of organizations on the sheet, which ones does your organization have an Information-Sharing relationship with (providing information, receiving information, or both in the past six months. This includes face-to-face meetings, phone calls, emails, and any other sharing, but does not include learning alliance meetings, or instances where information was shared generally with a broad group rather than directly with the other organization (for example, a presentation at a conference or larger gathering)." LINC's experience has generally shown that unless you want to examine only formal or only informal connections, distinguishing between the two becomes cumbersome both for the respondent and for the analysis.

- Clarification on the type of communication between organizations would help to avoid the misinterpretation of relationships — and any perception of activities occurring outside of the formal, prescribed government channels between municipal offices/departments."

- In this Endline analysis, the enumerator only surveyed current learning alliance members; respondents could identify relationships with all current and previous learning alliance members. The enumerator gave respondents a laminated list (Annex 2) of organizations from which they selected. In this way, they gauged the extent to which members continue to draw on relationships with former members of the learning alliance.

- LINC made efforts to improve coordination between the SWS project team and enumerators, organizing a day-long meeting to review the roster, survey, and schedule to ensure that interviews took place with appropriate organizational representatives and that interviewees understood the objectives.

- Due to enumerator availability, a single enumerator (along with an SWS team member in some cases) conducted all Endline surveys. In Mille and South Ari, the SWS effort had the benefit of the separate USAID Lowland WASH Activity (Lowland WASH) operating in the region, and synergies between that project and SWS allowed IRC staff to help facilitate the alliances, as well as to help schedule and attend some of the SNA interviews.

- In this Endline survey, the Tetra Tech and IRC teams directed the enumerator to focus interviews exclusively on water sustainability issues in South Ari and Mille, and exclusively on sanitation issues in Debre Birhan and Woliso, to be clearer to all respondents. The enumerator reported that this slightly changed the focus of discussions compared with the Baseline and Midterm. This change should not affect the SNA results.

- As noted, several times, staff turnover in institutions continued to be a challenge both for the alliance and for conducting the SNA, in terms of identifying and locating the appropriate person to survey. For this Endline, in cases where the planned respondent had moved to another job or position, leaving a new member, the enumerator and SWS personnel attempted to locate the former member and survey them at their new position. This should provide more accurate responses regarding relationships over the previous six months than those that might be provided by an entirely new participant.

Plan Surveys: Planning for this Endline SNA took place primarily via virtual meetings and interactions with the SWS Tetra Tech and IRC teams during the COVID-19 pandemic. The effort required coordination among LINC, its in-country enumerator, and the IRC and Tetra Tech teams to remotely prepare and deliver the survey. LINC and the SWS teams jointly reviewed the survey instrument and actor rosters, and the SWS teams clarified the current learning alliance members. Subsequently, the SWS teams met with the enumerator to review the roster, survey and responses, and narrative and interview technique, and to schedule the interviews.

Conduct Surveys: The LINC enumerator conducted the surveys in person from late October through mid-December 2021, during which time some areas enforced certain COVID-19 pandemic restrictions. This period also coincided with civil unrest that delayed data collection in Mille and South Ari. In Mille and South Ari, IRC staff members helped to facilitate and sometimes attend the interviews. This close coordination eliminated some of the issues the enumerator and the IRC and Tetra Tech teams previously reported; despite this, some corrections needed to be made regarding actor names, institutional restructuring of some actors, whether they are or were a formal learning alliance member, as well as the accuracy and consistency of certain attributes (discussed separately below). These issues highlight the importance of coordination and communication for effective SNA in planning, as well as in interpreting and contextualizing the findings.

Considering Current Plus Former Members: Some internal debate occurred over whether to include former learning alliance members in the analysis; ultimately LINC and the field teams agreed that the former members would not be surveyed except in specific cases. The SWS teams iterated that in some cases, these actors turned out to be stakeholders, rather than former members, that had been included briefly in alliance meetings to assess their potential inclusion, and often in the case of NGOs, completed projects. In this analysis, all comparisons with the Baseline and Midterm SNA compare networks only of current members, to maintain consistency for comparing results. In most of the other analyses (i.e., where no comparison with previous network metrics was made) LINC has for the most part left those "former" actors within the networks to show their ongoing relationships; in some cases, some were named quite frequently for relevant collaboration.

Note Concerning Reciprocity: For the purposes of this report, reciprocity only refers to two actors naming one another as a connection. As noted above, LINC analysts simplified questions regarding relationships, with questions phrased as to whether or not a connection exists, not distinguishing whether or not the survey respondent made or received the request. In other words, the "directionality" of relationships (in versus out) is based on which actor *named* the relationship and not based on the direction of information flow or support provision.

Qualitative Survey: In addition to the SNA data, the enumerator asked each interviewee a series of questions to collect qualitative data to support other systems analysis activities: 1) the main problems related to water/sanitation; 2) ideas and recommendations for solutions; and 3) priority actions. All three surveys asked these questions: Baseline, Midterm, and Endline; LINC and its enumerator facilitated translations and transcripts of recordings to support further systems analysis.

SNA Platforms and Tools: The online systems mapping platform Kumu generated most of the network maps and metrics used in this report; links for each alliance are provided in the corresponding section. UCINet software provided Core-Periphery Analysis for social network data.

Draft Report Review: The SWS teams received a first draft of this report, together with a virtual presentation of the results: IRC on January 18, 2021, and Tetra Tech on January 22, 2021, on which they provided comments. On this review, the SWS teams questioned the consistency and accuracy of the sector and function data respondents self-reported. (e.g., the Woreda Agriculture and Natural Resources Office indicated sectors of sanitation and hygiene). Following discussion and consideration, LINC analysts decided to alter the sector and function attribute data with SWS team input, thereby making the analysis more consistent and accurately reflective. (In the example, the sector assigned to the Woreda Agriculture and Natural Resources Office became "Indirect WASH," as the office is not directly involved in sanitation and hygiene.) In some alliances, these changes significantly affected the analysis, as well as comparisons with the Baseline and Midterm where the original data had been obtained, but the team agreed that these changes produced a more accurate, representative data set.

Network Metrics Overview

Prior to beginning the analysis, the reader should become familiar with the following SNA terms:

- **Node, or Actor:** An organization included in the network. "Node" can be considered synonymous with "Actor(s)."

- **Connection:** A representation of a relationship between actors, illustrated by a line connecting two actors (nodes). "Out-Degree" views the connection *from* the survey respondent to another actor; "In-Degree" is then the number of times others name an actor. Each connection, therefore, represents both an In- and Out-Degree.

- **Network Size:** Number of actors (nodes) in the network.

- **Density:** The percentage of named connections of the total number of possible connections. A network where each actor is directly connected to every other actor has a density of 100 percent.

- **Degree:** The number of unique ties an actor has, an indicator of prominence or significance of the actor within the network.

- **Reciprocity:** The extent to which relationships are reciprocated (named by both respondents in the survey).

- **Average Degree:** The average number of connections of all actors in the network, which can be considered in one of two ways: 1) the average of all In-Degrees and Out-Degrees to and from each node (Kumu) or 2) considering each connection as having both an In-Degree and an Out-Degree, this method gives a product exactly half that of Kumu (UCINet). This report has standardized Baseline and Midterm figures derived from Kumu, and used the Kumu figures herein.

- **Average Distance:** The average number of steps required to get between any two actors in a network via the shortest path (calculated with UCINet previously, Kumu herein).

- **Core-Periphery:** A network analysis structure used in social and economics networks. Informally, the Core is a group of densely connected nodes, whereas Periphery consists of more sparsely connected nodes; the nodes in the Core are also reasonably well connected to those in the Periphery (provided with UCINet).

- **Closeness Centrality:** A measure of the closest distance of a given actor from all other actors; actors with high closeness can most easily spread information to the rest of the network.

- **Betweenness Centrality:** The number of times an actor lies on the shortest path between two other actors; elements with high betweenness have more control over the flow of information and act as key bridges within the network.

How to Read This Report — Interpreting and Using Network Maps

Reading Network Maps: Network maps presented in this report show "nodes" as circles in the map, which each represent an actor; and "connections" represented by lines between the nodes. The size of each node is based on its Degrees, so that more prominent actors in the network appear larger. The position of nodes in a map may vary and is not intended to reflect distance or another attribute of the network. Generally, nodes with the highest number of connections are placed near the center, while those with the fewest connections appear at the periphery.

Report Organization: This report is divided into four sections corresponding to the separate analyses for the four Ethiopian learning alliance locations:

Debre Birhan (Small Town Sanitation)

Woliso (Small Town Sanitation)

Mille (Rural Water Supply)

South Ari (Rural Water Supply)

Report Overview: Each section of the report begins with an overview of the learning alliance, then continues with a summary of main findings and recommendations. These findings and recommendations provide the content for the SWS teams' feedback to the learning alliances. LINC analysts then view all the current and former learning alliance members and their attributes, including Sectors, Functions, Type, and Coverage. They examine each of the three types of connections: Information-Sharing, Direct Coordination, and Problem-Solving. Each of these types of connections generates a sub-network of actors working with others through various relationships; for each, LINC analysts look more intently at the network to analyze how the actors interact, who are the key actors, and what improvements might be made to the system. For all cases where results can be compared with previous SNAs, side-by-side comparisons are included of Baseline and Midterm data.

Combining Filters and Attributes: The ability to combine multiple actor and connection filters, as well as individual attributes within a single filter, provides a powerful analysis tool, allowing users to examine networks and sub-networks according to a range of sub-network inclusion criteria. Aside from several examples herein, this analysis examines sub-networks based only on a single filter but may combine multiple attributes. Combining filters, such as Function + Sector, rapidly evolves into many thousands of combinations. With the Kumu links now publicly available, and with the SWS teams having received an overview of the data and usage, readers and stakeholders may wish to examine further sub-networks generated by combining filters and attributes.

Access Results via Kumu: Kumu is user-friendly and allows customizable filtering of all node and edge attributes, allowing even novice users to access the platform for more in-depth analysis. During the debriefing of this report to the SWS teams, the Kumu system with SWS data was introduced to the staff members. Links to the visualizations from each location are provided in the respective sections.

Terminology and Use of Capitalization: To provide more clarity for the reader, this report capitalizes the names of the various network attributes and metrics when referring to them by name. For example, attributes like "Water Supply" and "Sector" are capitalized when referring specifically to SNA labels. Similarly, metrics like Density and Degree are capitalized when referring to the network metric. In this report, the term "SNA" has been applied, as opposed to "ONA" (Organizational Network Analysis) used in the Baseline and Midterm reports, as it is more consistent with other similar efforts.

Debre Birhan (Urban Sanitation Learning Alliance, Tetra Tech)

Learning Alliance Overview and Initiatives

Debre Birhan Learning Alliance: Debre Birhan is a town in the Amhara Region of central Ethiopia with roughly 138,000 inhabitants; it is situated at an elevation of 2,840 meters, making it the highest-altitude town of its size in Africa. With support from Tetra Tech, the Debre Birhan Learning Alliance is focusing on improving the quality and sustainability of sanitation services in urban contexts by strengthening responsible local systems to operate more effectively and efficiently. SWS activities include:

- Developing a coordination platform (learning alliance) with representation across the sector.

- Identifying learning opportunities in priority areas.

- Facilitating activities to ensure consensus on fecal sludge dumping and management.

- Supporting the learning alliance to formulate a strategy and operationalize plans for public and communal latrines.

- Strengthening the learning alliance to advocate for sanitation investments through capacity building interventions.

Priorities and Challenges: The enumerator recorded the following challenges during the first part of the SNA survey:

- **Growth and Limited WASH Development:** Two competing issues face the town of Debre Birhan. First, it is one of the most rapidly growing towns in Ethiopia; and second, it has low development of sanitation infrastructure; these two problems compound, resulting in residents continually questioning government's actions and motives.

- **Public and Communal Latrines:** Due to the rapid growth of the town and lack of adequate infrastructure, there is a considerable shortage of public and communal latrines in slums and poor communities, as well as highly traversed areas including markets, a bus station, a sports stadium, and certain other districts.

- **Industrial Waste Disposal:** The town also faces challenges with industrial waste dumping. As no treatment plant exists for industrial waste — and few industries treat their own waste — serious issues of illegal and unregulated dumping persist; the enumerator recorded many complaints from residents regarding this issue, particularly from neighboring farmers.

- **Dumping Site:** Debre Birhan's waste dumping site is one of the largest such sites. A new temporary dumping site filled and subsequently closed after three months of service due to poor evaporation and low infiltration. The town administration has started working to secure a new fecal sludge dumping site that is expected to temporarily serve until the World Bank Second Ethiopia Urban Water Supply and Sanitation Project (UWSSP-II) intervenes with financial support to help solve the issue.

- **Unregulated Dumping:** While the town has a formal dumping site, it is not monitored or regulated, with all varieties of solid and liquid waste dumping from different actors. While the issue is covered in the town's development plan, it is not practically implemented. Learning alliance members report that this has been an issue from the outset of SWS, but little practical progress has been made.

Debre Birhan Activities: In Debre Birhan, the learning alliance identified priority activities to improve management issues related to public latrines and commissioned a new municipal effluent disposal site for fecal and industrial waste to replace the old site closed in 2018. Since its launch, the learning alliance has participated in meetings, trainings, and learning exchange visits and has implemented an action research agenda related to its goals. Due to COVID-19 restrictions, the team did not hold learning alliance meetings or other events from January through late-August 2020. Twenty-two members attended a learning alliance meeting on August 24, 2020. According to the November 2020 semiannual report, the following priority activities are completed and ongoing:

- **World Bank Support:** Debre Birhan is benefitting from the government-led World Bank UWSSP-II, which is assisting in many WASH–related areas, including infrastructure financing, advisory services, and capacity building.

- **Sanitation Budget:** The town government allocated US $902,000 for sanitation activities in FY 2021, an increase of 68 percent from the previous year. Also, only $60,400 (22 percent) of the town's FY 2020 budget from the World Bank Urban Local Government Development Project was allocated to construction of sanitation facilities.

- **Learning Visit:** Members participated in a three-day learning visit to Hawassa to see and discuss the town's approach to fecal and solid waste management, shared sanitation facilities, and public-private partnerships in waste management.

- **Public and Communal Latrines:** The learning alliance assigned a seven-member working group to develop management guidelines to reestablish and train communal latrine management committees in line with its Action Plan. The working group identified opportunities for improvements to two public and three communal facilities recently constructed through a Municipality and Debre Birhan University joint venture. All new facilities will take part in an SWS–developed Communal and Public Latrine Management training. In feedback on the initial draft of this report the SWS team noted, "until now there are no communal and public latrine maintenance activities in the town. Municipal office, UWSSP-II, and Debre Birhan University are constructing new communal and public latrines. Yes, there is demand from communal latrine user groups for maintenance support from sector stakeholders, but the learning alliance is empowering user groups to collect user fees and conduct maintenance by themselves to sustain their services and build ownership."

- **Sludge Disposal Site:** Completion and operationalization occurred at the planned fecal sludge disposal site; however, the site closed three months after its completion and no longer operates.

Nearby communities complained about seepage and pollution from overflowing trenches, as it appears the Municipality granted access to three nearby factories without consulting the utility, despite its initial designation as only for residential waste. This issue remains a key point of contention between parties, and the learning alliance agreed that mediation support is necessary to develop an acceptable permanent solution.

Timeline: Debre Birhan was selected as an SWS site after the other three locales (and after completion of the original Baseline SNA in those three); the learning alliance convened its first meeting in September 2018. Thus, changes in the network between the Baseline and Midterm SNAs represented a shorter duration than in the other three locations.

Debre Birhan SNA Findings and Recommendations

Summary: The Debre Birhan Learning Alliance is one of the largest of the four learning alliances (currently 20 members). The alliance is a positive example of inter-sector participation, with members representing multiple levels of public administration, NGOs, private sector, donor, and academics, making it the most diverse of the alliances. Despite some turnover within organizations, the participating institutions have remained committed and consistent. The strength and cohesiveness of the network increased successively from the Baseline to Midterm to Endline SNAs in all three types of relationships. In feedback from the draft version of this report, the SWS team reports numerous alliance achievements since the Midterm, including increased participation of decision-makers, increased town sanitation budget, and increased dialogue across sanitation issues. This is reinforced in the SNA findings through the significantly increasing connections of all types. Overall, the SNA shows significant network strengthening, SWS staff testimony backs this up when discussing their activities and observations. The Kumu link for the Debre Birhan Learning Alliance can be found here.

Relationship Types and Linkages: The connections between alliance members increased in all three types of relationships and successively in each SNA. Information-Sharing relationships are the most common (224 connections), followed by Direct Coordination (105), and then Problem-Solving (99). Cooperation between members extends outside the immediate alliance and continues with former members and stakeholders surveyed in the Baseline and/or Midterm. The average number of connections of each actor (Average Degree) also increased for all three types of relationships.

Actor Sectors and Functions: Most Debre Birhan Alliance members are concerned primarily with the Sanitation (18 actors, 123 connections) and Hygiene (11 actors, 47 connections) sectors. The most common organizational functions of learning alliance members are: Hygiene Promotion, Capacity Building, Community Mobilization, Monitoring and Regulation, and then Advocacy; these networks have the most actors, and the highest Average Degree.

> *Recommendation: Learning alliance members might use these results to improve coordination and strengthen relationships around some of these specific WASH objectives; for example, work toward common advocacy goals, collaborate on synergistic capacity building or community mobilization initiatives, or improve coordination in service delivery and monitoring. (The SWS team acknowledged this suggestion and noted that the efforts of stakeholders so far to improve the town's sanitation systems are already*

positive within a short time, and that bringing institutions together toward common goals and behavior changes takes time, energy, and resources.)

Network Cores: LINC's Core-Periphery analysis reveals seven core actors, six of whom appear in the cores of all three relationship types, indicating a centralized core network structure governing all types of relationships.

> *Recommendation: The alliance might look for opportunities to strengthen leadership within the alliance to involve non-traditional members. On the positive side, this situation might lead to opportunities to plan and implement more advanced coordinated activities and priorities that require high-level collaboration between key public institutions.*

Information-Sharing Network: The number of reported instances of Information-Sharing relationships increased 42 percent to 202 reported connections during the Endline period; 39 percent of reported connections occur more frequently than once per month. Each surveyed actor cited an average of 10.7 Information-Sharing connections with other current and former members. The actors named all six of the former members at least once, indicating a level of impact beyond the immediate membership of the learning alliance. The top actors measured by network metrics include: Water Supply and Sewage Enterprise, Debre Birhan Town Health Office, and Municipality (Sanitation and Beautification Core Process). These actors also figured prominently in the Baseline and Midterm analyses and superseded the previous prominence of some kebeles (namely, 06 and 09).

> *Recommendation: Going forward, learning alliance leaders might build on this already solid foundation and try to further strengthen Information-Sharing through more formal, routine channels and forums.*

Coordination Network: There are significantly fewer Coordination (99) than Information-Sharing (224) connections and thus, a lower Density network. The top actors in network cohesion metrics are similar to those in Information-Sharing; UWSSP-II also appears to be prominent since having recently joined the network. Respondents reported increases in all types of Coordination activities; Service Provision and Community Engagement are the most cited areas overall, but the most marked *increases* occurred in the areas of Service Provision (+134% increase), Maintenance and Rehabilitation (+145%), and Monitoring (+79%). (The SWS team noted that no Sanitation Maintenance activities exist, so respondents may have been referring to activities less related to sanitation and the alliance specifically.) The increase in coordination in Service Provision might be attributed in part to the allocation of financial resources from the town government and UWSSP-II for construction of sanitation facilities. This as well likely contributes to UWSSP-II's prominence in the Coordination network metrics. Debre Birhan's working group to develop guidelines to reestablish and train communal latrine management committees may also have strengthened coordination.

Problem-Solving Network: Respondents cited Problem-Solving relationships as the second-most common, with 105 stated connections. The most prominent actors were generally consistent with the other relationship types, but the cases of private sector actors Dashen Brewery and Habesha Brewery appear prominently in In-Degree and Betweenness, respectively; perhaps this could serve as a

springboard for further integration of the private sector into the alliance. Respondents reported on the outcomes of Problem-Solving relationships; in 64 percent of cases, "Support was Provided and Problem Resolved," the highest percentage of case resolution of the four learning alliances analyzed. In an additional 19 percent of cases, "Support Was Provided but Problem Remained Unresolved." The learning alliance appears to be functioning at a high level in the area of members collaborating to resolve urban sanitation challenges.

Learning Alliance Members and Attributes

Surveyed Members: Table DB-1 below presents the learning alliance members surveyed in the Baseline (17 in total), Midterm (19), and Endline (21) SNA surveys. The Endline survey includes three new actors added to the learning alliance, while one dropped out. Of the 21 actors surveyed in the Endline, 20 participate in the learning alliance; the enumerator surveyed Communal Latrine Operator (located next to Selassie Orthodox Church), but it is not a formal member of the alliance.

Table DB-1: Debre Birhan Learning Alliance			
Surveyed Alliance and Network Members			
Organization	Baseline	Midterm	Endline
Agriculture and Land Admin. Office	✓	✓	✓
Amanuel Development Organization	✓	✓	✓
Communal Latrine Operator (Selassie Orthodox Church) *	✓	✓	✓
Culture and Tourism Office		✓	✓
Dashen Brewery			✓
Debre Berhan Town Health Office	✓	✓	✓
Debre Berhan University	✓	✓	✓
Debre Birhan UWSSP-II (Government-Implemented)			✓
Finance and Local Economic Development Office	✓	✓	✓
Habesha Brewery			✓
Health Extension Office (Kebele 06)	✓		
Housing Development Core Process	✓		
Kebele 02	✓	✓	✓
Kebele 03	✓	✓	✓
Kebele 05		✓	✓
Kebele 06	✓	✓	✓
Kebele 07		✓	✓
Kebele 09		✓	
Municipality (Sanitation and Beautification Core Process)	✓	✓	✓
North Shewa Zone Land Administration and Use		✓	✓
Public Latrine Operator (Chair)	✓	✓	✓
Trade and Industry Office (Trade and Market Development)	✓	✓	✓
Urban Land and Housing Management Office **	✓		
Urban Land Registration and Information Office **		✓	✓

Table DB-1: Debre Birhan Learning Alliance			
Surveyed Alliance and Network Members			
Organization	Baseline	Midterm	Endline
Vacuum Truck Emptying Company	✓		
Water Supply and Sewage Enterprise	✓	✓	✓

* Surveyed in Endline, but not a formal member of learning alliance.
** During Baseline, these were same organization (Urban Land and Housing Management Office).

Organization Types, Coverage, and Sectors: Table DB-2 (right) summarizes the types and numbers of members currently in the alliance (right column) against those counted in previous periods (middle column). Table DB-3 (below) provides a detailed summary for all organizations currently or previously included in the learning alliance, their type (legal form), geographical coverage, and sectors of work

Table DB-2: Surveyed Learning Alliance Members		
Type	Members (incl. Former)	Members (Current)
Town Government Offices	10	8
Kebele Administrations	7	5
Private Sector	4	3
Zone Government	1	1
Community Representative	1	1
NGOs	1	1
Donor Project	1	1
Academic Institution	1	1

within WASH systems. The enumerator originally collected responses to this question during the first interview of the actor (Baseline, Midterm, or Endline); however, the SWS team stated that it inconsistently applied responses, and therefore, it later assigned revised attributes for both Sectors and Functions. Eighteen actors are government institutions, four are private sector, and one each of the other types. As the Debre Birhan Learning Alliance focuses on sanitation issues, note that nearly all surveyed organizations indicated sanitation and/or hygiene as a focus sector. Table DB-3 can be used to identify common areas of focus should learning alliance activities continue or expand going forward. Note that actors that are no longer members of the alliance are indicated by an asterisk (*).

Table DB-3: Debre Birhan Learning Alliance							
Organization Types, Coverage, and Focus Sectors							
Organization	Type	Geography	Sectors				
			Water Supply	Sanitation	Hygiene	Institut. WASH	Indirect WASH
Agriculture and Land Admin. Office	Government	Town					✓
Amanuel Development Organization	NGO	Region	✓	✓	✓		
Communal Latrine Operator (Selassie Orthodox Church)*	Community Rep.	Town		✓	✓		
Culture and Tourism Office	Government	Town					✓
Dashen Brewery	Private	Town		✓			✓

Table DB-3: Debre Birhan Learning Alliance							
Organization Types, Coverage, and Focus Sectors							
Organization	Type	Geography	Sectors				
			Water Supply	Sanitation	Hygiene	Institut. WASH	Indirect WASH
Debre Berhan Town Health Office	Government	Town		✓	✓	✓	
Debre Berhan University	Academic	Zone		✓	✓	✓	
Debre Birhan UWSSP-II (Govt.-Implemented)	Donor	Town	✓	✓			
Finance and Local Economic Development Office	Government	Town					✓
Habesha Brewery	Private	Town		✓			✓
Health Extension Office (Kebele 06)*	Government	Kebele		✓	✓	✓	
Housing Development Core Process*	Government	Town					✓
Kebele 02	Government	Kebele		✓	✓	✓	
Kebele 03	Government	Kebele		✓	✓	✓	
Kebele 05	Government	Kebele		✓	✓	✓	
Kebele 06	Government	Kebele		✓	✓		
Kebele 07	Government	Kebele		✓	✓	✓	
Kebele 09 *	Government	Kebele		✓	✓	✓	
Municipality (Sanitation and Beautification Core Process)	Government	Town		✓			
North Shewa Zone Land Administration and Use	Government	Zone					✓
Public Latrine Operator (Chair)	Private	Region		✓			
Trade and Industry Office (Trade and market development)	Government	Town					✓
Urban Land and Housing Management Office *	Government	Town					✓
Urban Land Registration and Information Office	Government	Town					✓
Vacuum Truck Emptying Company *	Private	Town		✓			
Water Supply and Sewage Enterprise	Government	Town	✓	✓			

Not currently a member of the learning alliance.

Organization Functions and Services: Table DB-4 on the following page presents the functions and services that each current and former learning alliance member provides. The enumerator initially asked organizations this question, but upon review of the initial draft of this report the SWS team requested a

revision of the Functions to reflect more accurate and consistent responses in line with what functions each serves. (The SWS team provided this data. In some cases, it is significantly different from what respondents provided. The field team stated that this provides the best set of data.) LINC collected similar data during the Baseline and Midterm surveys, but it did not heavily analyze it in the report, so the issue does not affect comparisons with Baseline and Midterm results. Also, two actors, North Shewa Zone Land Administration and Use, and Public Latrine Operator had no checked responses, so treating the issue in this manner may resolve other minor issues as well. Again, organizations not presently members of the learning alliance are indicated by an asterisk (*).

Table DB-4: Debre Birhan Learning Alliance

Organization Functions and Services

Organization	Monitoring Regulation	Capacity Bldg.	Advocacy	Coordination	Finance	Community Mobilize	Hygiene Promotion	Research	WASH Service Provision	WASH Maintenance Support	WASH Infrastructure Development
Agriculture and Land Administration Office	✓										
Amanuel Development Organization		☞	✓	✓	☞	☞	✓				✓
Communal Latrine Operator (Selassie Orthodox Church) *							✓			☞	
Culture and Tourism Office		✓					☞				
Dashen Brewery	✓	✓	☞		✓	☞	☞			☞	✓
Debre Berhan Town Health Office	✓	✓	✓	✓		✓	✓	✓		✓	
Debre Berhan University		☞	✓		☞	✓	☞	✓		☞	✓
UWSSP-II (Government-Implemented)		☞	☞	☞	✓	✓	☞			✓	✓
Finance and Local Economic Development Office	✓					☞					
Habesha Brewery	☞	☞	☞		✓	✓	☞		✓	✓	☞
Health Extension Office (Kebele 06) *	☞	✓	✓	☞		☞	✓				
Housing Development Core Process *	✓										
Kebele 02	☞	☞	✓	✓		✓	✓			✓	
Kebele 03	✓	☞	☞	☞		☞	☞				
Kebele 05	☞	☞	☞	☞		☞	✓				
Kebele 06	☞	☞	☞	☞		☞	✓				
Kebele 07	☞	☞	☞	☞		☞	✓				
Kebele 09 *	✓	✓	☞	☞	☞	☞	✓				
Municipality (Sanitation and Beautification Core Process)	☞	✓	✓	☞		☞	☞		☞	☞	☞
North Shewa Zone Land Administration and Use	✓		✓	✓		✓				☞	
Public Latrine Operator (Chair)						✓	✓		✓		
Trade and Industry Office (Trade and Market Development)		✓									
Urban Land and Housing Management Office *							✓				
Urban Land Registration and Information Office	✓	✓		✓	✓	✓				✓	
Vacuum Truck Emptying Company *									☞		
Water Supply and Sewage Enterprise	✓	☞	☞	☞	☞	☞	☞		☞	☞	☞

* Not currently a member of the learning alliance.

Debre Birhan Learning Alliance Network Snapshot

Overall Network Metrics:
Table DB-5 (right) compares the network metrics for the Debre Birhan Learning Alliance, following the survey results from the Baseline (gray, second from the left) through Midterm (center) and Endline (right) periods. The table summarizes the network metrics for the overall network (top section), and for each of the three types of relationships (Information-Sharing, Direct Coordination, and Problem-Solving). To provide a direct comparison with previous surveys, the metrics shown here include the active network of current learning alliance members, 100 percent of whom were surveyed. Responses were reported for the *previous six months*.

Network Size and Connections: The size of the learning alliance and the number of connections between members increased in all three types of relationships, from Baseline to Midterm, and Midterm to Endline, demonstrating increasing

Table DB-5: Debre Birhan Network Snapshot					
Metric Changes from Baseline to Midterm to Endline					
Metric	**Baseline**	**Midterm**	**Change**	**Endline**	**Change***
Overall Network					
Size: Current Members	16	19	+19%	21**	+11%
Connections	96	208	+119%	205	0%
Information-Sharing					
Connections	77	142	+82%	202	+42%
Density	28%	47%	+68%	48%	+2%
Average Degree	9.06	14.20	+57%	19.24	+35%
Average Distance	1.72	1.38	-20%	1.38	0%
Direct Coordination					
Connections	20	78	+290%	86	+10%
Density	22%	35%	+59%	20%	-43%
Average Degree	2.86	6.32	+121%	8.19	+30%
Average Distance	2.05	1.63	-20%	1.71	+5%
Problem-Solving					
Connections	71	81	+14%	97	+20%
Density	26%	21%	-19%	23%	+10%
Average Degree	8.36	8.10	-3%	9.24	+14%
Average Distance	1.59	1.68	+6%	1.68	0%

* Percent Change from the Midterm.
** Includes Communal Latrine Operator (Selassie Orthodox Church), who was surveyed but not officially a member.

instances and depth of relationships. Information-Sharing relationships are the most common type of relationship between learning alliance members (224 connections), followed by Direct Coordination (105) and then Problem-Solving (99). As will be discussed below, cooperation between members has extended outside the immediate alliance, and continues with ongoing connections with all six former members.

Network Metrics: Network Density remained relatively consistent with the Midterm period, as the increased Connections are offset by the increased Size. Degree is a good indicator for purposes of the Snapshot; Average Degree represents the average number of connections for all actors. This metric positively increased for all types of relationships. Average Distance represents the average number of steps to get from each actor to every other actor; as shown in the table, Distance increased marginally, though it is generally low (2.0 and less), indicating efficient reach ability within the network (a lower Distance value represents higher cohesive).
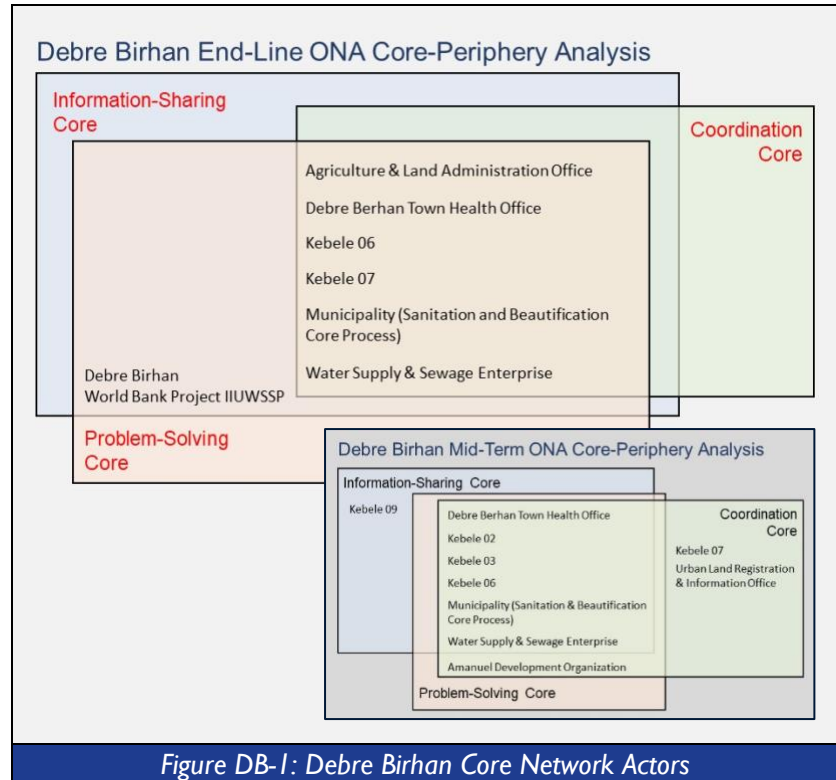
Figure DB-1: Debre Birhan Core Network Actors

Core Network Actors

Core-Periphery Model: Figure DB-1 shows the core network actors for each type of relationship, and where they overlap. As shown in the diagram, in Debre Birhan, the core actors have converged, serving primary roles in all three relationship types. Seven actors in total are included in network cores, six of which are included in all three cores and one (UWSSP-II) which is included in Information-Sharing and Problem-Solving cores, but absent a role in the Coordination core.

Comparison with Midterm SNA: Comparing this result with the Midterm Analysis, some changes occurred in network dynamics, as the composition of the network cores illustrates.

Network Cores: Seven "core" actors are identified in the Endline Network Core-Periphery Analysis (Figure DB-1), six of which are included in the cores of all three types of relationships. Comparing core actors with the Midterm analysis (inset), the core actors have increasingly consolidated across the three types of relationships. Actors residing only in the periphery are not shown in the diagram.

Core Changes: Notable core actors that appeared in the Midterm SNA but are absent from the Endline are Amanuel Development Organization; kebeles 02, 03, and 09; and Urban Land Registration and Information Office. UWSSP-II and the Agriculture and Land Administration Office are new cores appearing in the Endline period. In both the Midterm and Endline, core actors are primarily included in all three cores, though some of the core actors have changed.

Sector-Based Analysis

Sector-Based Network Metrics: Using the Kumu tool, sub-networks can be examined by indicated sector. Figure DB-2 presents key network metrics for each of the five WASH sectors (left column). The Debre Birhan Learning Alliance focuses on sanitation, specifically improving communal and public latrines and fecal sludge management, which addresses both the Sanitation and Hygiene sectors. Comparing the two network maps in Figure DB-2, Sanitation (left) includes 18 actors with 123 connections, network Density of 40 percent, and high Reciprocity of 66 percent. The actors working in Hygiene network are somewhat smaller in number but include many of the same players: 11 actors, 47 connections, and similar rates of Density and Reciprocity.

Sector	Actors	Connections	Density	Avg. Degree	Reciprocity
Sanitation	18	123	40%	13.67	66%
Hygiene	11	47	43%	8.55	62%
Indirect WASH	10	24	27%	4.80	33%
Institutional WASH	8	22	39%	5.50	57%
Water Supply	3	3	50%	2.00	50%

Figure DB-2: Debre Birhan Sector-Based Analysis
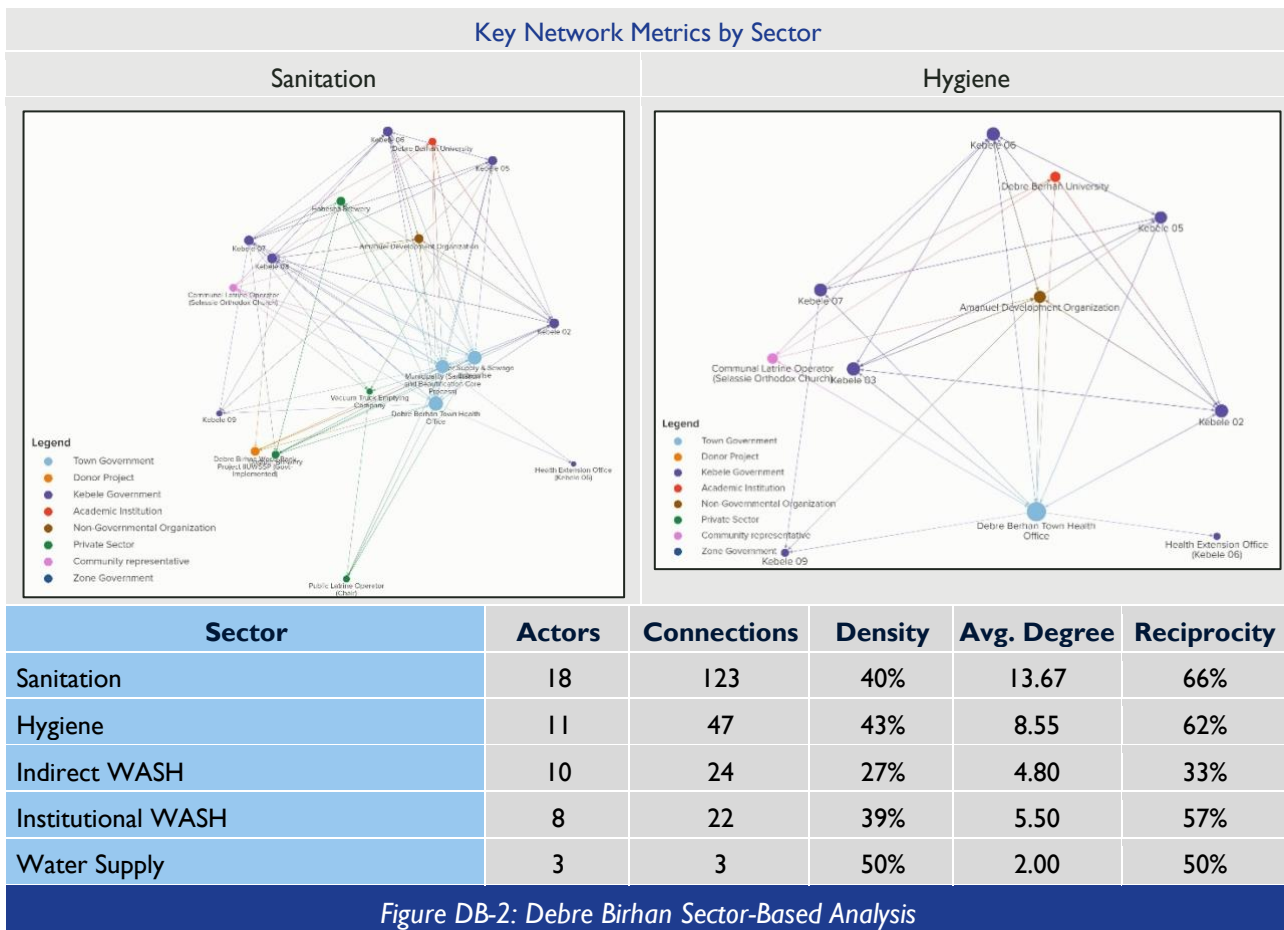
Analysis: Looking at the table and focusing on the Sanitation and Hygiene (top two) sectors, the high Density, Average Degree, and Reciprocity illustrate a cohesive learning alliance network focused on their priorities. Note also that the 10 actors working in Indirect WASH exhibit the lowest cohesion metrics, with Density (27 percent) and Reciprocity (33 percent) reflecting seemingly less-close coordination and contact.

Data Collection and Overview: The metrics in the table in Figure DB-2 include all current and former learning alliance members and represent all three types of connections (Information-Sharing, Direct Coordination, and Problem-Solving). The survey allowed for multiple selections, so the sectors are not exclusive of one another. It is also noted that the SWS team recategorized the sectors of some actors following the initial review of this report to ensure greater accuracy and consistency in responses. LINC agrees that this reflects the most accurate data and analysis, and in most cases, changes were not dramatic.

Function/Mission-Based Analysis

Alliance Functions and Metrics: Figure DB-3 presents sub-networks and metrics by indicated organizational function or mission; again, the enumerator allowed multiple selections to be made. The most cited organizational functions are Hygiene Promotion (19 actors), Capacity Building (18), Community Mobilization (18), Monitoring and Regulation (16), and Advocacy (16). The most cohesive sub-networks as measured by Density (highlighted yellow) are those working on WASH Maintenance Support (77 percent), Coordination (53 percent), Advocacy (52 percent), and WASH Service Provision (52 percent). Function-based sub-networks illustrating the highest reciprocal relationships are WASH Infrastructure Development (91 percent), WASH Maintenance Support (79 percent), and WASH Service Provision (71 percent).

Key Network Metrics by Function					
Hygiene Promotion			Capacity Building		
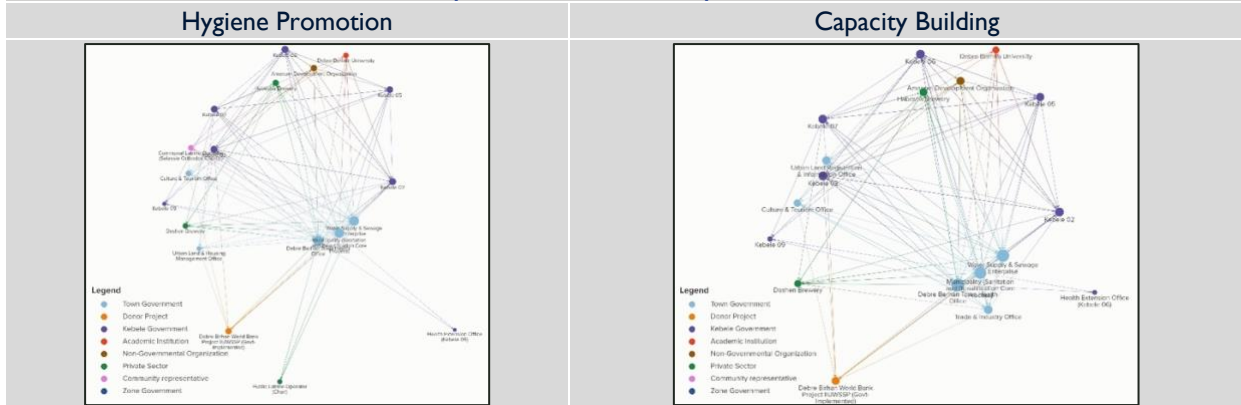
Mission/Function	Actors	Connections	Density	Avg. Degree	Reciprocity
Hygiene Promotion	19	135	39%	14.21	59%
Capacity Building	18	141	46%	15.67	55%
Community Mobilization	18	137	45%	15.22	63%
Monitoring and Regulation	17	124	46%	14.59	61%
Advocacy	16	116	48%	14.50	68%
Coordination	14	97	53%	13.86	62%
Financing	9	24	33%	5.33	50%
WASH Maintenance Support	8	43	77%	10.75	79%
WASH Infrastructure Development	7	21	50%	6.00	91%
WASH Service Provision	8	29	52%	7.25	71%
Research	2	1	50%	1.00	0%

Note: *Orange-highlighted cells reflect highest figures (see narrative). Sub-networks with the highest numbers of actors logically also have the highest numbers of connections and degrees.*

Figure DB-3: Debre Birhan Function-Based Analysis

Data Source Comparison: As noted previously, the SWS teams ultimately assigned Functions in the interest of consistency. Generally, this had the effect of significantly increasing the number and type of Functions for many of the organizations, most notably those serving functions of Monitoring and Regulation, Capacity Building, Advocacy, Coordination, Community Mobilization, and Hygiene Promotion. Table DB-6 compares the differences between the original respondent surveys versus the functions assigned by the SWS teams. Some noteworthy observations

Function	Survey Responses		SWS Teams	
	Actors	**Connections**	**Actors**	**Connections**
Hygiene Promotion	11	37	19	135
Capacity Building	8	23	18	141
Community Mobilization	8	26	18	137
Monitoring and Regulation	11	40	17	124
Advocacy	7	22	16	116
Coordination	5	13	14	97
Financing	5	8	9	24
WASH Maintenance Support	5	13	8	43
WASH Infrastructure Dev.	4	0	7	21
WASH Service Provision	3	1	8	29
Research	2	1	2	1

Table DB-6: Debre Birhan Actor "Functions" — Comparison between Survey and SWS Team Designations

are that the SWS teams identified 18 organizations performing Capacity Building and Community Mobilization, versus only eight organizations self-selecting in both cases; 16 involved in Advocacy, versus only seven self-selecting; and 14 working in Coordination, versus only five self-selecting. This is a good illustration to note the importance of consistent data because, as shown in Table DB-6, changing just the actor Function had profound effects on those sub-network metrics. This also had the effect to somewhat "homogenize" many of the Function-based sub-networks, since many of them now include essentially the same actors (and thus, similar metric values). On the other hand, Reciprocity increased in most cases despite the larger network sizes, perhaps indicating that LINC analysts correctly assumed that the SWS team's designations are the more accurate.

Integrate Functions to Address Priorities: SWS and alliance members might use these results to improve coordination and strengthen relationships around certain WASH objectives, such as working toward common Advocacy goals; working together on synergistic Capacity Building or Community Mobilization initiatives; or improving Coordination in WASH Service Provision, Maintenance, or Monitoring.

Information-Sharing Relationships

Information-Sharing Network: Figure DB-4 below illustrates the Information-Sharing sub-network map and prominent network actors according to In-Degree (most oft-cited by other respondents), Closeness Centrality (closest distance to all other actors, effective at spreading information), and Betweenness Centrality (most often lie on the shortest path between any two other actors, effectively serving as bridges between actors). The top-three actors in all three metrics are the same, although in different order; these are Debre Birhan Town Health Office, Water Supply and Sewage Enterprise, and

Municipality (Sanitation and Beautification Core Process). From Rank 4 onward, note the differences in the roles that other actors play in the network. This network representation includes all current and former learning alliance members.

Network: Debre Birhan Information-Sharing Network All Current and Former Members	**Network Metrics:** Actors: 26 Connections: 224 Density: 34%

Note: Dark blue lines represent frequent (>1/month) Information-Sharing. Light blue represents less frequent (<1/month) Information-Sharing.

Top Eight Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Water Supply and Sewage Enterprise	Debre Berhan Town Health Office	Debre Berhan Town Health Office
2	Debre Berhan Town Health Office	Water Supply and Sewage Enterprise	Water Supply and Sewage Enterprise
3	Municipality (Sanit. and Beaut. Core Process)	Municipality (Sanit. and Beaut. Core Process)	Municipality (Sanit. and Beaut. Core Process)
4	Agriculture and. Land Admin. Office	Kebele 07	Trade and Industry Office
5	Kebele 06	Kebele 03	Kebele 02
6	Kebele 02	Kebele 05	Agriculture and. Land Admin. Office
7	Finance and Local Econ. Dev. Office	Trade and Industry Office	Kebele 06
8	Urban Land Reg. and Info. Office	Kebele 02	Kebele 03

Figure DB-4: Debre Birhan Information-Sharing Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Betweenness Centrality for the Information-Sharing relationships; Table DB-7 compares the top five Betweenness (bridging) actors from the Baseline, Midterm, and Endline SNAs. As shown, several actors' roles have evolved over time. The Debre Birhan Town Health Office, Water Supply and Sewage Enterprise, and Municipality (Sanitation and Beautification Core Process) have consistently remained, while

Table DB-7: Debre Birhan Prominent Actors		
Betweenness Centrality (Bridging Actors)		
Baseline	**Midterm**	**Endline**
Water Supply and Sewage Enterprise	Kebele 09	Debre Berhan Town Health Office
Debre Berhan Town Health Office	Water Supply and Sewage Enterprise	Water Supply and Sewage Enterprise
Kebele 06	Debre Birhan University	Municipality (Sanit. and Beaut. Core Process)
Amanuel Dev. Org.	Municipality (Sanit. and Beaut. Core Process)	Trade and Industry Office
Urban Land and Housing Mgt. Office	Debre Berhan Town Health Office	Kebele 02

other actors have risen or declined in Betweenness prominence. A different kebele appears in the top-five slot for each SNA period (in order from Baseline: Kebele 06, Kebele 09, and Kebele 02). All the Endline leaders in Betweenness are public institutions.

Frequency of Information-Sharing: The enumerator asked survey respondents which other current and former learning alliance members they shared information with during the past six months outside of alliance meetings, and how often they engaged—more or less than once per month. Results are presented in Figure DB-5, alongside the results from the Baseline and Midterm analyses. As shown, Information-Sharing between learning

Figure DB-5 Debre Birhan Information Sharing
Frequency of Sharing

Figure DB-5: Debre Birhan Information-Sharing
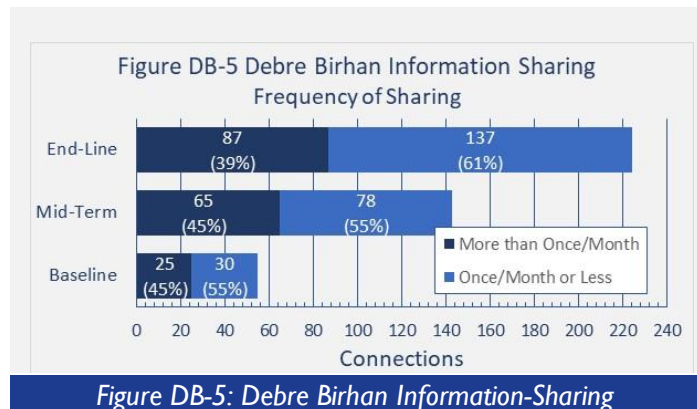
alliance members increased markedly from the Baseline (55 total connections) to Midterm (143 connections) and Endline (224 connections) periods. The proportion of frequent (>1/month) to infrequent (<1/month) remained relatively constant, but the overall increase in Information-Sharing is evident.

Information-Sharing Relationships: In the current Endline survey, all 21 stakeholders surveyed (20 learning alliance members plus Communal Latrine Operator) indicated an average of 10.7 Information-Sharing relationships with other current and former Learning members with whom they remain in contact. Going forward, learning alliance leaders might build on this already solid foundation by further strengthening Information-Sharing through both formal and informal means, such as new forums, venues, and sharing initiatives at alliance meetings.

Debre Birhan Kebele Information-Sharing: The Baseline and Midterm SNAs reported on the connectivity of Debre Birhan kebeles in Information-Sharing relationships, noting the significantly increased connectivity developing over time. Figure DB-6 compares kebele connectivity in Debre Birhan, incorporating the Endline data. Results are comparable to the Midterm, with the six kebeles having 17 connections in the Midterm versus 15 in the Endline. In the Midterm, 5 of 17 connections were reported to be "frequent," versus 3 of 15 reported to be "frequent" in the Endline. (In the Endline map in Figure DB-6, "frequent" connections are colored dark blue.)

Network: Debre Birhan
　　　　Institution Type: Kebele
　　　　Relationship: Information-Sharing

| Baseline | Midterm | Endline |

Figure DB-6: Debre Birhan Kebele Information-Sharing

Information-Sharing with Former Members and Actors: Five actors who previously participated in the learning alliance and/or a previous SNA survey but who are not members of the alliance remained included as potential survey responses. (Thus, it is only possible for them to have In-Degree connections and not Out-Degree connections.) As an indicator of their continued importance in Debre Birhan sanitation activities, Table DB-8 presents these actors and the number of Information-Sharing relationships cited by current alliance members. As shown in the table, the Urban Land and Housing Management Office, Vacuum Truck Emptying Company, and Kebele 09 remain relatively prominent participants in Information-Sharing. For reference, the Average In-Degree for all actors is 8.6 and the Median In-Degree is 8.

Table DB-8: Debre Birhan Information-Sharing	
Former Surveyed Members and Actors	
Former Learning Alliance Member	**In-Degree**
Urban Land and Housing Mgt. Office (Housing Development Core Process)	9
Vacuum Truck Emptying Company	6
Kebele 09	5
Communal Latrine Operator (Selassie Orthodox Church)	3
Health Extension Office (Kebele 06)	2

Coordination Relationships

Coordination Network: Figure DB-7 below illustrates the Coordination sub-network map and prominent network actors according to In-Degree, Closeness, and Betweenness Centrality. There are Significantly fewer Coordination connections (99) have been made than Information-Sharing (224); this is logical as it is a generally deeper and more complex type of relationship than Information-Sharing. The most prominent actors are generally consistent with those from the Information-Sharing relationships, with Debre Birhan Town Health Office, Municipality (Sanitation and Beautification Core Process), and Water Supply and Sewage Enterprise ranking as the top three (Water Supply and Sewage Enterprise ranks eighth in Closeness). While UWSSP-II did not rank in the top eight in In-Degree, it serves a key role in the network as a bridging actor and disseminator of information. Per SWS teams' feedback, the

learning alliance framework is on a voluntary and mutual basis; they state that coordination is working very well on a formal accountability level (this can be easily observed in the network map below, with central, well-connected Town Government actors).

Network: Debre Birhan Coordination Network All Current and Former Members	Network Metrics: Actors: 26 Connections: 99 Density: 15%

Top Eight Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Debre Berhan Town Health Office	Debre Berhan Town Health Office	Debre Berhan Town Health Office
2	Municipality (Sanit. and Beaut. Core Process)	Municipality (Sanit. and Beaut. Core Process)	Municipality (Sanit. and Beaut. Core Process)
3	Water Supply and Sewage Enterprise	Kebele 07	Water Supply and Sewage Enterprise
4	Kebele 06	Ag and Land Admin Office	UWSSP-II
5	Kebele 09	Finance and Local Econ. Dev. Office	Trade and Industry Office
6	Ag and Land Admin Office	UWSSP-II	Kebele 02
7	Kebele 02	Trade and Industry Office	Ag and Land Admin Office
8	Kebele 05	Water Supply and Sewage Enterprise	Urban Land Reg. and Info. Office

Figure DB-7: Debre Birhan Coordination Network Map and Prominent Actors

**Prominent Actor Comparison with Previous SNAs:** The Baseline and Midterm SNAs examined the Closeness Centrality for the Coordination relationships; Table DB-9 compares the top five Closeness (information-spreading) actors from the Baseline, Midterm, and Endline SNAs. Various of the actors' roles have again evolved over time. Amanuel Development Organization served a more prominent role in the network in previous periods (they currently reside fifteenth in the Endline), while UWSSP-II and the Trade and Industry Office now have greater potential to serve

Table DB-9: Debre Birhan Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	**Midterm**	**Endline**
Kebele 06	Amanuel Dev. Org.	Debre Berhan Town Health Office
Debre Berhan Town Health Office	Water Supply and Sewage Enterprise	Municipality (Sanit. and Beaut. Core Process)
Urban Land and Housing Mgt. Office	North Shewa Zone Land Admin. and Use	Water Supply and Sewage Enterprise
Amanuel Dev. Org.	Kebele 07	UWSSP-II
Water Supply and Sewage Enterprise	Debre Berhan Town Health Office	Trade and Industry Office

as disseminators of information within the network. Going forward, the alliance might seek ways to reinforce the roles of prominent actors to improve sustainability.
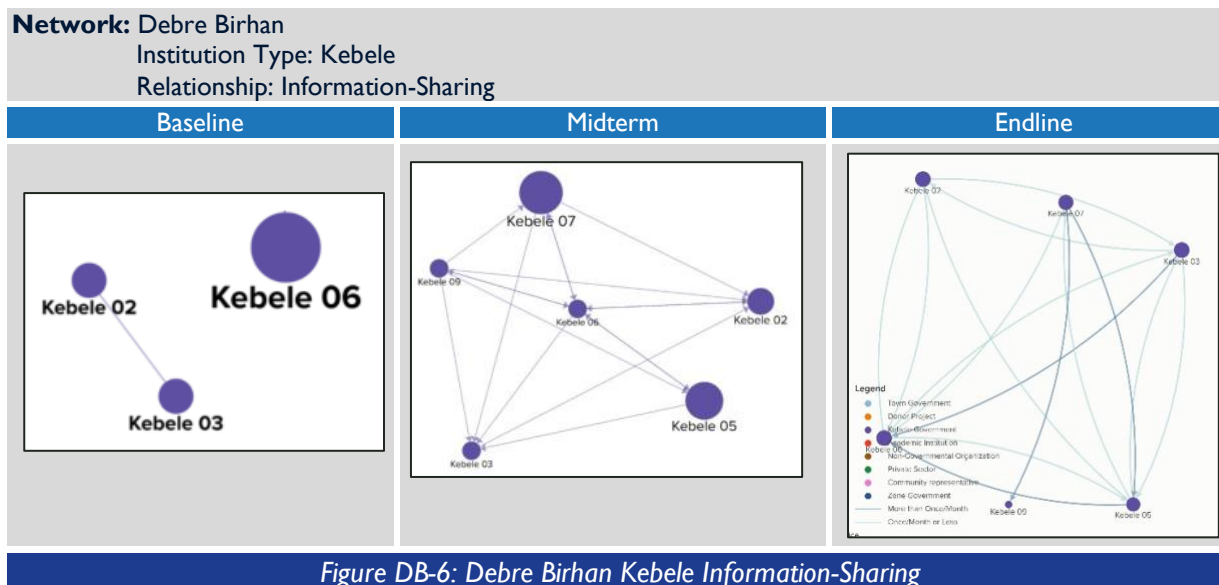
Type of Coordination Activities: The enumerator asked respondents which other current and former learning alliance members they directly coordinated with during the previous six months and on what types of activities. Results are presented in Figure DB-11, alongside the results from the Midterm analysis (the Baseline did not record these results). As shown, Direct Coordination increased across all five types of activities.

Figure DB-8 Debre Birhan Coordination Coordination Activities

Figure DB-8: Debre Birhan Coordination
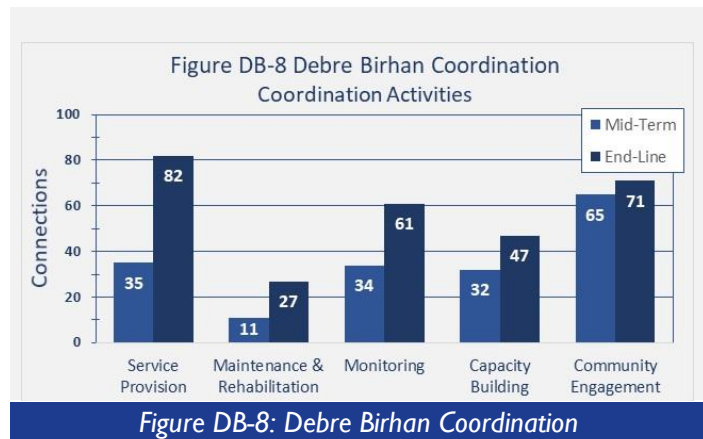
Service Provision: The increase in Direct Coordination in Service Provision may be attributed to the allocation of financial resources from the town government and UWSSP-II for construction of sanitation facilities. This as well likely contributes to UWSSP-II's prominence in the coordination network metrics previously presented. In cooperation with SWS, Debre Birhan's seven-member working group is developing guidelines to reestablish and train communal latrine management committees; this has likely strengthened Direct Coordination in the recent period.

Average Coordination Relationships: In the Endline survey, all 21 stakeholders surveyed indicated an average of 4.7 Direct Coordination relationships with other actors, which include both current as well as previous learning alliance members with whom they remain in contact. This reflects an increase of 15 percent over the number of Direct Coordination relationships (4.1 average) over the Midterm SNA.

Capacity Building: The more modest, yet still significant, increase in Capacity Building coordination (+47 percent) may be partly attributed to the application and dissemination of lessons learned during the three-day learning visit to Hawassa that the learning alliance members attended.

Reciprocity: Going back to Table DB-5, overall reciprocity for Direct Coordination relationships measured 27 percent; the reader might expect a higher figure when considering with whom organizations coordinate. Examining the reciprocity of relationships by type of coordination yields the following: Service Provision (17 percent reciprocal), Maintenance and Rehabilitation (0 percent), Monitoring (35 percent), Capacity Building (9 percent), and Community Engagement (25 percent).

Coordination with Former Members and Actors: Table DB-10 presents the cited coordination relationships with five former members of the learning alliance, or stakeholders previously or not significantly involved. (Again, since the enumerator did not survey these institutions, their connections include only In-Degrees.) Kebele 09, Urban Land and Housing Management Office, and Vacuum Truck Emptying Company remain relatively prominent in Direct Coordination with current learning alliance

members. For reference, the Average In-Degree for all actors is 3.8; therefore, ongoing coordination with Kebele 09 remains above the average of current members, while Urban Land and Housing Management Office and Vacuum Truck Emptying Company remain at roughly the average

Problem-Solving Relationships

Problem-Solving Network: Figure DB-9 below illustrates the Problem-Solving sub-network map and prominent network actors according to selected metrics. The most prominent actors are again generally consistent with those from the other types of relationships: Debre Birhan Town Health Office, Municipality (Sanitation and Beautification Core Process), and Water Supply and Sewage Enterprise. As is the case with direct coordination relationships, UWSSP-II plays a central role in spreading information and bridging actors in the network. Note the ranking of Dashen Brewery (In-Degree) and Habesha Brewery (Betweenness), illustrating the prominence and potential role of the private sector in facilitating and contributing to Problem-Solving relationships.

Table DB-10: Debre Birhan Coordination	
Former Surveyed Actors	
Former Learning Alliance Member	**In-Degree**
Kebele 09	5
Urban Land and Housing Mgt. Office (Housing Development Core Process)	3
Vacuum Truck Emptying Company	3
Communal Latrine Operator (Selassie Orthodox Church)	2
Health Extension Office (Kebele 06)	2

Network: Debre Birhan Problem-Solving Network All Current and Former Members	**Network Metrics:** Actors: 26 Connections: 105 Density: 16%
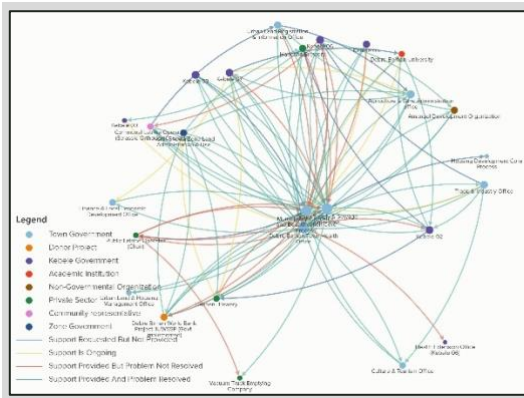
Top Eight Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Municipality (Sanit. and Beaut. Core Process)	Debre Berhan Town Health Office	Debre Berhan Town Health Office
2	Debre Berhan Town Health Office	Water Supply and Sewage Enterprise	Municipality (Sanit. and Beaut. Core Process)
3	Water Supply and Sewage Enterprise	Municipality (Sanit. and Beaut. Core Process)	Water Supply and Sewage Enterprise
4	Dashen Brewery	Kebele 07	Habesha Brewery
5	Ag and Land Admin Office	Trade and Industry Office	Ag and Land Admin Office
6	Comm. Latrine Oper. (Selassie Orth. Church)	Kebele 06	North Shewa Zone Land Admin. and Use
7	Debre Birhan University	UWSSP-II	UWSSP-II
8	UWSSP-II	Ag and Land Admin Office	Public Latrine Operator (Chair)

Figure DB-9: Debre Birhan Problem-Solving Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Closeness Centrality for the Problem-Solving relationships. Table DB-11 compares the top five Closeness (information-spreading) actors from the three SNAs. The prominence of Amanuel Development Organization in the earlier SNAs is noted, along with its departure from prominence in the Endline (Rank 16). UWSSP-II is ranked seventh in Problem-Solving Closeness Centrality. None of the kebeles currently reside in the top five: kebeles 07, 06, and 02 rank 10, 11, and 12, respectively.

Problem-Solving Requests: The enumerator asked respondents which other current and former members they either sought, or were requested to provide with Problem-Solving assistance during the previous six months, and whether the members provided assistance and resolved the issue. Results for the Endline survey are presented in Figure DB-10 (due to the different structure of the question, a comparison with Baseline and Midterm SNAs is discussed below).

Resolution of Problem-Solving Requests: In 64 percent of cases, respondents replied the support had been Provided-and-Resolved,

Table DB-11: Debre Birhan Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	**Midterm**	**Endline**
Debre Berhan Town Health Office	Amanuel Dev. Org.	Debre Berhan Town Health Office
Kebele 02	Ag and Land Mgt. Office	Municip. (Sanit. and Beaut. Core Proc.)
Kebele 06	Debre Berhan Town Health Office	Water Supply and Sewage Enterprise
Ag and Land Mgt. Office	Municip. (Sanit. and Beaut. Core Proc.)	Habesha Brewery
Amanuel Dev. Org.	Kebele 07	Ag and Land Mgt. Office

while in 19 percent of cases the support had been Provided-But-Not-Resolved. In 8.6 percent of cases support is ongoing; as well, in 8.6 percent of cases, the requested support had not been provided. Comparing this with the Midterm SNA, in 94 percent of cases, respondents replied their issue had either been resolved or the support remained ongoing at the time of the survey; in the Baseline SNA, the issue had been resolved or remained ongoing in 77 percent of the cases.

Top Actors' Requested Support Resolution: Looking at the top-three learning alliance members in In-Degree (named actors for requesting Problem-Solving assistance), all appear to have been diligent in providing support. In the case of Municipality (Sanitation and Beautification Core Process) as the target (named) actor, it provided support for 94 percent of 17 requests. It resolved 53 percent, provided support but did not resolve 35 percent, did not provide support for 6 percent, and
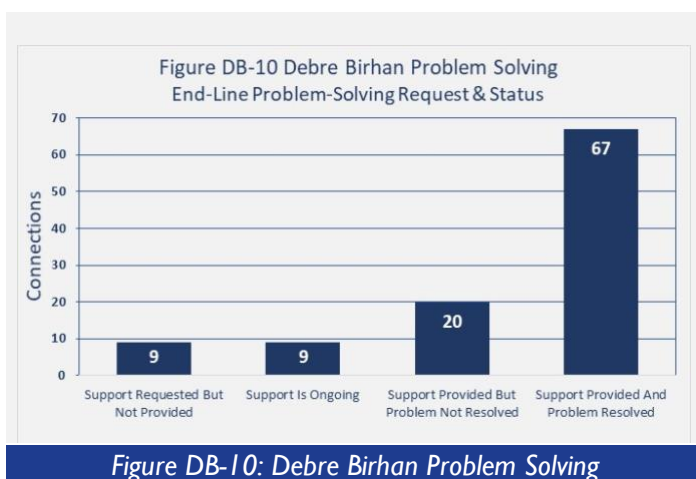
Figure DB-10: Debre Birhan Problem Solving

provided ongoing support for 6 percent. In the case of Debre Birhan Town Health Office, 85 percent of 13 requests were resolved, 8 percent provided but not resolved, and 8 percent ongoing. In the case of Water Supply and Sewage Enterprise, of 11 requests, 45 percent were provided and resolved, 45 percent provided but not resolved, and 9 percent remain ongoing.

Cases of Support Requested but Not Provided: The enumerator examined the nine instances of support being requested but not provided to determine if they were perhaps attributed to a single learning alliance member; however, each of the nine cases involved a different target (named) actor, and only two cases involved the same source (respondent).

Average Problem-Solving Relationships: In the Endline survey, all 21 stakeholders surveyed indicated an average of 5.0 Problem-Solving relationships with other actors, again including both current and former learning alliance members. This reflects an increase of 17 percent over the number of Problem-Solving relationships (4.3 average) in the Midterm SNA.

Problem Solving with Former Members, Actors: Table DB-12 presents the indicated Problem-Solving relationships with the five actors

Table DB-12: Debre Birhan Problem-Solving	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
Communal Latrine Operator (Selassie Orthodox Church)	4
Urban Land and Housing Mgt. Office (Housing Development Core Process)	3
Kebele 09	2
Vacuum Truck Emptying Company	2
Health Extension Office (Kebele 06)	1

who appeared in previous SNA surveys. For these relationships, Communal Latrine Operator received the most mentions (the SWS team questioned this finding in the draft version of this report); the

balance of the six actors had three or fewer requests. For reference, the Average In-Degree for all actors is 4.0.

Reflections on the SNA

Reflections: The Debre Birhan Learning Alliance is one of the largest of the four learning alliances, with 20 members presently. The alliance is a positive example of inter-sector participation, with members representing multiple levels of public administration, NGOs, private sector, donor, and academics, making it the most diverse of the alliances. Despite some turnover within organizations, the institutions' participation has remained committed and consistent. The strength and cohesiveness of the network increased successively from the Baseline to Midterm to Endline SNAs in all three types of relationships. In providing context to the findings in this report, the SWS team reports numerous alliance achievements since the Midterm, including increased participation of decision-makers, an increased town sanitation budget, and increased dialogue across sanitation issues. This is reinforced in the SNA findings through the significantly increased connections of all types. The Tetra Tech team reports recent achievements related to decision-making, town sanitation budget, and stakeholder dialogue, much of which is observed in the SNA findings. Increasing trends in coordinating Service Provision might be attributed in part to financial resources from the Municipality and UWSSP-II, which also points to those actors' prominence in the network. Overall, the SNA shows significant network strengthening; SWS staff testimony backs this up when in discussions of its activities and observations.

Woliso (Urban Sanitation Learning Alliance, Tetra Tech)

Learning Alliance Overview and Initiatives

Woliso: Woliso is a town located near the geographic center of Ethiopia, 114 km southwest of Addis Ababa. It is the administrative center of the Southwest Shewa Zone in the Oromia Region. Woliso town has seven administrative kebeles and a population of roughly 119,000, according to the local administration. The town's main economic activities are commerce, manufacturing and tourism, with tourists attracted to the town's natural hot spring and nearby volcanic mountain and its crater lake. The goal of SWS' small-town sanitation component in Woliso is to improve the quality and sustainability of sanitation services by strengthening responsible local systems to operate more effectively and efficiently.

Learning Alliance Priorities: Tetra Tech facilitates the Woliso Learning Alliance, which began meeting in May 2018. The alliance formed working groups and identified activities in two priority areas: 1) address management of shared (communal and public) latrine facilities, and 2) establish a sludge disposal and treatment site. Since its launch, the learning alliance has participated in meetings, trainings, and exchange visits and has implemented an action research agenda related to its goals.

Woliso Activities and Progress: According to the November 2020 SWS Semiannual Report, the Woliso Learning Alliance added COVID-19 Prevention and Mitigation topics to its discussions and agenda, leveraging the platform to respond to emerging issues. Participants most recently met in August

2020; 27 members attended, with notably low representation of civil society and the private sector. In 2020, the learning alliance successfully advocated for funds to purchase land for the sludge disposal site; however, the municipality has yet to discuss the proposed site with neighboring communities. As of September 30, 2020, the disposal site had yet to open, but the municipality completed an environmental and social impact assessment. However, according to the SWS team, communities situated nearby the site had not been consulted. Privately owned vacuum trucks continue to provide emptying services at high prices (typically unaffordable to most) and dispose of the waste illegally in forested areas or rivers, or at the disposal sites of neighboring towns. Pressure is increasing on the utility from the town's residents, especially low-income households, to find a solution and resume emptying services.

Woliso SNA Findings and Recommendations

Summary: The Woliso Learning Alliance is one of the smaller of the four alliances (14 members), remaining steady in membership and participation. Due to the situation in Woliso and the lack of private sector and NGO actors working in the sanitation sector, the alliance primarily includes only government actors, plus one informal public latrine "committee." The cohesiveness of the network decreased over the previous period, with reported connections decreasing for all three types of relationships, in the case of Coordination and Problem-Solving by more than half. The SWS team attributes the decreasing connections primarily to the challenges of COVID-19 lockdowns and gathering restrictions. Despite declining trends, the alliance appears healthy with reasonable metrics across functional areas and all three types of relationships. Leading actors are consistent with those observed in practice by the SWS team, and include the Municipality, Town Health Office, and Water Supply and Sewage Utility. The Kumu link for the Woliso Learning Alliance can be found here.

Learning Alliance Size and Connections: The Woliso Learning Alliance has remained stable in terms of its membership but has generally trended downward in its stated connections with one another, most markedly in Coordination and Problem-Solving relationships, with a number of connections decreasing by roughly half in both cases. At present, alliance members include only government institutions, plus one "committee" (Communal Latrine Management Committee).

Network Snapshot: Reported connections decreased for all three types of relationships compared to the Midterm. The SWS team raised this point on its initial review of this report, attributing the decrease to the extreme times due to COVID-19, lockdowns, states-of-emergency, and restrictions on gatherings. Information-Sharing is by far the most common type of relationship (124 connections), with Problem-Solving (53), and Direct Coordination (45) accounting for less than half the number of connections. Network Density figures are in some dispute, as the SWS team stated that some actors surveyed during the Midterm had not formally been alliance members, which would cause a reduction in those Density figures.

Challenges: According to the LINC enumerator, alliance members reported similar challenges facing the alliance as in Debre Birhan. Specifically, strong initial commitment followed by somewhat declining interest; high turnover of members; lack of decision-makers; and managers taking advantage of capacity-building opportunities rather than members. Feedback from the SWS team differs, citing increased

interest among the members in SWS learning opportunities. Perhaps this can be viewed as isolated cases of feedback or misunderstanding due to local language between the respondent and the enumerator.

Sectors and Functions: All Woliso Learning Alliance members logically focus on Sanitation and Hygiene sectors, and the relationships between actors working on common areas show positive network cohesiveness. In this analysis, the reader can observe the lack of actors other than public administrations. The most common organizational functions are Monitoring and Regulation, followed by Hygiene Promotion, Coordination, Advocacy, and Community Mobilization (all with the same 11 actors and connections).

Network Core Actors: Core-Periphery analysis, in contrast to Debre Birhan, has a more diverse group of cores, according to the three types of relationships, with 10 of the 14 actors appearing as a core in at least one type of relationship. It is noted that some of these findings are inconsistent with observations of the SWS team (described below), which is known to happen within the science of SNA. Specifically, in this case, according to the SWS team, the Municipality takes a lead role in all three types of relationships on a regular basis, and only appears in two of three cores (they do not appear in the Information-Sharing core). It is also surprising (and disputed) that Burka Gudina Kebele appears as a core, as a localized (neighborhood) entity. The SWS team indicated that the Town Health Office (cores in all three types of relationship) and Water Supply and Sewage Utility (core in Coordination) are also among the most active in the alliance, with representatives of both serving as chairpersons on steering committees.

Information-Sharing Network: The number of reported Information-Sharing relationships increased by 10% to 137 reported connections during the Endline period, 36% of which occur more frequently than once per month. Each of the 14 surveyed actors cited an average of 9.8 Information-Sharing connections with other members. All six of the former members were named at least once, indicating a level of impact beyond the immediate membership of the alliance. The top actors measured by network metrics are Municipality (Sanitation and Beautification) and Town Environmental Protection and Climate Change Authority Office. Since both these town-level institutions figure prominently in all analyses, any efforts to further the activities of the learning alliance and its work should rely on these two actors.

Coordination Network: Coordination connections (47) are less than half the number as Information-Sharing connections (124); a 42 percent reduction in reported connections overall occurred from the Midterm (81). These metrics indicate that the learning alliance may function on more basic levels than higher level Coordination. The most common areas of Coordination are in Service Provision, Community Engagement, and Monitoring.

> *Recommendation: Recommendations for the alliance include to more actively seek pathways to improve higher level coordination, perhaps through activities organized around key functional and priority areas like Monitoring, Regulation, or Hygiene Promotion; and to consider possibilities for joint activities in areas of Capacity Building or Service Provision.*

Problem-Solving Network: The enumerator recorded a slightly higher rate of Problem-Solving relationships (54 connections) than Direct Coordination (47). Problem-Solving relationships decreased by nearly half from the Midterm period (102). Looking at the resolution of Problem-Solving requests, 57 percent reported Support Provided and Problem Resolved; 33 percent reported Support Provided and Not Resolved; only 7 percent of cases reported Support Not Provided. Numerous actors appear to have responded quite effectively to requests for Problem-Solving support, including: Town Environmental Protection and Climate Change Authority Office, Town Health Office, Ayetu Kebele (01), and Ejersa Kebele (02).

Learning Alliance Members and Attributes

Surveyed Members: Table W-1 below presents the learning alliance members (and previously surveyed actors) surveyed in the Baseline (12 in total), Midterm (18), and Endline (14) SNA surveys. SWS project staff stressed that the decline of actors in the Endline is not indicative of low participation or member attrition. Some of these instances are instead attributed to a single actor with multiple departments being counted as multiple actors; relevant stakeholders surveyed but not intended to be on the alliance (Baseline); and the issue that some inactive members had been surveyed in the Midterm SNA, but then eliminated for this Endline. In the table, current non-members appear last in the table.

Table W-1: Woliso Learning Alliance			
Surveyed Alliance and Network Members			
Organization	Baseline	Midterm	Endline
Ayetu Kebele (01) *		✓	✓
Burka Gudina Kebele (03) *	✓	✓	✓
Ejersa Kebele (02) *	✓	✓	✓
Hora Kebele (04) *		✓	✓
Municipality (Sanitation and Beautification) **	✓	✓	✓
Public Latrine Representative		✓	✓
Town Communications Affairs Office	✓	✓	✓
Town Construction Bureau		✓	✓
Town Culture and Tourism Office		✓	✓
Town Environmental Protection and Climate Change Authority Office	✓	✓	✓
Town Finance and Development Office	✓	✓	✓
Town Health Office	✓	✓	✓
Town Micro and Small Enterprise Office	✓	✓	✓
Water Supply and Sewage Utility	✓	✓	✓
Ambo University		✓	
Town Infrastructure Development Office	✓	✓	
Town Land Administration Office	✓	✓	
Waste Collection Service Provider	✓	✓	

* In previous SNA surveys, these kebeles were known by the numbered designation shown in the parentheses, preserved here for comparison with Baseline and Midterm.

Table W-1: Woliso Learning Alliance			
Surveyed Alliance and Network Members			
Organization	Baseline	Midterm	Endline

*** Previously Town Municipal Services Office.*

Organization Types, Coverage, and Sectors: Table W-2 (right) summarizes the types and numbers of members currently in the alliance (right column) compared to those in previous periods (middle column). Table W-3 (below) summarizes all organizations currently or previously included in the alliance, their type (legal form), geographical coverage,

Table W-2: Surveyed Learning Alliance Members		
Type	**Members (Incl. Former)**	**Members (Current)**
Town Government	11	9
Kebele Government	4	4
Private Sector	2	0
Academic Institution	1	0
Committee (not legal entity)	1	1

and sectors of work. These attributes will be used in the SNA to make observations regarding relationships and cooperation. All the current members are town or kebele government institutions, plus one Communal Latrine Management Committee, which is a voluntary elected management committee of user groups, not a legal entity. Former members are indicated by an asterisk (*).

Table W-3: Woliso Learning Alliance							
Organization Types, Coverage and Focus Sectors							
Organization	Type	Geography	Sectors				
			Water Supply	Sanitation	Hygiene	Institut. WASH	Indirect WASH
Ambo University *	Academic	Zone				✓	
Ayetu Kebele (01)	Government	Kebele		✓	✓	☞	
Burka Gudina Kebele (03)	Government	Kebele		☞	☞	✓	
Ejersa Kebele (02)	Government	Kebele		✓	✓	☞	
Hora Kebele (04)	Government	Kebele		✓	✓	✓	
Municipality (Sanitation and Beautification)	Government	Town		✓	✓	☞	
Public Latrine Representative	Committee	Kebele		✓	☞		
Town Communications Affairs Office	Government	Town					✓
Town Construction Bureau	Government	Town					✓
Town Culture and Tourism Office	Government	Town					☞
Town Env. Prot. and Climate Ch. Auth. Off.	Government	Town		✓	✓		✓
Town Finance and Development Office	Government	Town					✓
Town Health Office	Government	Town		✓	✓	☞	

Table W-3: Woliso Learning Alliance							
Organization Types, Coverage and Focus Sectors							
Organization	Type	Geography	Sectors				
			Water Supply	Sanitation	Hygiene	Institut. WASH	Indirect WASH
Town Infrastructure Development Office *	Government	Town					☞
Town Land Administration Office *	Government	Town					☞
Town Micro and Small Enterprise Office	Government	Town		✓	✓		
Waste Collection Service Provider *	Private	Town					☞
Water Supply and Sewage Utility	Government	Town	✓	✓	✓	✓	

* Not presently a member of the learning alliance.

Organization Type Summary and Attrition: Table W-3 (following page) provides a detailed summary for all organizations currently or previously included in the learning alliance, their type (legal form), geographical coverage, and sectors of work within WASH systems. While the enumerator asked this question during the initial survey of each respondent, the designations used in this analysis are based on those the SWS team provided following the initial draft of this report.

Organization Functions and Services: Table W-4 on the following page presents the functions and services that each current and former learning alliance member provides. Again, the SWS team advised the revision of the Function designations for a number of the actors in the interest of consistency and accuracy; thus, the designations in Table W-4 substitute the SWS team input for the survey responses. As in Debre Birhan, this process resulted in considerably more designations than the survey respondents, especially in areas of Advocacy, Coordination, Community Mobilization, and Hygiene Promotion. Only four serve Finance, two WASH Maintenance Support, and three WASH Infrastructure Development, reportedly functions of considerable need in Woliso; practically, these are the actors available. Again, an asterisk (*) denotes organizations not presently members of the learning alliance.

Organization Functions and Services

Organization	Functions and Services										
	Monitoring Regulation	Capacity Bldg.	Advocacy	Coordination	Finance	Community Mobilize	Hygiene Promotion	Research	WASH Service Provision	WASH Maintenance Support	WASH Infrastructure Development
Ambo University*											
Ayetu Kebele (01)	⚑		⚑	⚑		⚑	✓				
Burka Gudina Kebele (03)	⚑		⚑	⚑		⚑	✓				
Ejersa Kebele (02)	✓		⚑	⚑		⚑	⚑				
Hora Kebele (04)	✓		⚑	✓		✓	✓				
Municipality (Sanitation and Beautification)**	⚑	⚑	⚑	✓	✓	⚑	✓		⚑	⚑	⚑
Public Latrine Representative			✓	✓		✓	⚑		⚑		
Town Communications Affairs Office			⚑	⚑		⚑	⚑				
Town Construction Bureau											⚑
Town Culture and Tourism Office	✓		✓	✓		✓	⚑				
Town Env. Protection and Climate Change Authority Office	⚑	✓	✓	⚑		⚑	⚑				
Town Finance and Development Office	✓				⚑						
Town Health Office	⚑	⚑	⚑	✓		⚑	✓		⚑		
Town Infrastructure Development Office*	✓										
Town Land Administration Office*	✓										
Town Micro and Small Enterprise Office		⚑			⚑						
Waste Collection Service Provider*										✓	
Water Supply and Sewage Utility	⚑	⚑	⚑	✓	⚑	⚑	✓		⚑	✓	✓

Not currently a member of the learning alliance.

Woliso Learning Alliance Network Snapshot

Overall Network Metrics: Table W-5 on the right provides a comparative summary of network metrics for the Woliso Learning Alliance, following the survey results from the Baseline (column 2) through Midterm (middle) and Endline (right) periods. The table summarizes the network metrics for the overall network (top), and for each of the three types of relationships (Information-Sharing, Direct Coordination, and Problem-Solving). The metrics shown here include only current members of the alliance.

Table W-5: Woliso Network Snapshot					
Metric Changes from Baseline to Midterm to Endline					
Metric	**Baseline**	**Midterm**	**Change**	**Endline**	**Change***
Overall Network					
Size (Actors)	14	19	+26%	14	-26%
Connections	80	152	+90%	125	-18%
Information-Sharing					
Connections	68	136	+100%	124	-9%
Density	37%	48%	+30%	68%	+14%
Average Degree	9.72	13.60	+40%	17.71	+30%
Average Distance	1.70	1.55	-9%	1.12	-28%
Direct Coordination					
Connections	31	81	+161%	45	-44%
Density	29%	49%	+69%	25%	-49%
Average Degree	7.42	9.40	+27%	6.43	-32%
Average Distance	2.03	1.72	-15%	1.67	-3%
Problem-Solving					
Connections	67	102	+52%	53	-48%
Density	31%	27%	-13%	29%	+7%
Average Degree	8.54	10.20	+19%	7.57	-26%
Average Distance	1.79	1.59	-11%	1.56	-2%

* Percent Change from the Midterm.

Network Size and Connections: According to the figures, the Woliso Learning Alliance has declined in membership, although SWS staff clarified this issue: some of the actors surveyed in the Midterm had not formally been members, had been already inactive prior to the Midterm, or in some cases only participated in an earlier survey without having been members. With this clarification in mind, the membership appears to be steady. Reported connections decreased for all types of relationships compared to the Midterm. In Direct Coordination and Problem-Solving, the number of Endline connections is nearly half that of the Midterm. Information-Sharing is the most common type of relationship (124 connections), followed by Problem-Solving (53), and then Direct Coordination (45).

Density, Degree, and Distance: In this case, given the SWS team's input concerning the Midterm survey respondents, the metrics are more difficult to compare on an even basis. Network size is likely to affect Density (unless connections increase proportionally). Clearly from the Baseline to the Midterm, a significant increase in relationship activity occurred, as did a drop-off in connections between the Midterm and the Endline, at least in part attributed to COVID-19. Average Degree (combined In- and Out-Degree) is a good indicator for this situation, increasing in Information-Sharing to a high of 17.71 average connections per actor, and declining in Direct Coordination and Problem-Solving. Distance

(steps from one actor to each other) did not change considerably, despite the different network structure.

Core Network Actors

Core-Periphery Model: Figure W-1 shows the core network actors for each type of relationships, and where they overlap. As shown in the diagram, ten actors appear as cores in at least one type of relationship. In contrast to Debre Birhan, where cores are consolidated, only two Woliso actors appear as cores in all three types of relationships: Town Health Office and Burka Gudina Kebele (formerly "Kebele 03" in previous SNAs). Three others reside in two of three cores: Ejersa Kebele (formerly "Kebele 04") resides in Information-Sharing and Problem-Solving cores; and

Figure W-1: Woliso Core Network Actors

Municipality (Sanitation and Beautification) and Town Environmental Protection and Climate Change Authority Office reside in Coordination and Problem-Solving cores. The SWS team noted a few somewhat illogical findings; specifically, the Municipality practically takes a lead role in all three types of relationships on a regular basis, but only appears in two of three cores (Coordination and Problem-Solving). The team found it surprising that Burka Gudina Kebele appears as a core, as it is a localized (neighborhood) entity. Such things sometimes do occur with SNA, illustrating the need to ground-truth SNA findings with observations from the field. Again, actors residing only in peripheries are not shown.

Core Actors and Opportunities: Perhaps in part because the Woliso Learning Alliance is smaller (currently 14 members), its Core-Periphery analysis appears to be a more dynamic representation of actors appearing in different cores. This could represent an opportunity for certain actors to take on more leading roles in varied alliance activities, with different areas of coordination, to address priority sanitation challenges.

Comparison with Midterm: Comparing the Endline with the Midterm analysis, the number of overall core actors (11) is the same, many of which are the same actors, although some appear in different cores. This may reflect an evolution of their roles, responsibilities, and prominence within the alliance. It is worth noting that none of the five former members appear as cores in the current analysis; neither did any appear as a core in the Midterm. Thus, those former members would appear to have not been

significant contributors to the alliance, a finding that SWS team observations back up. Notably, the Town Health Office is now a core in all three types of relationships, having previously only appeared as a core in Information-Sharing; this is also in line with SWS team observations, which indicated that the Town Health Office is among the most active members of the alliance, with its head serving as the deputy chairperson for the learning alliance.

Sector-Based Analysis

Sector-Based Network Metrics: Figure W-2 presents key network metrics for the actors working in each of the five WASH sectors (left column in table). Note that the response allowed for multiple selections (i.e., sectors are not exclusive of one another), and that this analysis includes all three types of connections. Again, in this case the SWS team altered the survey responses in the interest of consistency. In this case, the changes were more significant than in Debre Birhan; for instance, seven of the eight members who had self-indicated Water Supply changed, with only one remaining.

Analysis: Logically, most of the Woliso Learning Alliance members focus on the Sanitation and Hygiene sectors (Figure W-2 map). In Sanitation, 10 of the actors —

Key Network Metrics by Sector

Sectors: Sanitation; Hygiene

Sector	Actors	Connections	Density	Degree	Reciproc.
Sanitation	10	66	73%	13.20	57%
Hygiene	10	66	73%	13.20	57%
Institutional WASH	8	33	59%	8.25	57%
Indirect WASH	8	14	25%	3.50	27%
Water Supply	1	0	0%	0.00	0%

Figure W-2: Woliso Sector-Based Analysis

including all current members — recorded at least one connection over the past six months. The high Density, Degree, and Reciprocity in both the Sanitation and Hygiene sectors (these are the same 10 actors and corresponding connections) indicate robust and healthy relationships between the actors. The eight actors working in Institutional WASH also show relatively high cohesiveness, while the eight working in Indirect WASH less so. In viewing the map, the reader can easily see that the town and kebele government members dominate the network and its relationships.

Function/Mission-Based Analysis

Function/Mission-Based Network Metrics: In Figure W-3 below, LINC analysts examined sub-networks and metrics by indicated organizational function; here again, the SWS team provided the responses used in this analysis. In the table, the highest metrics and discussion points are highlighted
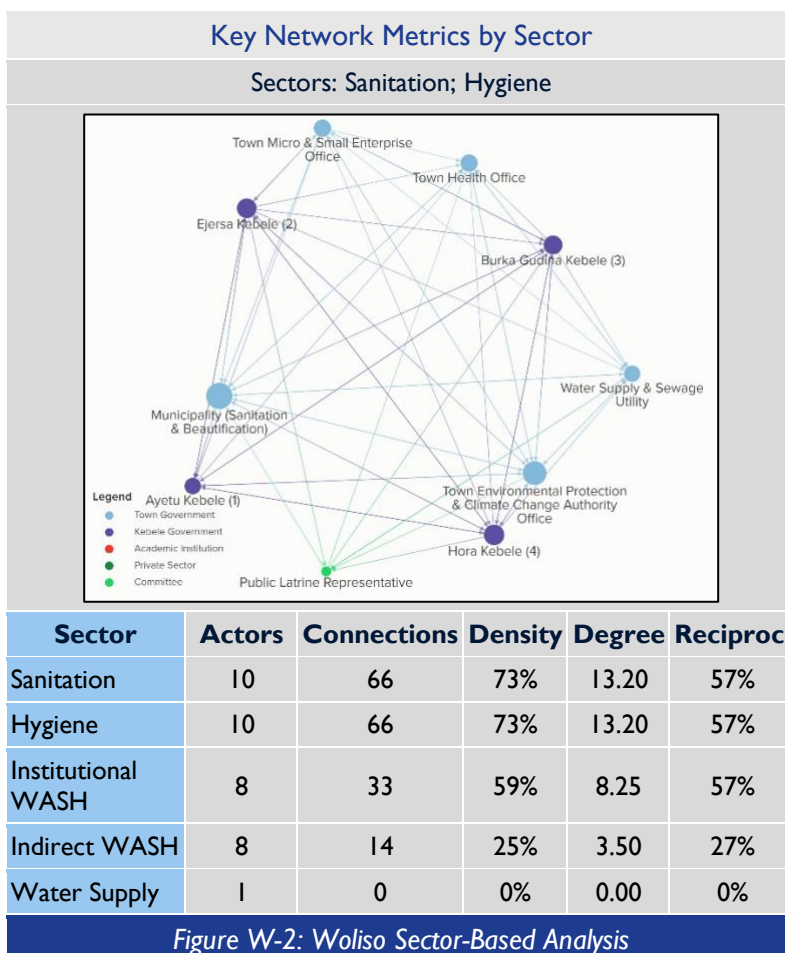
(orange). The reader may wish to refer to Table W-4 as a reminder of which actors are providing which functions.

Most Common Functions: The most common organizational functions are Monitoring and Regulation (12 actors), followed by Hygiene Promotion, Coordination, Advocacy, and Community Mobilization (all with the same 11 actors and connections per the revised designations). The sub-network of actors working in these functions is shown in Figure W-3. Note the low representation of actors working in Financing, WASH Infrastructure, and WASH Maintenance.

Findings and Observations: The metrics suggest that, while Monitoring and Regulation has the most actors, their cohesiveness is not as high (Density = 58 percent) compared with those in the four subsequent functions, again all of which include the same actors and connections as shown in the map (Density = 76 percent). While only five actors work in Capacity Building, they show high cohesiveness (Density = 90 percent), indicating that possibly some coordination is occurring in that area.

Mission/Function	Actors	Connections	Density	Degree	Reciprocity
Monitoring and Regulation	12	77	58%	12.83	57%
Hygiene Promotion	11	84	76%	15.27	65%
Coordination	11	84	76%	15.27	65%
Advocacy	11	84	76%	15.27	65%
Community Mobilization	11	84	76%	15.27	65%
WASH Service Provision	5	12	60%	4.80	50%
Capacity Building	5	18	90%	7.20	80%
Financing	4	10	83%	5.00	67%
WASH Infrastructure Dev.	3	4	67%	2.67	100%
WASH Maintenance Support	1	2	100%	2.00	100%
Research	---	---	---	---	---

Note: Orange-highlighted cells reflect highest values (see narrative).

Figure W-3: Woliso Function-Based Analysis

Data Source Comparison:
Table W-6 shows for comparison the surveyed respondents' self-reported responses for Functions, as well as the responses the SWS team designated. As with Debre Birhan, the general effect was to increase the number of actors (and connections) for numerous Functions. This is most notable for Hygiene, Coordination, Advocacy, and Community Mobilization (the four identical sub-networks). Again, this case illustrates the importance of consistently and accurately reported data. In this case, while the data are likely more consistent with the SWS team inputs, the respondent data provided more interesting points for discussion.

Table W-6: Woliso Actor "Functions"				
Comparison between Survey and SWS Team Designations				
Function	**Survey Responses**		**SWS Team**	
	Actors	**Connections**	**Actors**	**Connections**
Monitoring and Regulation	10	27	12	77
Hygiene Promotion	6	23	11	84
Coordination	6	22	11	84
Advocacy	3	3	11	84
Community Mobilization	3	3	11	84
WASH Service Provision	3	1	5	12
Capacity Building	2	1	5	18
Financing	1	---	4	10
WASH Infrastructure Development	1	---	3	4
WASH Maintenance Support	1	---	1	2
Research	---	---	12	77

Information-Sharing Relationships

Information-Sharing Network: Figure W-4 below presents the Information-Sharing sub-network map and prominent network actors according to In-Degree (most oft-cited); Closeness Centrality (information spreaders); and Betweenness Centrality (bridging actors). The two top-ranked actors in all three metrics are Municipality (Sanitation and Beautification) and Town Environmental Protection and Climate Change Authority Office. In terms of Betweenness, a significant drop-off occurs after these first two. The remainder of the prominent actors are also generally consistent across all three metrics, albeit in different orders. Ejersa Kebele, Burka Gudina Kebele, and Hora Kebele (formerly Kebeles 02, 03, and 04, respectively) figure prominently in Information-Sharing. Paradoxically, Ayetu Kebele appears less prominent (although with relatively high In-Degree); the SWS team reports that all four town kebeles are alliance members and have similar levels of accountability and participation throughout the project. Apparently, their connections put them in a less "strategic" position within the network.

Network: Woliso	**Network Metrics:** Actors: 19
Information-Sharing Network	Connections: 137
All Current and Former Members	Density: 40%

Note: Dark blue lines represent frequent (>1/month) Information-Sharing. Light blue represents less frequent (<1/month) Information-Sharing.

Top Eight Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)
2	Town Env. Prot. and Clim. Ch. Auth. Office	Town Env. Prot. and Clim. Ch. Auth. Office	Town Env. Prot. and Clim. Ch. Auth. Office
3	Town Health Office	Ejersa Kebele (02)	Town Culture and Tourism Office
4	Burka Gudina Kebele (03)	Hora Kebele (04)	Hora Kebele (04)
5	Town Comm. Affairs Office	Town Culture and Tourism Office	Ejersa Kebele (02)
6	Water Supply and Sewage Utility	Town Micro and Small Enterprise Office	Burka Gudina Kebele (03)

Figure W-4: Woliso Information-Sharing Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Betweenness Centrality for the Information-Sharing relationships; Table W-7 compares the top-five Betweenness (bridging) actors from the Baseline, Midterm, and Endline SNAs. The Municipality (Sanitation and Beautification) has consistently remained the top actor in Information-Sharing Betweenness throughout the implementation period. As the consistent bridging actor, it may be a logical next step for it to assume a stronger leadership role in facilitating the learning alliance going forward.

Frequency of Information-Sharing: The enumerator asked survey respondents which other learning alliance members they shared information with during the past six months outside from learning alliance meetings, and how often they

Table W-7: Woliso Prominent Actors		
Betweenness Centrality (Bridging Actors)		
Baseline	**Midterm**	**Endline**
Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)
Water Supply and Sewage Utility	Water Supply and Sewage Utility	Town Env. Prot. and Clim. Ch. Auth. Off.
Burka Gudina Kebele (03)	Town Health Office	Town Culture and Tourism Office
Ejersa Kebele (02)	Public Latrine Representative	Hora Kebele (04)
Town Health Office	Town Culture and Tourism Office	Ejersa Kebele (02)

engaged—more or less than once per month. Results are presented in Figure W-5, alongside the results from the Baseline and Midterm analyses. Note again that the Baseline and Midterm survey phrased the question in terms of information requests *from others to the respondent* (only one direction). As shown, Information-Sharing between Woliso Learning Alliance members increased significantly from the Baseline to Midterm, and more modestly during the Endline period. In

the most recent six-month period, learning alliance members reported 131 Information-Sharing relationships.

Frequency of Sharing: Although the reported Information-Sharing increased in all periods, the proportion of frequent (>1/month) to infrequent (<1/month) decreased modestly from 48 percent in the Baseline period to 36 percent in the Endline period. In the current Endline survey, all 14 current learning alliance members reported an average of 9.8 Information-Sharing relationships (Out-Degree) with other actors,

Figure W-5: Woliso Information-Sharing

including both current and former learning alliance members, indicating a fairly high level of communication and Information-Sharing between the alliance members.
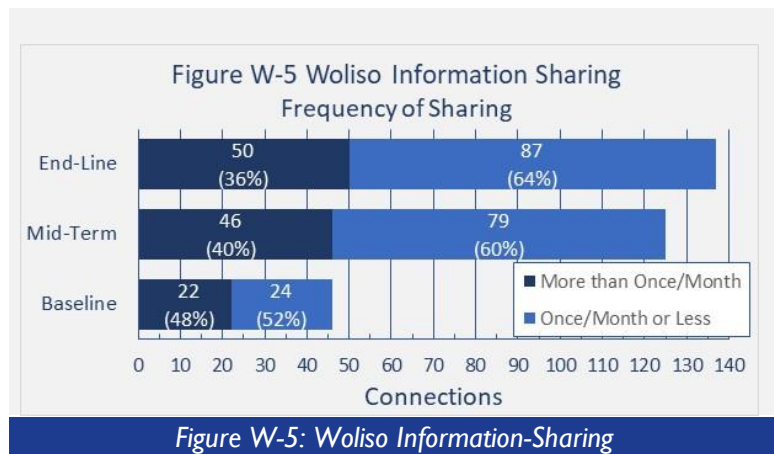
Woliso Kebele Information-Sharing: The Midterm SNA reported on the connectivity of Woliso kebeles in Information-Sharing relationships. Figure W-6 compares kebele connectivity in Woliso between the Midterm and Endline SNAs. In the Midterm analysis, LINC noted few relationships between the kebeles, with only Kebele 04 reporting linkages to Kebele 02 and Kebele 03. Per the Midterm, "Given the kebeles' strategic positions, coupled with the likelihood that they have similar sanitation-related goals and experience similar sanitation-related challenges, it is worth considering whether there is the demand and interest for more intentional approaches for Information-Sharing among kebeles." As shown in Figure W-6, Information-Sharing among kebeles has increased markedly since the Midterm analysis, with the number of reported connections increasing from two connections among three kebeles, to presently eleven connections among four kebeles, indicating vibrant, well-functioning relationships among kebeles.

Network: Woliso
Institution Type: Kebele
Relationship: Information-Sharing

Midterm	Endline
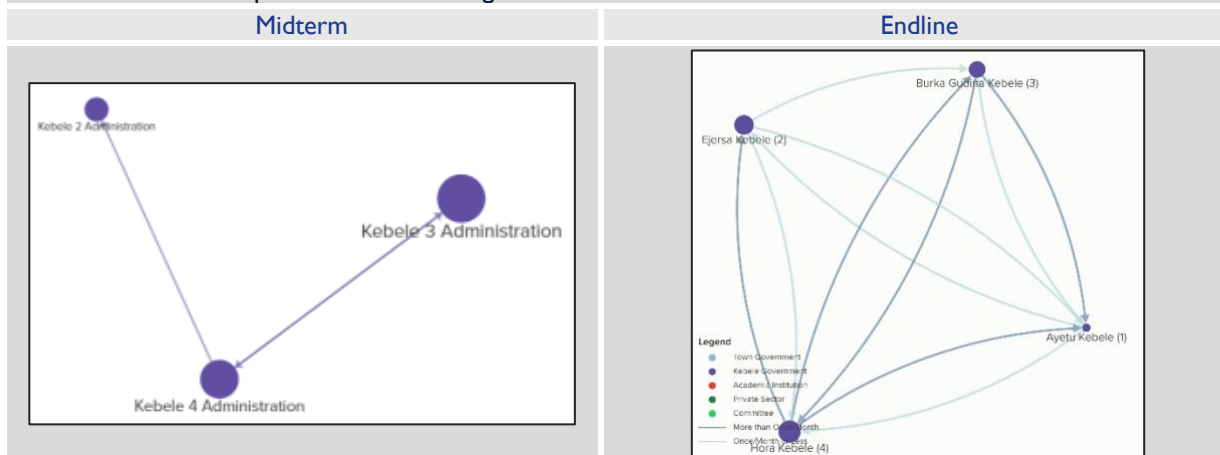
Figure W-6: Woliso Kebele Information-Sharing

Information-Sharing with Former Learning Alliance Members: Table W-8 presents the four former alliance members and their In-Degree. The Town Land Administration Office (In-Degree=5) and Town Infrastructure Development Office are actually both part of the Municipality, but the Midterm surveyed them as separate actors. Thus, the only notable finding is that Waste Collection Service Provider (In-Degree=4) still retains a higher level of communication with current alliance members; although going back to the Core-Periphery Analysis, it is not a core in any relationship type.

Table W-8: Woliso Information-Sharing

Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
Town Land Admin. Office	5
Waste Collection Service Provider	4
Ambo University	2
Town Infrastructure Dev. Office	1

Coordination Relationships

Coordination Network: Figure W-7 below illustrates the Coordination sub-network map and prominent network actors according to In-Degree, Closeness Centrality (information spreaders), and Betweenness Centrality (bridging). Note the significantly fewer connections compared to Information-Sharing, indicating that alliance members may operate at a more basic level. Relaying this back to the learning alliance might be an opportunity to spur joint activities between members to strengthen coordination. Looking back at Table W-7, effective activities could be planned around key functional areas of, for example, Monitoring, Regulation, or Hygiene Promotion.

Prominent Actors: As with Information-Sharing, the most prominent actor in all three metrics is Municipality (Sanitation and Beautification), followed by many of the same actors in different rankings. The Town Construction Bureau newly appears at Rank 2 in Closeness (Information-Sharing). The four kebeles also appear prominently. All those listed remain members of the alliance. Notice in the map that

the network is composed almost entirely of town- and kebele-government actors, and that the lone private sector actor, Waste Collection Service Provider (green, left side) is no longer in the alliance.

Network: South Ari Coordination Network All Current and Former Members

Network Metrics: Actors: 19
Connections: 47
Density: 14%

Top Eight Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)
2	Town Env. Prot. and Clim. Ch. Auth. Office	Town Construction Bureau	Water Supply and Sewage Utility
3	Town Health Office	Town Comm. Affairs Office	Burka Gudina Kebele (03)
4	Burka Gudina Kebele (03)	Ejersa Kebele (02)	Town Health Office
5	Water Supply and Sewage Utility	Water Supply and Sewage Utility	Town Env. Prot. and Clim. Ch. Auth. Office
6	Avetu Kebele (01)	Town Micro and Small Enterprise Office	Ejersa Kebele (02)

Figure W-7: Woliso Coordination Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Closeness Centrality for the Coordination relationships; Table W-9 compares the top-five Closeness (information-spreading) actors from the Baseline, Midterm and Endline SNAs. The actors residing at the top in Closeness have remained consistent. Related to restructuring and turnover, the SWS team and LINC enumerator also indicated that different managers — and levels of managers — had been interviewed on previous SNAs.

Table W-9: Woliso Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	**Midterm**	**Endline**
Town Municipal Services Office *	Town Municipal Services Office *	Municipality (Sanit. and Beautif.)
Town Land Admin. Office *	Municipality (Sanit. and Beautif.)	Town Construction Bureau
Municipality (Sanit. and Beautif.)	Town Culture and Tourism Office	Town Comm. Affairs Office
Town Comm. Affairs Office	Avetu Kebele (01)	Ejersa Kebele (02)
Town Infrastructure Dev. Office *	Town Health Office	Water Supply and Sewage Utility

Coordination Activities: The enumerator asked respondents what types of activities they cooperated with current and former learning alliance members. Results are presented in Figure W-8, alongside the results from the Midterm analysis. Direct Coordination increased in three areas and decreased in two areas, including decreases in areas of Service Provision and Community Engagement — the two overall highest areas in both

Figure W-8 Woliso Coordination Coordination Activities

Figure W-8: Woliso Coordination
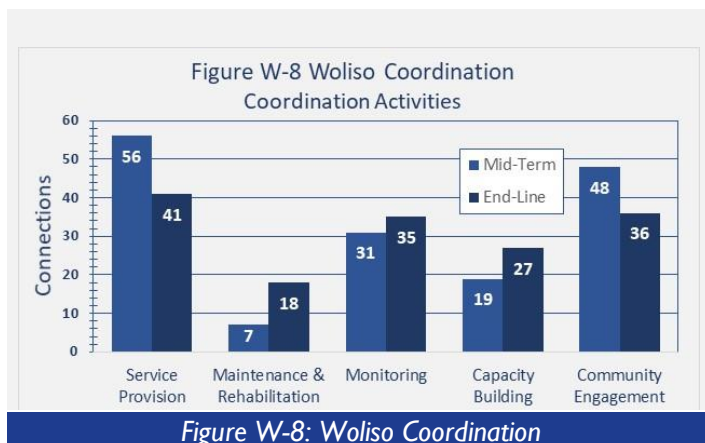
Midterm and Endline. The decrease in Service Provision coordination could be discouraging, as almost all the actors in the learning alliance are public institutions, many working in Service Provision. Perhaps knowing this, the alliance might be encouraged to introduce more direct coordination actions, or support more informal channels, or institutional engagement at lower and higher levels than traditionally practiced.

Average Coordination Relationships: The overall level of Coordination relationships decreased between the Midterm (81 reported connections) and Endline (47), or a 42 percent reduction. (See also Table W-5.) The average number of named linkages (Average Out-Degree) decreased from 4.0 at the Midterm to 3.4 presently. These results indicate both a lower level overall and a lower level per learning alliance member of Direct Coordination.

Table W-10: Woliso Coordination	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
Waste Collection Svc. Provider	2
Ambo University	0
Town Infrastr. Dev. Office	0
Town Land Admin. Office	0

Coordination with Former Learning Alliance Members: Waste Collection Service Provider is the only former alliance member with cited In-Degrees (2). It is worth noting that Waste Collection Service Provider is also the only private sector member in the alliance. Should any additional private sector or NGO actors or projects appear in the field of sanitation, the SWS team is confident that they will be included in alliance cooperation going forward.

Problem-Solving Relationships

Problem-Solving Network: Figure W-9 below illustrates the Problem-Solving network map and prominent actors according to the three metrics. Respondents reported Problem-Solving relationships (54) at slightly higher rates than Direct Coordination (47), although as discussed below, Problem-Solving relationships decreased significantly — by nearly half — from the Midterm period (102). The top-ranking actors are again consistent with the other types of relationships.

Table W-11: Woliso Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	**Midterm**	**Endline**
Town Municipal Svcs. Office *	Town Municipal Svcs. Office *	Municipality (Sanit. and Beautif.)
Town Infrastruct. Dev. Office *	Municipality (Sanit. and Beautif.)	Town Comm. Affairs Office
Town Health Office	Avetu Kebele (01)	Town Finance and Dev. Office
Water Supply and Sewage Utility	Water Supply and Sewage Utility	Town Construction Bureau
Town Finance and Dev. Office	Town Env. Prot. and Clim. Ch. Auth. Office	Town Micro and Small Enterprise Office

* Not presently a member and/or part of Municipality.

Network: Woliso	**Network Metrics:** Actors: 19
Problem-Solving Network	Connections: 54
All Current and Former Members	Density: 16%

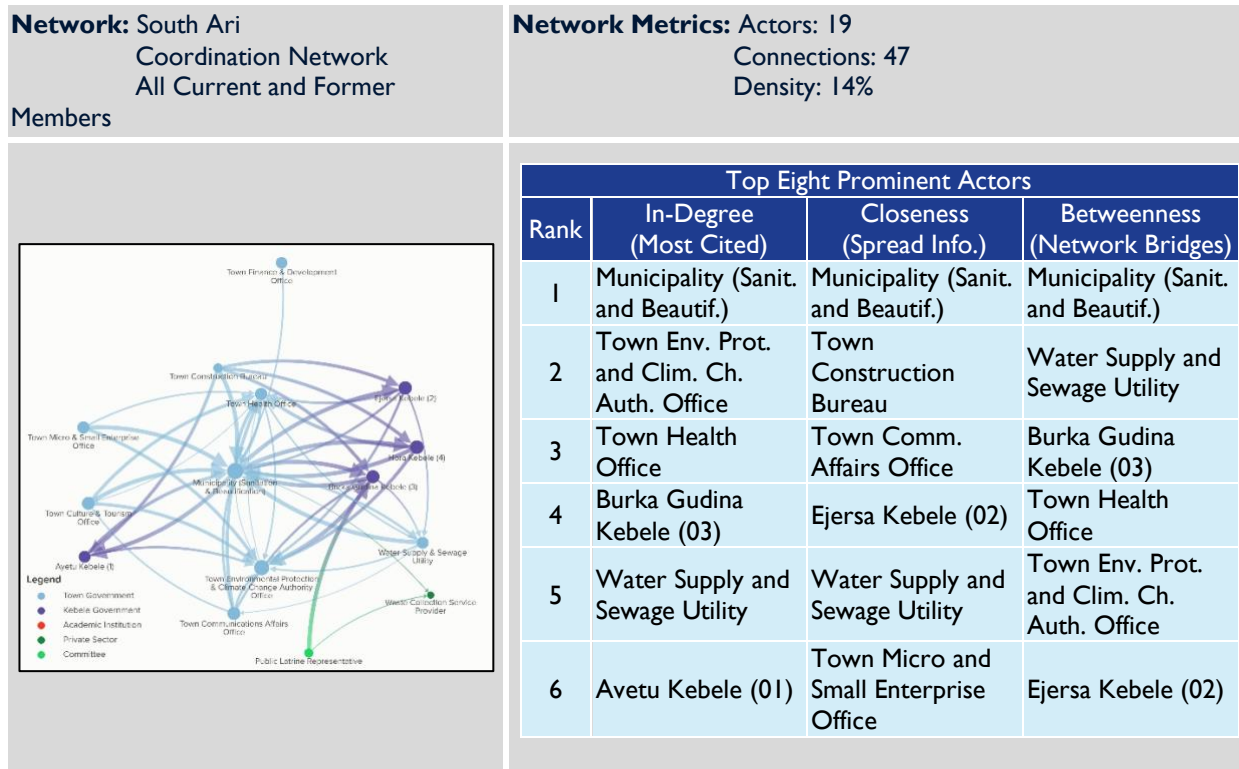|	Top-Eight Prominent Actors		
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)	Municipality (Sanit. and Beautif.)
2	Town Env. Prot. and Clim. Ch. Auth. Office	Town Comm. Affairs Office	Town Micro and Small Enterprise Office
3	Burka Gudina Kebele (03)	Town Finance and Dev. Office	Ejersa Kebele (02)
4	Town Health Office	Town Construction Bureau	Town Env. Prot. and Clim. Ch. Auth. Office
5	Avetu Kebele (01)	Town Micro and Small Enterprise Office	Burka Gudina Kebele (03)
6	Ejersa Kebele (02)	Ejersa Kebele (02)	Town Finance and Dev. Office

Figure W-9: Woliso Problem-Solving Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Closeness Centrality for the Problem-Solving relationships. Table W-11 compares the top-five Closeness (information-spreading) actors from the three periods. The actors are again consistent with those in other relationship types.

Problem-Solving Resolution: The enumerator asked respondents which other members they either sought, or requested to provide, Problem-Solving assistance during the previous six months, and whether they provided the assistance and resolved the issue. Results for the Endline survey are presented in Figure W-10. As mentioned previously, the number of Problem-Solving connections decreased by nearly half from the Midterm to the Endline, although in over half of the cases (31 of 54), Support was Provided and Problem Resolved; in 33% of cases (18 of 54) Support was Provided but Problem Not Resolved. Only one Problem-Solving relationship is reportedly Ongoing. In comparison, other learning alliances appear to have multiple ongoing relationships at a given time. Here, the Ongoing Relationship is between Burka Gudina Kebele (03) Municipality (Sanitation and Beautification).

Top Actors' Requested Support Resolution: Looking at the top learning alliance members in In-Degree (named actors), we see the following with regard to the top two actors: The Municipality (Sanitation and Beautification) fielded 11 requests for assistance, with the following results: Resolved (4); Not Resolved (5); Ongoing (1), and Not Provided (1). Town Environmental Protection and Climate Change Authority Office fielded eight requests, of which seven of eight were Provided and Resolved.

Figure W-10: Woliso Problem Solving
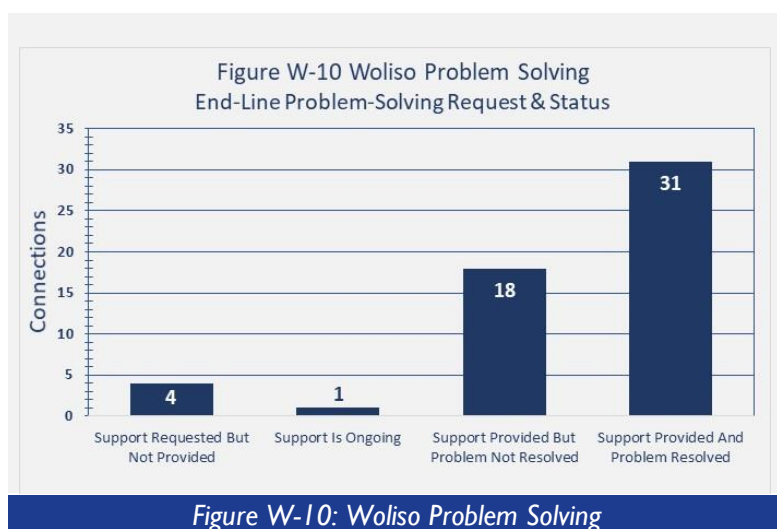
Actor Performance in Case Resolution: Other actors that addressed and resolved all or most Problem-Solving requests include: Town Health Office (4/5 Resolved); Ayetu Kebele (01) (3/4 Resolved); Ejersa Kebele (02) (3/4 Resolved). Three of four requests to Water Supply and Sewage Utility were Not Resolved.

Average Problem-Solving Relationships: In the Endline survey, all 14 stakeholders surveyed indicated at least one Problem-Solving connection over the previous six months. The average of all reported linkages (Out-Degrees) is a low figure of 3.9, higher only than Mille of the four alliances, and a 24% decrease from the Midterm (Average Out-Degree=5.1).

Problem Solving with Former Learning Alliance Members: Of the four former alliance members (two of which are under the Municipality) only one (Ambo University) had a reported connection (In-Degree), and only one reported instance.

Reflections on the SNA

Reflections: The Woliso Learning Alliance is one of the smaller of the four alliances with 14 members, remaining steady in participation. Due to the situation in Woliso and the lack of private sector and NGO actors working in the sanitation sector, the alliance primarily includes only government actors, plus one informal public latrine "committee." The cohesiveness of the network decreased over the previous period, with reported connections decreasing for all three types of relationships, in the case of Coordination and Problem-Solving by more than half. The SWS team attributes the decreasing connections primarily to the short-term challenges of COVID-19 lockdowns and gathering restrictions, which all took place in the lead-up to this study. Despite declining trends, the alliance appears healthy across functional areas, collaborating and sharing in all three types of relationships. Leading actors generally remained consistent with those observed in practice by the SWS team.

Mille (Rural Water Learning Alliance, IRC)

Learning Alliance Overview and Initiatives

Mille Woreda: Mille is a rural district (woreda) in Afar Region in northeastern Ethiopia roughly 100 km directly west from the Djibouti border. The woreda (district) has a population of roughly 120,000 inhabitants, of which less than 20,000 live in urban areas in the towns of Mille and Eli Wuha, while the balance are primarily pastoralists, moving with their livestock in search of pasture and water. Mille is a flat, arid landscape with low rainfall averaging 200 mm annually and high temperatures averaging 28°C. Although the Mille River passes through Mille on its way from the highlands around Addis Ababa before drying out in the salt flats toward Djibouti, most of the woreda has high water scarcity, despite the Mille Dam.

Mille Water Supply: Officially, water supply coverage in 2017 measured 35 percent; however, based on updated asset inventory data, IRC estimates coverage to be between 15 percent and 21 percent, with 55 percent of public water users spending up to 30 minutes roundtrip to fetch water, including only 6 percent with piped water systems on their premises (which are often unavailable). In rural areas, only 5 percent of the population has steady access to water. The proportion of people with access to safely managed water is effectively zero. According to IRC, only 29 water supply schemes are in place: shallow boreholes with hand pumps; shallow and deep wells with motorized pumps and small distribution systems; and a few stand posts for people and livestock. Twenty-three percent of schemes appeared inoperable at the time of their asset inventory survey. Finance is a major constraint to development, as well as maintenance, rehabilitation, and capacity of service providers.

Mille Learning Alliance: In SWS, with support of IRC, the Mille Learning Alliance is working to develop the woreda's water systems; coordinate toward achieving the GTP II 2020 targets and SDGs; and gain experience and share best practices within the woreda by addressing functionality, finance, and maintenance of water supply schemes to improve service sustainability. Synergies with Lowland WASH reportedly greatly assisted the alliance in water system maintenance and capacity building. Objectives of the learning alliance are to:

- Promote learning, capacity building, and practices of institutions and their officials and representatives.

- Guide innovation and activities to solve critical water-delivery challenges in the woreda.

- Share best practices and lessons learned to complement existing coordination structures and activities.

- Implement an integrated pilot, focusing on asset management, institutional maintenance arrangements, finance mechanisms, and incorporating monitoring data to guide asset management.

Learning Alliance Achievements: The survey respondents reported that the learning alliance created positive working relationships in all related sectors; prior to SWS, the Water Offices took

primarily responsible for water efforts, but after introduction of the learning alliance platform, different sectors began integrating functions in their plans. For example, currently when an issue occurs such as maintenance, the stakeholders can more effectively and rapidly resolve the issue. Members report that this is an important and positive development. Alliance meetings reportedly continued following the easing of COVID-19 restrictions, with the most recent meeting held in September 2020. Another noted achievement of the alliance lies in SWS efforts to support government offices to incorporate their local sector plans into long-term, SDG–guided master plans. According to the November 2020 SWS Semiannual Report, the SDG planning team continues to work on the WASH Master Plan, but progress remains slow with the burden falling mainly on the Water Office as the leader. Input from the IRC team stresses, however, that it is a group effort relying on all members. The anticipated master plan process took much more time than expected due to low motivation and other office priorities and responsibilities of the planning team. In the most recent meeting, the learning alliance committed to organize a high-level meeting on the performance of Mille Utility and the WASH Master Plan.

Mille SNA Findings and Recommendations

Summary: The Mille Learning Alliance is the smallest of the four alliances (11 current members), yet in previous SNAs had much higher numbers of members (23 in total). The SWS team noted, however, that some of the actors surveyed during the Baseline as "stakeholders" did not ultimately participate in the alliance; numerous NGOs and programs also participated (six total) but have all also either completed their projects or are no longer participating in the alliance. Nevertheless, the actors currently in the alliance show among the highest cohesiveness of the four learning alliances, with high metrics including Densities routinely 70 percent and higher for various attribute-based sub-networks, and 90 percent and higher not uncommon. The high number of former actors and surveyed stakeholders makes Mille results somewhat difficult to compare to the Baseline and Midterm, since the SNAs do not distinguish between actual members versus the "periphery stakeholders" surveyed. The key central actors in the Mille Alliance, according to the metrics, include the Woreda Water Office, Regional Water Resource Bureau, and Woreda Administration Office. A new stakeholder emerged in the Endline, Mille Woreda Maintenance and Spare Part Enterprise, formed by unemployed youth as a kind of association to supply spare parts for water supply and distribution in the region. While a pilot project with the Africa Development Bank and the Ministry of Water, Irrigation and Energy facilitated the formation of the enterprise, SWS facilitated capacity building for the enterprise at Ethiopian Water Technology Institute, supported construction of the enterprise shop, and facilitated dialogue throughout the process.

Learning Alliance Network: Overall, the number of reported connections has decreased, although sub-network Density is the same or higher than in the Midterm due to the fewer number of members. Information-Sharing is the most common (65 connections), followed by Direct Coordination (30 connections), then Problem-Solving (27 connections). The numbers of reported connections decreased by 30 percent to 60 percent from Midterm values. Two new members, Mille Woreda Maintenance and Spare Part Enterprise and WASHCO — both non-government — highlight new potential within the alliance. According to the SWS team, no other private sector actors are currently involved, and no NGOs are based in Mille; CARE Ethiopia and German Agro Action manage projects in Mille but are so far unwilling to attend regular alliance meetings because of the travel required.

Learning Alliance Sustainability: Mille Learning Alliance members reported attendance issues; as few as half the members attended in at least some cases (although again, some confusion surrounds which stakeholders are formal members). The common issue of staff turnover in government agencies appears to be most prevalent in Mille of the four alliances. As with other alliances, a lack of decision-makers are represented, and members — typically technical "experts" — receive little support from management, and thus find it difficult to follow up on action items. The sustainability of the alliance remains in question, more so now that Lowland WASH has finished. While the issue of sustainability following the closeout of the SWS project has yet to be discussed in detail among alliance members, so far, none of the members have taken the initiative to assume responsibility to coordinate future meetings. Financing expenses associated with the meetings also seems to be an issue. On this topic, a member of the IRC team noted, "Yes, sustainability of the LA is an issue, as [it] is for any short-term intervention. This is a learning project, and the question should be: 'in the time we had, has the learning alliance contributed to change in improving sustainability of WASH services?'." It is also worth noting that Mille's extremely hot climate restricts working hours, sometimes to only a few hours per day for government agencies. The Kumu link for the Mille Learning Alliance can be found here.

Staff Turnover: One of the challenges learning alliance members commonly cite is the turnover of government officials and their appointed alliance representatives. Coalitions like the learning alliances can help to weather turnover and ensure continuity. Each time a decision is made to change government decision-makers, the coalition risks losing momentum. The issue appears to be among the most prevalent in Mille; this was similarly noted in the Midterm SNA and pointed out as a cause for why agreed-upon action items had not been completed between meetings. Platform meetings provide an opportunity for new staff to get oriented with other agencies and actors and meet collaborators; and Information-Sharing linkages can help bring new members up to speed on the activities, opportunities, and challenges that are ongoing in the WASH sector.

Finance and Maintenance Challenges: The woreda, with the Regional Water Bureau and partners including CARE Ethiopia and German Agro Action, implemented minor and major maintenance measures, new water delivery construction initiatives, and staff capacity building. There remain significant shortages of water scheme operation budgets, repeated breakdowns of pumps and pipelines, and flood damage to generators and other assets. On top of that, government agencies reportedly do not pay their water/sewage utilities; if water consumption in public offices goes unpaid, there is also little incentive to conserve. At the next alliance meeting, the Water Office has agreed to report in detail on non-functionality of water delivery schemes, why certain schemes are not working, and who should be responsible for repair and ongoing maintenance and management.

Alliance Cores: The Core-Periphery Analysis reveals that eight of the 11 current members are identified as Cores in at least one type of relationship; the Regional Water Resource Bureau, Woreda Administration Office, and Woreda Water Office are identified as Cores in all three types of relationships.

Recommendation: The fact that eight of the 11 members appear as a Core in at least one type of relationship could potentially be used as a point of positive feedback or motivation for certain members to increasingly engage.

Information-Sharing Network: The number of reported Information-Sharing relationships decreased by more than half, to 66 reported connections during the Endline; 38 percent occur more frequently than once per month. Information-Sharing remains the most common type of relationship, based on the number of connections. The most prominent Information-Sharing actors are the Regional Water Resource Bureau, Woreda Water Office, and Woreda Health Office. WASHCO bears mention due to its high In-Degree, although it does not rank as highly in Closeness or Betweenness. According to feedback from the LINC enumerator, alliance members report that the WASHCOs are not functioning per outlined management guidelines; tariffs have not been set for most of their water schemes; fees are not regularly collected; and some WASHCOs have still not opened savings accounts. Numerous former alliance members still have reported relationships with current members.

Coordination Network: Coordination connections (30) occur significantly less than Information-Sharing (65), and experienced a 61 percent reduction from the number of connections in the Midterm (76). The most common areas of Coordination are currently in Monitoring, Maintenance and Rehabilitation, and Service Provision, although instances of Coordination decreased in all areas except for Maintenance and Rehabilitation (which during the Midterm was the least common area of Coordination). Illustrating the attrition of the alliance, of the four stakeholders initially working in WASH Service Provision, only one remains (Regional Water Resource Bureau); and of the nine actors initially working in Community Engagement, only three remain.

Recommendation: The discussion herein outlines several recommendations for the learning alliance going forward: 1) Improve higher level Coordination through activities organized around key functional areas like Monitoring, Regulation, or Hygiene Promotion; 2) Develop joint activities in areas of Service Provision and Maintenance and Rehabilitation; 3) Engage new private and NGO actors, should they appear on the scene, to add diversity and capabilities to the alliance; 4) To the extent practical, support the Mille Woreda Maintenance and Spare Part Enterprise, a newly added member of the alliance founded by unemployed youth, which aims to provide parts and service for water systems.

Problem-Solving Network: The enumerator reported a slightly lower rate of Problem-Solving relationships (27 connections) than Direct Coordination (30), decreasing by more than half in the Midterm period (from 61). In this sub-network, the Mille Woreda Maintenance and Spare Part Enterprise (established by unemployed youth) ranks second in In-Degree, an encouraging sign for its success going forward. In most cases, the members function effectively to address and resolve Problem-Solving requests; in 85 percent of cases members provided assistance; and in 36 percent of cases, they helped resolve the issue. Again, a number of the former alliance members still have reported connections to the alliance.

Learning Alliance Members and Attributes

Surveyed Members: Table M-1 below presents the learning alliance members surveyed in the Baseline (21 in total), Midterm (16), and Endline (11) SNAs. The Endline survey includes two new alliance members, while seven dropped between the Midterm and Endline. While the Mille Learning Alliance has suffered some attrition over the life of the project, the SWS team stresses that numerous actors surveyed for the Baseline were, in fact, potential stakeholders and ultimately not appropriate members for the alliance. For convenience, Table M-1 appears alphabetically grouped according to membership period.

Table M-1: Mille Learning Alliance			
Surveyed Alliance and Network Members			
Organization	Baseline	Midterm	Endline
Mille Town Water Utility	✓	✓	✓
Regional Water Resource Bureau	✓	✓	✓
Woreda Administration Office	✓	✓	✓
Woreda Agriculture and Pastoralist Development Office	✓	✓	✓
Woreda Education Office	✓	✓	✓
Woreda Finance and Economic Development Office	✓	✓	✓
Woreda Health Office	✓	✓	✓
Woreda Water Office	✓	✓	✓
Woreda Women and Children Affairs Office	✓	✓	✓
Mille Woreda Maintenance and Spare Part Enterprise			✓
WASHCO			✓
AMREF	✓	✓	
CARE Ethiopia	✓	✓	
Pastoralist and Agriculture Bureau	✓	✓	
Regional Education Bureau	✓	✓	
Regional Finance and Economic Development Bureau	✓	✓	
Regional Health Bureau	✓	✓	
UNICEF	✓	✓	
Afar Community Initiative Sustainable Development Association	✓		
Lay Volunteers International Association	✓		
Pastoralist Community Development Program *	✓		
Save the Children	✓		
Semera University	✓		

The Pastoralist and Agriculture Bureau managed this program.

Organization Types, Coverage, and Sectors: Table M-2 summarizes the types and numbers of members currently in the alliance (right column) against those that appeared in previous periods (middle column). Of all current plus former members, 13 are government institutions at woreda (8) and regional (5) levels; six are NGOs; and one each are affiliated with an association, the private sector, and an

academic institution. None of the six NGOs currently operate and/or participate in the learning alliance, and the academic institution, Semera University, is also no longer a member of the alliance. The IRC team noted that none of the six NGOs had ever been formal learning alliance members, but had been surveyed as potential participants; that said, three of the six did participate in both the Baseline and Midterm surveys.

Organization Types, Coverage, and Sectors:

Table M-3 (below) provides a detailed summary for all organizations currently or previously included in the learning alliance, their type (legal form), geographical coverage, and sectors of work within WASH systems. These attributes will be used in the analysis to make observations regarding their indicated relationships and cooperation. The enumerator originally collected responses to this question during the first interview of the actor (Baseline, Midterm or Endline); however, the SWS team stated that responses had been inconsistently applied, and therefore later assigned

Table M-2: Surveyed Learning Alliance Members		
Type	**Past + Present**	**Current**
Woreda Administrations	8	7
Regional Administrations	5	1
NGOs	6	0
Associations	1	1
Private Sector	1	1
Academic Institution	1	0
Community Representative	1	1

Note attrition (last column, highlighted orange).

revised attributes for both Sectors and Functions. In Mille, this resulted in significant changes. As the Mille Learning Alliance focuses on water, most actors indicated Water Supply as a focus sector, with many of them also involved in all four of the other possible sectors.

Table M-3: Mille Learning Alliance							
Organization Types, Coverage, and Focus Sectors							
Organization	Type	Geography	Sectors				
			Water Supply	Sanitation	Hygiene	Institut. WASH	Indirect WASH**
Afar Community Initiative Sustainable Development Association*	NGO	Region					✓
AMREF*	NGO	Region	✓	✓	✓	✓	
CARE Ethiopia*	NGO	Region	✓	✓	✓	✓	
Lay Volunteers International Association *	NGO	Region	✓	✓	✓	✓	
Mille Town Water Utility	Government	Woreda	✓				
Mille Woreda Maintenance and Spare Part Enterprise	Private sector	Woreda					✓
Pastoralist and Agriculture Bureau*	Government	Woreda	✓				
Pastoralist Community Development Program*	Government	Region	✓	✓	✓	✓	
Regional Education Bureau*	Government	Region				✓	
Regional Finance and Economic Development Bureau*	Government	Region					✓
Regional Health Bureau*	Government	Region		✓	✓		

Table M-3: Mille Learning Alliance							
Organization Types, Coverage, and Focus Sectors							
Organization	Type	Geography	Sectors				
			Water Supply	Sanitation	Hygiene	Institut. WASH	Indirect WASH**
Regional Water Resource Bureau	Government	Region	✓	✓	✓	✓	
Save the Children*	NGO	Region	✓	✓	✓	✓	
Semera University*	Academic	Region					✓
UNICEF *	NGO	Region	✓	✓	✓	✓	
WASHCO	Association	Kebele	✓	✓		✓	
Woreda Administration Office	Government	Region					✓
Woreda Agriculture and Pastoralist Development Office	Government	Woreda	✓				
Woreda Education Office	Government	Woreda				✓	
Woreda Finance and Economic Development Office	Government	Woreda					✓
Woreda Health Office	Government	Woreda	✓	✓	✓	✓	
Woreda Water Office	Government	Woreda	✓	✓	✓	✓	
Woreda Women and Children Affairs Office	Government	Woreda					✓

Not presently a member of the learning alliance.
*** Indirect WASH was not a response option for Mille during the Baseline and Midterm SNAs but was asked of the two new members during the Endline; data are retained here. Mille Woreda Maintenance and Spare Part Enterprise selected only this sector.*

Organization Functions and Services: Table M-4 (following page) presents the functions and services that each current and former alliance member provides. The enumerator only asked this question the first time each organization participated in the survey (i.e., if an actor had been a member during the previous SNA, it answered the question then). Again, the SWS team later revised the Function designations for many of the actors in the interest of consistency and accuracy; these are the entries shown in the table and used in subsequent analysis.

Organization	Monitoring Regulation	Capacity Bldg.	Advocacy	Coordination	Finance	Community Mobilize	Hygiene Promotion	Research	WASH Service Provision	WASH Maintenance Support	WASH Infrastructure Development
Table M-4: Mille Learning Alliance											
Organization Functions and Services											
Afar Community Initiative Sustainable Development Association *						✓					
AMREF *		✓	✓				✓			✓	✓
CARE Ethiopia *		✓	✓			✓	✓			✓	✓
Lay Volunteers International Association *		✓	✓			✓	✓			✓	✓
Mille Town Water Utility									✓	✓	
Mille Woreda Maintenance and Spare Part Enterprise			✓							✓	
Pastoralist and Agriculture Bureau *										✓	✓
Pastoralist Community Development Program *										✓	✓
Regional Education Bureau *	✓		✓	✓	✓	✓	✓				✓
Regional Finance and Economic Development Bureau*	✓				✓						
Regional Health Bureau *	✓	✓	✓	✓	✓	✓	✓				✓
Regional Water Resource Bureau	✓	✓	✓	✓	✓	✓				✓	✓
Save the Children *		✓	✓	✓			✓			✓	✓
Semera University *								✓			
UNICEF *		✓	✓	✓	✓	✓	✓			✓	✓
WASHCO						✓			✓	✓	
Woreda Administration Office	✓				✓						
Woreda Agriculture and Pastoralist Development Office										✓	✓
Woreda Education Office			✓	✓	✓	✓	✓		✓		✓
Woreda Finance and Economic Development Office	✓				✓						
Woreda Health Office		✓	✓	✓	✓	✓	✓		✓	✓	✓
Woreda Water Office		✓		✓	✓	✓			✓	✓	✓
Woreda Women and Children Affairs Office	✓										

* Not currently a member of the learning alliance.

Mille Learning Alliance Network Snapshot

Overall Network Metrics: Table M-5 (right) provides a comparative summary of network metrics for the Mille Learning Alliance, tracking the survey results from the Baseline (second column from left) through Midterm (middle) and Endline (right) periods. The table summarizes the network metrics for the overall network (top), and for each of the three types of relationships (Information-Sharing, Direct Coordination, and Problem-Solving). The metrics shown here include only current members of the learning alliance.

Relationships and Connections: Reported connections decreased from the Midterm for all types of relationships. Information-Sharing remains the most common type of relationship (65 connections), followed by Direct Coordination (30) and then Problem-Solving (27); the decrease in connections is mostly attributed to the reduction in members surveyed. (Again, some of the stakeholders surveyed at the Baseline had not been considered members.) There currently remain 11 members of the alliance. Note that the enumerator did not survey former members, but included them as potential survey responses; only current members, however, are presented in Table M-5.

Table M-5: Mille Network Snapshot					
Metric Changes from Baseline to Midterm to Endline					
Metric	**Baseline**	**Midterm**	**Change**	**Endline**	**Change***
Overall Network					
Size (Actors)	21	16	-24%	11	-31%
Connections	117	144	+23%	66	-54%
Information-Sharing					
Connections	122	109	-11%	65	-39%
Density	29%	45%	+55%	59%	+31%
Average Degree	5.81	6.81	+17%	11.82	+74%
Average Distance	1.91	1.31	-31%	1.29	-2%
Direct Coordination					
Connections	62	76	+23%	30	-61%
Density	26%	42%	+62%	27%	-36%
Average Degree	5.14	6.25	+22%	5.45	-13%
Average Distance	1.98	1.55	-22%	1.58	+2%
Problem-Solving					
Connections	67	61	-9%	27	-56%
Density	16%	25%	+56%	25%	0%
Average Degree	3.19	3.81	+19%	4.91	+29%
Average Distance	2.49	1.66	-33%	1.67	+1%

* Percent change from the Midterm.

Network Metrics: Network Density varies considerably among the three types of relationships. It is highest (and the only increase from the Midterm) for Information-Sharing (59 percent), declined for Direct Coordination (42 percent to 27 percent, presently), and remained constant at 25 percent for Problem-Solving. The low density for Direct Coordination and Problem-Solving reflects relatively fewer functional relationships in these important areas. Average Degree (average number of connections per actor) is a good indicator for comparing the average interaction per actor with earlier periods. The Average Degree for Information-Sharing (11.82) is more than double that for Direct Coordination (5.45) and Problem-Solving (4.91), again indicating that these relationships are struggling in the network.

Average Distance (number of steps from one actor to another) remains low (low values here being preferable), indicating that all members can easily gain access to other members, and the ability of information to flow through the network is likely efficient.
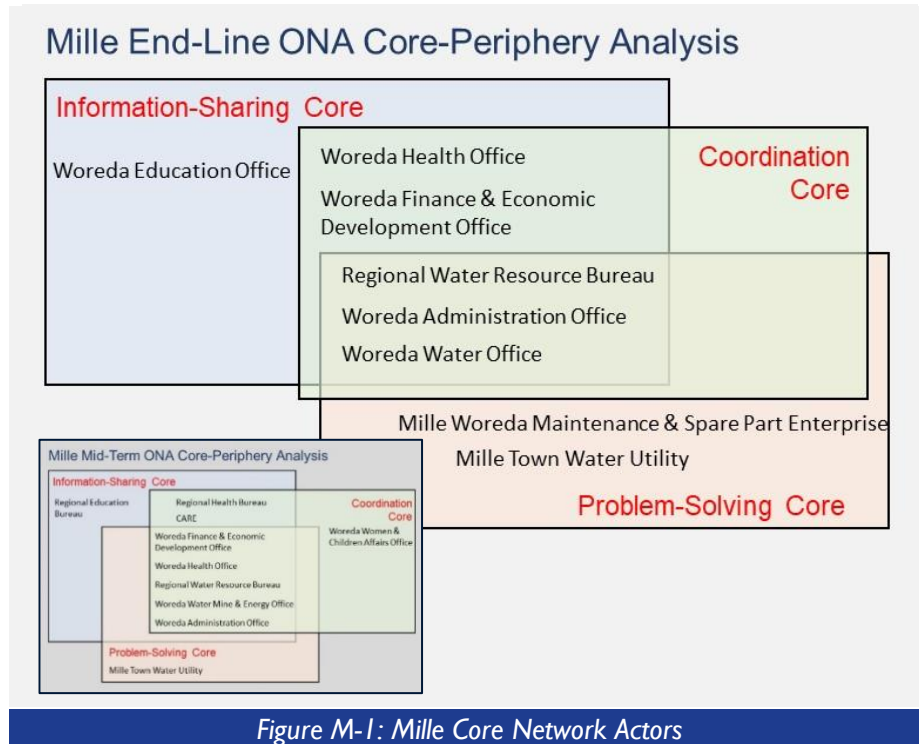
Figure M-1: Mille Core Network Actors

Core Network Actors

Core-Periphery Model: Figure M-1 shows the core network actors for each of the three types of relationships, and how they overlap. As shown in the diagram, in Mille eight actors are identified as cores in one or more type of relationship; three appear as cores of all three types of relationships, and two are cores in Information-Sharing and Coordination. Actors residing in the periphery are not shown.

Findings and Observations: All the cores in the Endline analysis are actors that remain in the alliance. In fact, eight of the 11 remaining members are identified as cores; given the relatively low Densities, it is likely that the Core-Periphery Analysis is unable to distinguish significantly between actors' roles. (i.e., the attrition likely limits the utility of this analysis.) No actors who have left the alliance appear as cores, although several do still have reported relationships (In-Degrees).

Comparison with Midterm: Comparing the Endline with the Midterm analysis, several notable changes occurred in the core network dynamics. The Midterm analysis reported 10 total Cores, five of whom appeared in all three types of relationships, with two in Information-Sharing and Coordination. The Woreda Water Office had not appeared as a core in the Midterm but now appear as a core in all three types of relationships, perhaps reflecting an increased role in the alliance during the period. Numerous actors who previously appeared as cores in the Midterm no longer appear: Woreda Water

Mine and Energy Office (appeared in cores of all three relationships), CARE Ethiopia (two types), Regional Education Bureau, Regional Health Bureau, and Woreda Women and Children Affairs Office. Of these, only Woreda Women and Children Affairs Office remains in the learning alliance. Developing and including women's, children's, and other social interest groups can present opportunities to strengthen social inclusion in WASH and the broader community.

New Learning Alliance Members: Of the two new alliance members (Mille Woreda Maintenance and Spare Part Enterprise and WASHCO), only Maintenance and Spare Part Enterprise appears in the Problem-Solving core, reflecting its mission to address water supply and maintenance issues. Expanding its role and integration in the alliance in areas of Coordination and Information-Sharing may further strengthen the network and help to resolve the ongoing water supply constraints. WASHCO does not appear as a Core in any relationship type.

Sector-Based Analysis

Sector-Based Network Metrics: Figure M-2 presents key network metrics for each of the five possible sectors (left column). As with the other alliances, the SWS project team made the sector designations used for this analysis. The two maps in Figure M-2 represent the Water Supply Sector with only current members (left), and with all former members and previously surveyed stakeholders (right).

Sector	Actors	Connections	Density	Avg. Degree	Reciprocity
Water Supply	13	32	21%	4,92	33%
Institutional WASH	12	31	23%	5.17	29%
Sanitation	11	25	23%	4.55	25%
Hygiene	10	19	21%	3.80	19%
Indirect WASH	7	7	17%	2.00	40%

Figure M-2: Mille Sector-Based Analysis
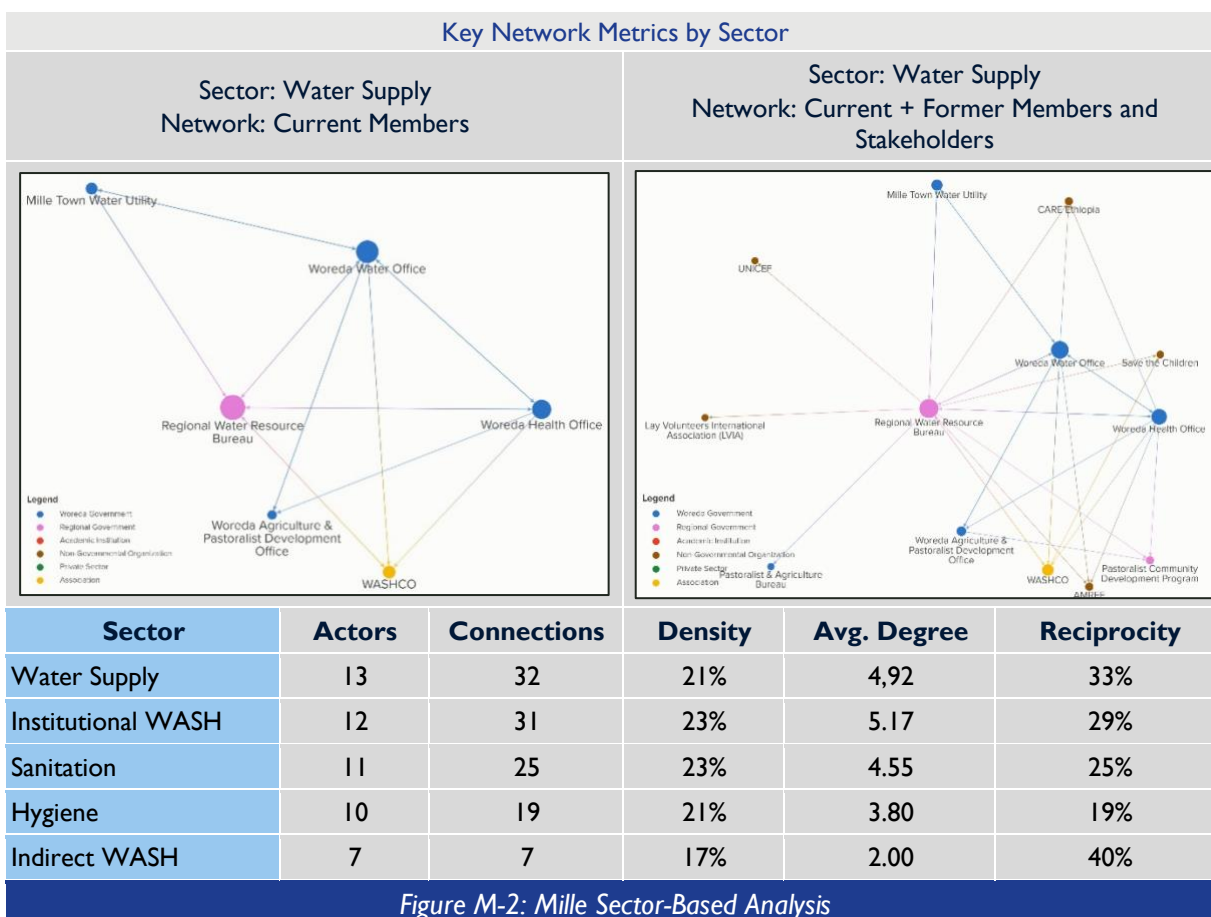
Analysis: Despite the Mille Learning Alliance focusing primarily on Water Supply, many of the actors' functions intersect with areas of Institutional WASH, Sanitation, and Hygiene. Examining the metrics, however, it is relatively consistent between the three sector-based sub-networks in terms of actors, Density (17 percent to 23 percent), and other metrics. Comparing the two maps (left, current members; right, current + former), the reader can readily observe the reduction of actors, particularly the NGOs (5) that have completed programs or are not currently involved. Looking closer, however, the main relationships and key actors remain the most active in the network (former members lie largely in the periphery).

Function/Mission-Based Analysis

Function/Mission-Based Network Metrics: Figure M-3 examines sub-networks and metrics by indicated organizational function or mission; again, the enumerator allowed multiple selections for the response, and the SWS team provided the responses used in this analysis. The data in the table section of Figure M-3 display key network metrics for function-based sub-networks for current members only (left, gray) and for current plus former members and stakeholders (right, light blue). Markedly in the case of Mille, there are significant differences between these two. The reader may choose to reconsult Table M-4 in specific cases as a reminder of which actors are providing which functions.

Figure M-3: Mille Function-Based Analysis

Mission/Function	Current Members Only					Current + Former Members, Stakeholders				
	Actors	Connect.	Dens.	Degree	Recipr.	Actors	Connect.	Dens.	Degree	Recipr.
WASH Maintenance Support	7	25	60%	7.14	79%	14	39	21%	5.57	39%
Financing	6	28	93%	9.33	87%	10	35	39%	7.00	59%
Community Mobilization	5	17	85%	6.80	70%	11	26	24%	4.73	37%
WASH Infrastructure Dev.	5	14	70%	5.60	75%	14	31	17%	4.43	24%
WASH Service Provision	5	13	65%	5.20	63%	5	13	65%	5.20	63%
Coordination	4	11	92%	5.50	83%	8	17	30%	4.25	42%
Monitoring and Regulation	4	8	67%	4.00	60%	7	12	29%	3.43	33%
Advocacy	4	8	67%	4.00	60%	11	19	17%	3.45	19%
Capacity Building	3	6	100%	4.00	100%	9	17	24%	3.78	21%
Hygiene Promotion	2	2	100%	2.00	100%	9	6	8%	1.33	20%
Research	---	---	---	---	---	1	---	---	---	---

Note: Orange-highlighted cells follow points of discussion in narrative.

Function-Based Sub-Network Metrics: Looking at the actors column in the left (gray) table versus those on the right (light blue) table in Figure M-3, the reader can quickly observe the significantly higher number of former alliance members working in each functional area; again, these do also include some stakeholders who had been formerly surveyed but ultimately did not join the alliance. In the top-cited functions (orange) the reader can see that the current members are roughly half of all current plus former. Again, the former members and stakeholders include numerous NGOs and various administrations. In the case of Mille, due to the high number of these actors, it is probably most insightful to primarily look at only the current members (left, gray). First, the Density (orange highlighted column) of all function-based sub-networks is high; 60 percent is the lowest measure. This indicates a

small, yet very cohesive network. The high reciprocity figures (orange column) reinforce this finding, as respondents reciprocate most of the connections on both sides of the connection.

Sub-Network Maps: Looking at the network maps in the top of Figure M-3, the reader can make several observations. The map on the left shows the network of *current members* working in WASH Maintenance Support. This function has the greatest number of actors, and the reader can easily observe its high interconnectivity (Density = 60 percent). Again, this illustrates that even in the largest of the function-based sub-networks, the alliance appears to have healthy relationships with high rates of interaction between members. The map on the right shows the network of actors working in Community Mobilization, which in this case includes all current and former members. This map clearly reinforces the situation on the ground, especially with the NGOs (brown), as the former members and stakeholders are those located around the periphery, while the five most prominent actors in the center of the diagram are the five *current* members.

Most-Cited Functions: Lastly, looking at the most cited organizational functions, WASH Maintenance Support (7 current, 14 total members) is the highest, followed by Financing, Community Mobilization, WASH Infrastructure Development, and WASH Service Provision. Note that in the right section, Advocacy as well as Monitoring and Regulation were highly represented among total members plus stakeholders, while they are far less represented functions in the current membership (currently only four actors each). Readers can use the Kumu link to filter and display results using other, various criteria.

Information-Sharing Relationships

Information-Sharing Network: Figure M-4 below displays the Information-Sharing and prominent network actors according to In-Degree (most oft-cited by other respondents); Closeness Centrality (closest distance to all other actors, effective at spreading information); and Betweenness Centrality (most often lie on the shortest path between any two other actors, effectively serving as bridges between actors).

Prominent Actors: The top actors in terms of the three metrics are generally consistent — not surprising given the smaller number of stakeholders (11) remaining in the alliance. The Woreda Water Office possesses 10 in-degrees, followed by those listed below in the table with seven and six. Only the top actor in Betweenness (Regional Water Resource Bureau) possessed a significant betweenness (0.162), as the second and those following all have a Betweenness of 0.071 or lower. Closeness metrics are considerably higher, indicating the sub-network's greater propensity to spread information throughout the network than to coordinate at higher levels. As with the other networks, Information-Sharing has the most connections of the three forms of relationships. WASHCO bears mention, as six actors named it (In-Degree = 6) for Information-Sharing, but it does not appear in the top six in the Closeness and Betweenness cohesiveness metrics. For reference, WASHCO named only four other actors (Out-Degree = 4). All the actors listed in the table remain as members in the learning alliance.

Network: Mille	Network Metrics: Actors: 23
Information-Sharing Network	Connections: 86
All Current and Former Members	Density: 17%
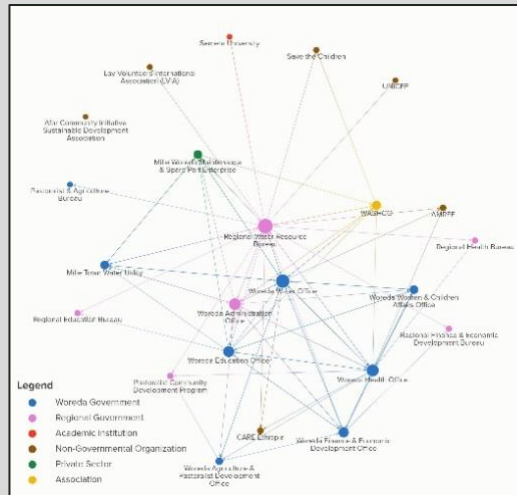
Top-Six Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Woreda Water Office	Regional Water Resource Bureau	Regional Water Resource Bureau
2	Regional Water Resource Bureau	Woreda Health Office	Woreda Water Office
3	Woreda Admin. Office	Woreda Water Office	Woreda Health Office
4	WASHCO	Woreda Admin. Office	Woreda Finance and Econ. Dev. Office
5	Woreda Finance and Econ. Dev. Office	Woreda Education Office	Woreda Admin. Office
6	Woreda Health Office	Woreda Finance and Econ. Dev. Office	Woreda Education Office

Figure M-4: Mille Information-Sharing Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Betweenness Centrality for the Information-Sharing relationships; Table M-6 compares the top-five Betweenness (bridging) actors from the Baseline, Midterm, and Endline SNAs. As shown, various actors' roles have evolved over time, although between the Midterm and Endline, four of the top five are consistent (albeit in different order). Again, attrition is reflected from those prominent in the Baseline, as three of the top five are no longer learning alliance members. Only the Regional Water Resource Bureau and Woreda Water Office have consistently remained; both remain learning alliance members. All the Endline leaders in Betweenness are regional- or woreda-level public institutions.

| *Table M-6: Mille Prominent Actors*		
Betweenness Centrality (Bridging Actors)		
Baseline	**Midterm**	**Endline**
Pastoralist Commun. Dev. Prog. *	Woreda Water Office	Regional Water Resource Bureau
Regional Health Bureau *	Regional Water Resource Bureau	Woreda Water Office
Regional Water Resource Bureau	Woreda Finance and Econ. Dev. Office	Woreda Health Office
Woreda Water Office	Woreda Admin. Office	Woreda Finance and Econ. Dev. Office
CARE Ethiopia *	Regional Health Bureau	Woreda Admin. Office

* No longer a learning alliance member.

Frequency of Information-Sharing: The enumerator asked survey respondents which other current and former learning alliance members they shared information with during the past six months, and how

often they engaged — more or less than once per month. Results are presented in Figure M-5, alongside the results from the Baseline and Midterm analyses. It is noted that the Baseline and Midterm survey phrased the question in terms of information requests *from others to the respondent* (only one direction).

As shown, Information-Sharing between Mille Learning Alliance members peaked during the Midterm period; at that time, the alliance had 16 members (compared to 21 at the Baseline period, and 11 presently).

Frequency of Sharing: The proportion of Frequent (>1/month) to Infrequent (<1/month) remained constant between the Midterm and Endline. In the current Endline survey, all 11 stakeholders surveyed indicated an average of 7.8 Information-Sharing relationships with other actors, including both current as well as previous learning alliance members with whom they remain in contact.

Figure M-5: Mille Information-Sharing
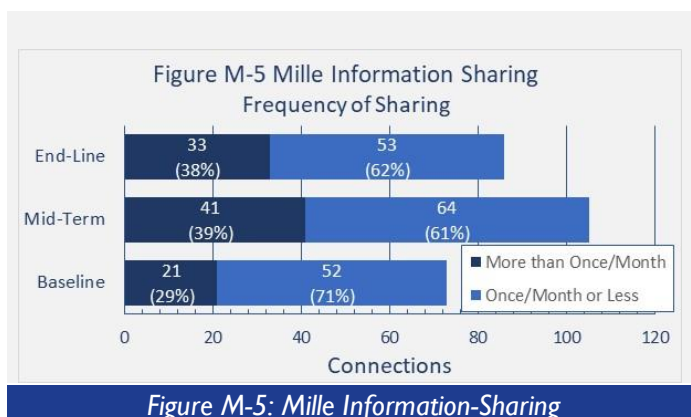
Information-Sharing with Former Learning Alliance Members: Due to attrition and institutional reorganizing, 12 actors that previously participated in the alliance are no longer members but remained on the survey as potential responses. (Thus, they could inherently only receive In-Degrees.) As an indicator of their continued importance in Mille water activities, Table M-7 presents those actors and the number of Information-Sharing relationships cited (only those with multiple citations are shown). As shown in the table, three current members mention a number of the former members (six received multiple citations).

Table M-7: Mille Information-Sharing	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
AMREF	3
CARE Ethiopia	3
Pastoralist Community Dev. Program	3
Regional Education Bureau	2
Regional Finance and Economic Development Bureau	2
Save the Children	2

Coordination Relationships

Coordination Network: Figure M-6 below illustrates the Mille Coordination sub-network map and prominent network actors according to In-Degree, Closeness Centrality, and Betweenness Centrality. Note the significantly fewer Coordination (43) connections than Information-Sharing (86) and the less dense network (8 percent). The most prominent actors are generally consistent with the Information-Sharing connections, although two former actors rank in the top six for In-Degree: CARE Ethiopia and Pastoralist Community Development Program. All the organizations ranking highest in Closeness (information spreaders) and Betweenness (bridging actors) are current members of the alliance. As with Information-Sharing, Betweenness values are low, nearing values of 0.00 from Rank 3 and lower.

Network: Mille	Network Metrics:	Actors: 23
Coordination Network		Connections: 43
All Current and Former Members		Density: 8%
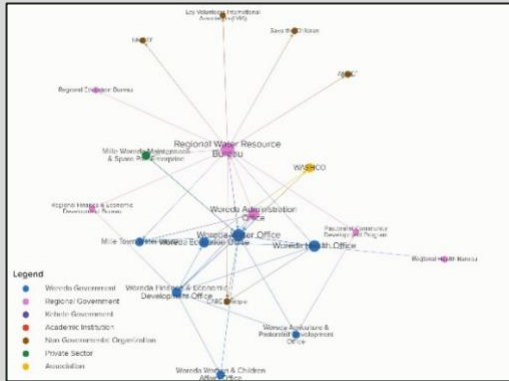
Top -ix Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Woreda Water Office	Regional Water Resource Bureau	Woreda Water Office
2	Regional Water Resource Bureau	Woreda Water Office	Regional Water Resource Bureau
3	CARE Ethiopia *	Woreda Health Office	Woreda Finance and Econ. Dev. Office
4	Mille Town Water Utility	Woreda Finance and Econ. Dev. Office	Woreda Health Office
5	Woreda Finance and Econ. Dev. Office	Woreda Admin. Office	Woreda Admin. Office
6	Pastoralist Comm. Dev. Program *	Woreda Ag. and Pastoral. Dev. Office	Mille Town Water Utility

No longer learning alliance members.

Figure M-6: Mille Coordination Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Closeness Centrality for the Coordination relationships; Table M-8 compares the top-five Closeness (information-spreading) actors from the Baseline, Midterm. and Endline SNAs. Some of the actors' roles have evolved, and several of the formerly prominent members are no longer members of the alliance: Pastoralist Community Development Program served a prominent role in the Baseline, but by the Midterm had dropped from the alliance. CARE is no longer a member, but had been prominent in Closeness in both the Baseline and Midterm.

Table M-8: Mille Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	Midterm	Endline
Pastoralist Comm. Dev. Program *	Woreda Health Office	Regional Water Resource Bureau
Regional Water Resource Bureau	CARE Ethiopia *	Woreda Water Office
Regional Health Bureau *	Regional Health Bureau *	Woreda Health Office
CARE Ethiopia *	Woreda Finance and Econ. Dev. Office	Woreda Finance and Econ. Dev. Office
Woreda Education Office	Regional Water Resource Bureau	Woreda Admin. Office

No longer learning alliance members.

Type of Coordination Activities: The enumerator asked respondents what types of activities they cooperated with current and former alliance members. Results are presented in Figure M-7, alongside the results from the Midterm analysis (the Baseline did not present these results). Direct Coordination

decreased in four of the five types of activities (average decrease 47 percent); only in Maintenance and Rehabilitation did instances of Direct Coordination increase (52 percent). In the Midterm period Maintenance and Rehabilitation scored as the least-common activity for coordination. The most significant decreases in Coordination took place in the activity areas of Service Provision (down 57 percent) and Community Engagement (down 62 percent). Of four stakeholders initially working in WASH Service Provision, only one remains (Regional Water Resource Bureau). Of nine actors initially working in Community Engagement, only three remain.

Network Maps: At the bottom of Figure M-7 are two network maps. The map on the left shows the sub-network of current alliance members working in Service Provision; the Woreda Water Office resides at the center of relationships, as is the case for most of the Coordination sub-networks. The figure on the right shows the current and former members working in Community Engagement. Most of the disconnected actors are former members of the alliance, mostly NGOs and other non-government actors, highlighting the attrition, as well as potentially lost opportunities in working together with actors from other sectors.

Figure M-7: Mille Coordination Activities
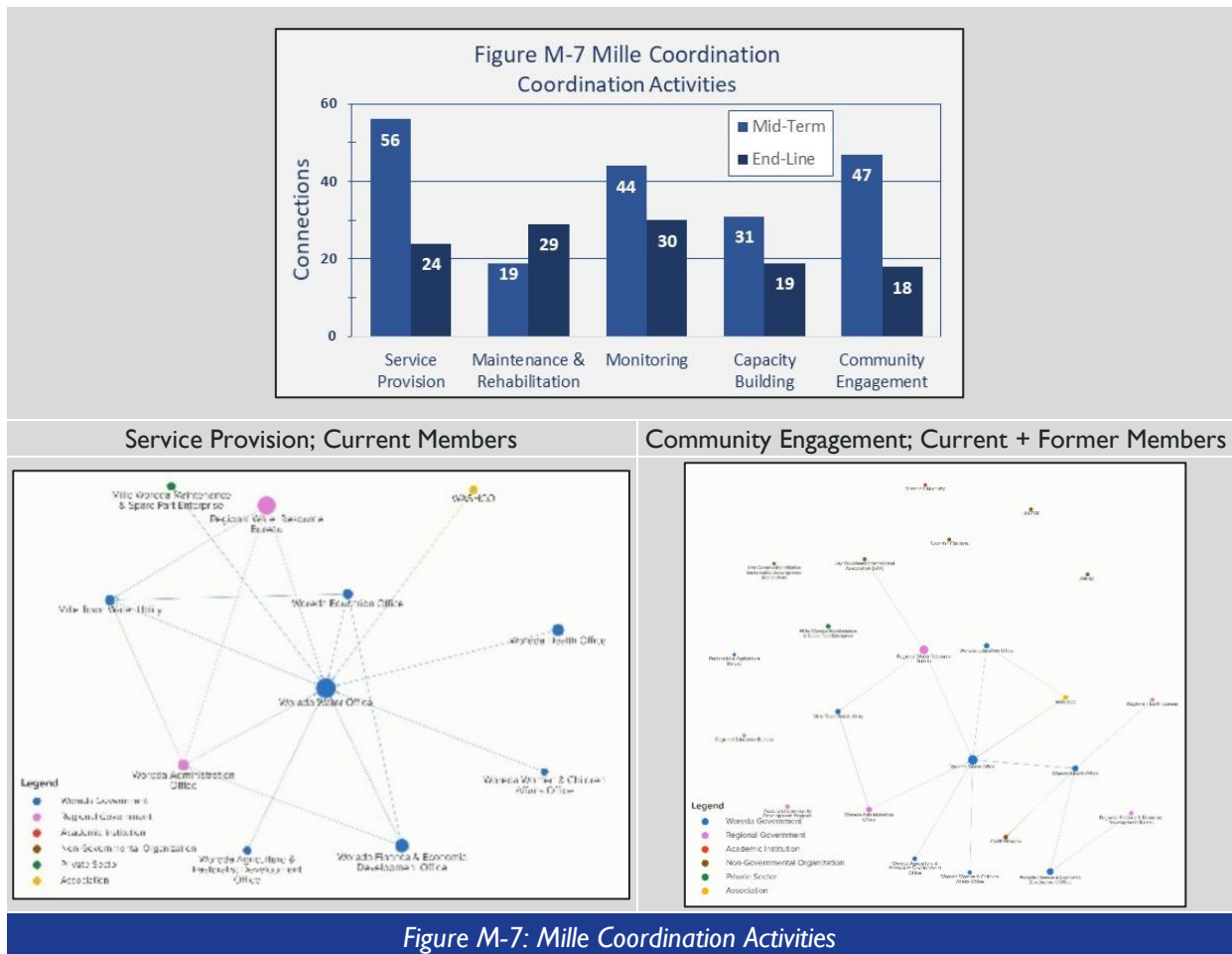
Maintenance and Rehabilitation: The increase in coordination in Maintenance and Rehabilitation is a positive sign, as the maintenance of water systems in Mille is an area of considerable priority. Interestingly, the Mille Woreda Maintenance and Spare Part Enterprise, a newly added member of the alliance founded by unemployed youth, does not appear as a prominent actor in any type of coordination; in fact, only one member cited it. Recall, however, that it figured prominently in Information-Sharing. The learning alliance might seek ways to better integrate the Mille Woreda Maintenance and Spare Part Enterprise into further or more advanced coordination efforts in maintenance and rehabilitation initiatives.

Coordination Relationships: In the Endline survey, all 11 stakeholders surveyed indicated at least one coordination relationship, with an average of 4.0 coordination relationships (Out-Degree) with other actors, including both current and previous learning alliance members. This reflects a decrease of 16 percent over the number of coordination relationships (4.75 average Out-Degree) from the Midterm SNA—not surprising given the membership attrition.

Table M-9: Mille Coordination	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
CARE Ethiopia	3
Pastoralist Comm. Dev. Program	3
Regional Education Bureau	2
Regional Finance and Econ. Dev. Bureau	2
Regional Health Bureau	2
Save the Children	2

Coordination with Former Learning Alliance Members: Table M-9 presents the indicated coordination relationships with actors who previously participated in the learning alliance but who no longer remain members (In-Degrees); only those with at least two citations from current members are shown. However, current members cited 11 of the 12 former members at least once. CARE Ethiopia and the Pastoralist Community Development Program had the highest In-Degrees of former alliance members, with three each. Recall that these organizations had also placed among the highest Information-Sharing relationships.

Problem-Solving Relationships

Problem-Solving Network: Figure M-8 below illustrates the Problem-Solving sub-network map and prominent network actors according to selected metrics. Problem-Solving relationships are the least common of the three types of relationships, with only 39 connections indicated. The most prominent actors are again consistent with those from the other types of relationships. The Woreda Water Office is the clear leader with an In-Degree of 10, distantly followed by Mille Woreda Maintenance and Spare Part Enterprise, and Regional Water Resource Bureau, each with 4. In Closeness (information spreaders), the Regional Water Resource Bureau and Woreda Water Office lead the other organizations. Again, Betweenness (bridging) is low throughout the network, with only the four shown having non-zero values.

Network: Mille	Network Metrics: Actors: 23
Problem-Solving Network	Connections: 39
All Current and Former Members	Density: 8%
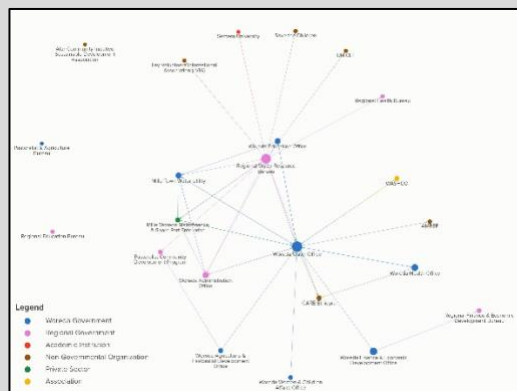
Top-Six Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Woreda Water Office	Regional Water Resource Bureau	Woreda Water Office
2	Mille Woreda Maint. and Spare Part Enterpr.	Woreda Water Office	Regional Water Resource Bureau
3	Regional Water Resource Bureau	Mille Town Water Utility	Mille Town Water Utility
4	CARE Ethiopia *	Woreda Admin. Office	Woreda Admin. Office
5	Mille Town Water Utility	Mille Woreda Maint. and Spare Part Enterpr.	---
6	Woreda Admin. Office	Woreda Finance and Econ. Dev. Office	---
* No longer a learning alliance member.			

Figure M-8: Mille Problem-Solving Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Closeness Centrality for the Problem-Solving relationships. Table M-10 compares the top-five Closeness (information-spreading) actors from the three SNAs. In the Baseline, four of the top five most prominent information-spreading actors are no longer in the alliance. In the Endline analysis, all five of the top actors represent either Regional or Woreda Government offices. As is the case in most all sub-networks that can be examined in this alliance, the Regional Water Resource Bureau is one of the main actors.

Problem-Solving Resolution: The enumerator asked respondents which other current and

Table M-10: Mille Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	**Midterm**	**Endline**
Regional Water Resource Bureau	Woreda Water Office	Regional Water Resource Bureau
Regional Finance and Econ. Dev. Bureau *	Woreda Education Office	Woreda Water Office
CARE Ethiopia *	Woreda Administration Office	Mille Town Water Utility
UNICEF *	Mille Town Water Utility	Woreda Admin. Office
AMREF *	Woreda Health Office	Mille Woreda Maint. and Spare Part Enterpr.

* No longer learning alliance members.

former members they either sought, or received requests to provide, Problem-Solving assistance from during the previous six months, and whether the assistance had been provided and the issue resolved. Results for the Endline survey are presented in Figure M-9. In 36 percent of cases, respondents answered that members provided support and resolved the issue, while in 49 percent of cases, members provided support but did not resolve the issue. In two cases (5 percent) support is Ongoing; in four cases (10 percent) members did not provide support. Comparing this with the Midterm SNA, in 82 percent of cases the members either Resolved the issue or the support is Ongoing; similarly, in the Baseline SNA, in 81 percent of the cases the members either Resolved the issue or the support is Ongoing. Although the precise phrasing and potential responses to the question differs from Baseline to Endline, it seems that there has been a decline in the success of alliance members working together to resolve joint challenges.

Top Actors' Requested Support Resolution: Observation of the top-three alliance members in In-Degree (named actors for Problem-Solving assistance) shows that the Woreda Water Office fielded 10 requests for assistance; members provided support in nine of the 10 cases but helped resolve only three. The Mille Woreda Maintenance and Spare Part Enterprise Development Office fielded four requests; members provided support in all four cases and resolved two. The Regional Water Resource Bureau also fielded four requests; members provided support but did not resolve three of the cases and did not address the fourth.

Figure M-9: Mille Problem Solving
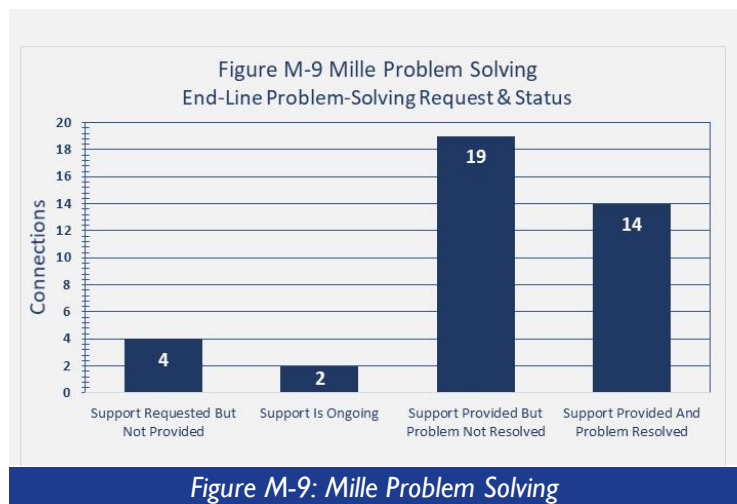
Cases of Support Requested but Not Provided: While four requests for support had been made but not provided, different entities received each of these requests, indicating that no one particular alliance member appears responsible for not responding to requests. AMREF, which is no longer a member of the alliance, is one of the four organizations that did not respond.

Average Problem-Solving Relationships: In the Endline survey, all 11 stakeholders surveyed indicated an average of 3.6 Problem-Solving relationships with other actors, including both current and former learning alliance members, representing a 7 percent decrease from the number of Problem-Solving relationships (3.8 average) from the Midterm SNA. This average of 3.6 is the lowest of the four learning alliances.

Problem Solving with Former Learning Alliance Members: Table M-11 presents the indicated Problem-Solving relationships with the

Table M-11: Mille Problem Solving	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
CARE Ethiopia	3
Pastoralist Community Dev. Program	2
AMREF	1
Lay Volunteers Int'l Assn.	1
Regional Finance and Econ. Dev. Bureau	1
Regional Health Bureau	1
Save the Children	1
Semera University	1
UNICEF	1

actors who no longer remain in the learning alliance, again 12 in total. Only CARE Ethiopia and the Pastoralist Community Development Program fielded multiple requests. For reference, the Average In-Degree for all actors in Problem-Solving relationships is 1.7; and the Average In-Degree only for those remaining in the alliance is 2.45.

Reflections on the SNA

Reflections: The Mille Learning Alliance is the smallest of the four alliances with 11 members presently. While up to 23 actors had previously been surveyed (indicating perhaps a larger alliance), the SWS team noted that some stakeholders did not ultimately participate in the alliance. Presently no NGO actors participate in the alliance, despite six having previously been surveyed. Nevertheless, the actors currently in the alliance show among the highest cohesiveness of the four learning alliances, exhibiting densities of 70 percent and higher. The high number of former actors and surveyed stakeholders makes the Mille results somewhat difficult to compare to the Baseline and Midterm, since the SNAs do not distinguish between actual learning alliance members versus the "additional stakeholders" surveyed. A new stakeholder emerged in the Endline — Mille Woreda Maintenance and Spare Part Enterprise, formed by unemployed youth to supply spare parts for water supply and distribution in the region — the success of which is partly attributed to the learning alliance and SWS facilitation and training support.

South Ari (Rural Water Learning Alliance, IRC)

Learning Alliance Overview and Initiatives

South Ari: South Ari is one of 11 woredas in the South Omo zone, located in the southwest corner of Ethiopia. The capital of the woreda Gazer is 17 km from the zone's capital, Jinka. The woreda has 46 rural kebeles, four small urban town kebeles, and a total population of about 263,000. Of the 50 kebeles, only 24 are reportedly accessible by car using dry weather roads.

South Ari Water Supply: The entirety of South Omo zone suffers from acute and severe water supply problems. Prior to SWS, water coverage in South Ari is estimated to serve only 12 percent of the area's population. According to IRC, the 2016/2017 water budget for South Omo was roughly US$0.28 per person per year, with no funds available for maintenance.

South Ari Learning Alliance: IRC facilitates the South Ari Learning Alliance, which had additional support in the form of a separate USAID project, Lowland WASH, which closed in early 2021; the two projects provided synergies, as well as the full-time presence of IRC staff to help facilitate learning alliance efforts. The goal of the learning alliance is to gain a better understanding of the woreda's water systems; coordinate to achieve the GTP II targets by 2020 and the SDGs in the longer run; gain experience by sharing best practices within the woreda and zone; and improve functionality, finance, and maintenance of water schemes to make them more sustainable. The structure of the South Ari Learning Alliance is different from the other three. Based on geographic clustering observed at the Baseline and subsequent stakeholder feedback stating that organizations interact primarily within (not between) geographies, IRC created two alliances: one at the zone level and one at the woreda level. Subsequently, the South Ari Woreda Learning Alliance has split into three sub-groups, but for the sake of experience-sharing all three alliances conducted their meetings jointly at a single location and time until the ninth meeting in September 2020. At that point the alliances decided to continue separately in their respective woredas. The tenth meeting in January 2021, conducted separately for each woreda in Jinka, focused on SDG planning. Per feedback from the IRC team: "It is worth mentioning that there was a split, but I don't think the SNA has been affected by this per say."

Learning Alliance Objectives: Objectives of the learning alliance are to:

- Promote learning, capacity building, and practices of institutions and their officials and representatives.

- Guide innovation and related activities to solve critical water delivery challenges in the woreda.

- Share best practices and lessons learned to complement existing coordination structures and activities.

- Implement an integrated pilot, focusing on asset management, institutional maintenance arrangements, finance mechanisms, and incorporating monitoring data to guide asset management.

South Ari Ongoing Activities, Progress, and Successes: Activities and challenges of the South Ari Learning Alliance are summarized below, combining input from November 2020 SWS Semiannual Report and feedback from the LINC enumerator following the SNA surveys.

- Due to COVID-19 travel and meeting restrictions, the learning alliance established group chats on the Telegram app in April 2020 to maintain communication among members; as of September 30, 2020, 79 posts had been made to the group. The alliance only scheduled one meeting during the most recent SWS reporting period to discuss WASH master planning and progress toward GTP II objectives.

- Due to the closeout of Lowland WASH, which played a key role in acting on the findings of SWS–supported Assets Inventory and Scheme Monitoring activities, members are working to transition the alliance to the Woreda Administration Office and/or the Woreda Water, Mine and Energy Office.

- In 2017, at roughly the outset of SWS and Lowland WASH, the estimated water coverage in South Omo measured only 12 percent; presently that figure has increased to 35 percent. This is attributed largely to contributions of both projects. Learning alliance members made a field visit to Uganda that dramatically and positively improved water system management, specifically in organizing a spare parts inventory and maintenance system, which is reportedly underway and improving.

South Ari SNA Findings and Recommendations

Summary: The South Ari Learning Alliance has the highest number of members (23) of the four alliances (though its structure and sub-alliances are unique), is diverse in terms of its membership, and has also had the least attrition since its inception. (Staff turnover in public institutions, on the other hand, and in keeping with the other alliances, is persistent in South Ari and has remained a challenge for the alliance.) The numbers of reported connections among alliance members stayed roughly consistent and healthy from the previous period, with only small variances. At the same time, the closeout of both SWS and Lowland WASH is raising concerns over the alliance's future and the support given to alliance members in the areas of capacity building and water scheme maintenance. The present plan, although it has yet to be finalized, is that the Woreda Administration Office and/or the Woreda Water, Mine and Energy Office will take over alliance facilitation. The Kumu link for the South Ari Learning Alliance can be found here.

Notable New Members: Since the Midterm, three new members joined the alliance, all of which are notable inclusions. World Vision's Area Program recently joined the alliance and plans interventions in the areas of WASH, education, livelihoods, health, and emergency response. Action for Development will construct four pilot sand dams in four South Omo communities, incorporating environmental protection measures and improve sustainable resource management, food security, and climate-smart agriculture. Arkisha Kebele Federation Head is a water users association (WUA) located further outside Jinka. The survey found that the former head left the WUA and opened a water supply spart parts enterprise; this can be considered a positive development that the learning alliance largely made possible.

Learning Alliance Sustainability: Numerous respondents reported the South Ari Learning Alliance had strong, positive commitment at the outset; however, interest and commitment declined over time due in large part to the turnover of members. In South Ari, the number of contacts no longer applicable during the Endline survey indicated a high level of turnover. The South Ari Alliance benefitted considerably through its cooperation with Lowland WASH, which facilitated capacity building and water scheme maintenance. Now that Lowland WASH has ended, the current plan is to transition organization responsibilities to the Woreda Administration Office and/or the Woreda Water, Mine and Energy Office.

> *Recommendation: As World Vision has already been established as a prominent alliance member — and comes with resources and a focus in WASH — perhaps it might be approached to provide facilitation and logistical support in the short-to-medium term should the alliance assume greater responsibility and independence.*

Learning Alliance Network: In the South Ari Alliance, Information-Sharing is the most common type of relationship (238 connections), with a correspondingly higher density value (47 percent), followed by Problem-Solving (109), and then Coordination (101). The reported connections increased since the Midterm for Information-Sharing and slightly decreased in the other relationships. The overall network metrics indicate that the alliance is functioning in a healthy manner in terms of its interactions; at the same time, however, concerns remain over the future due to the sustainability challenges mentioned above.

Alliance Cores: The Core-Periphery Analysis reveals 17 cores (among 23 members) across the three types of relationships; the high number of cores can be traced to the high number of reported relationships (i.e., Density) in the alliance. Three actors serve as cores in all three relationship types. The high number of relationships that alliance members sustained and reported is a significant achievement that should be relayed back to the alliance. This case and the accompanying Core-Periphery diagram is a unique way to show the members how each is contributing to various roles and types of relationships. Compared with the Midterm Core-Periphery, considerable changes occurred in the network core dynamics.

Alliance Sectors and Functions: Despite the South Ari Learning Alliance's focus on rural Water Supply, the most common sector includes those actors working on Indirect WASH (13 actors), followed by Water Supply (11). Most of those working in Indirect WASH are various zone and woreda level government offices with no direct WASH activities, plus two NGOs/projects, both no longer members. The most cited organizational functions are Advocacy (17), Community Mobilization (16), and Coordination and Hygiene Promotion (14); these same functions also exhibit the highest number of connections. This SNA can be used to show alliance members how introducing effective coordinating partners from other functional areas might enhance Water Supply sector coordination.

Information-Sharing Network: The number of reported Information-Sharing relationships (241) increased 19 percent from the Midterm and are the most common type of relationship. The most prominent actors include the Zone Water, Mine and Energy Department; Woreda and Zone Water,

Mine and Energy Office; and Lowland WASH. All 23 current members cited an average of 11.3 Information-Sharing connections (Out-Degree) with other members; the high number of connections and other metrics indicate a high level of communication and Information-Sharing between alliance members (nearly twice per month per actor, on average). This suggests that even a few members' modest efforts can help the alliance to sustain its efforts going forward. Also noteworthy is that while the alliance has mostly sustained its membership, even those organizations that are no longer members (all NGOs) still reportedly share information with each another.

Coordination Relationships: Coordination connections (101) are less than half the number of Information-Sharing (238) connections, and nearly the same as in the Midterm (104). The most common areas of Coordination are in Service Provision, Monitoring, and Community Engagement, although alliance members are active in all five areas of coordination. Coordination increased in all five areas since the Midterm; the number of instances nearly doubled (or exceeded) in areas of Maintenance and Rehabilitation, Monitoring, and Capacity Building. The increase in Coordination in Maintenance and Rehabilitation (135 percent) is considered positive, as the maintenance, rehabilitation, and spare parts supply are cited as urgent needs in South Ari. Monitoring (up 97 percent) and Capacity Building (up 82 percent) are similarly reported areas of need, particularly with respect to monitoring and training WUAs.

Problem-Solving Network: The 109 reported instances of Problem-Solving connections between current and former members in the past six months represents a decline of 27 percent from the Midterm, although still a healthy number. Again, Lowland WASH figured prominently in Problem-Solving. All 23 current members indicated an average of 5.0 Problem-Solving connections with current and former learning alliance members, representing a 17 percent decrease from the Midterm SNA (6.0 average). Other prominent Problem-Solving members include the new member, NGO Action for Development, Zone Education Department, and Arkisha Kebele Federation Head. Alliance members appear to take Problem-Solving seriously. In 81 percent of cases members provided the requested assistance and resolved 47 percent of the cases. Members (current + former) did not provide the requested support in only 15 of 115 cases.

Learning Alliance Members and Attributes

Surveyed Members: Table SA-1 on the following page presents the learning alliance members surveyed in the Baseline (23 in total), Midterm (20), and Endline (23) SNAs. The Endline includes three new stakeholders added to the alliance; none dropped between the Midterm and Endline. (Four dropped from the Baseline to the Midterm period, with one new added.) This alliance experienced low member attrition over the SWS project, although respondents cited declining interest in meetings and activities. Table SA-1 presents all current and former members.

Table SA-1: South Ari Learning Alliance			
Surveyed Alliance and Network Members			
Organization	Baseline	Midterm	Endline
Action for Development			✓
Arkisha Kebele Federation Head			✓
Gazer Town Water Utility	✓	✓	✓
International Rescue Committee Lowland WASH *	✓	✓	✓
Jinka Town Water Utility	✓	✓	✓
Jinka TVETC	✓	✓	✓
Jinka University	✓	✓	✓
Woreda Administration Office	✓	✓	✓
Woreda Agriculture and Natural Resources Office	✓	✓	✓
Woreda Education Office	✓	✓	✓
Woreda Enterprise and Industry Development Office **		✓	✓
Woreda Finance and Economic Development Office	✓	✓	✓
Woreda Health Office	✓	✓	✓
Woreda Water, Mine and Energy Office	✓	✓	✓
Woreda Women and Children Affairs Office	✓	✓	✓
World Vision			✓
Zone Administration Office	✓	✓	✓
Zone Agriculture and Natural Resources Department	✓	✓	✓
Zone Education Department	✓	✓	✓
Zone Finance and Economic Development Department	✓	✓	✓
Zone Health Department	✓	✓	✓
Zone Water, Mine and Energy Department	✓	✓	✓
Zone Women and Children Affairs Department	✓	✓	✓
AMREF	✓		
Catholic Development	✓		
Save the Children	✓		
South Omo Development Association	✓		

* USAID Lowland WASH has closed but the enumerator surveyed International Rescue Committee staff via telephone for this SNA.
** Formerly known as Woreda Microfinance Enterprise. This change has been made throughout this section.

Organization Types, Coverage, and Sectors: Table SA-2 summarizes the types and numbers of members currently in the alliance (right column) against those that appeared in previous periods (middle column). Table SA-3 (below) presents all current and former members and stakeholders in the learning alliance, their type (legal form), geographical coverage, and sectors of work. As the South Ari

Table SA-2: Surveyed Learning Alliance Members		
Type	**Past + Present**	**Current**
Woreda Administrations	8	8
Zone Administrations	7	7
NGOs	7	3
Town Government	2	2
Academic Institution	2	2
Association	1	1

Learning Alliance focuses on water, most of the actors indicated Water Supply as a focus sector, with many of them also involved in Indirect WASH and Institutional WASH. As with the other learning alliances, the SWS team provided the Sector designations used in this analysis. (As a note, considerably more respondents had self-selected Sanitation and Hygiene.)

Table SA-3: South Ari Learning Alliance							
Organization Types, Coverage, and Focus Sectors							
Organization	Type	Geography	Sectors				
			Water Supply	Sanitation	Hygiene	Institut. WASH	Indirect WASH
Action for Development	NGO	Zone	✓	✓	✓	✓	
AMREF *	NGO	Zone	✓				
Arkisha Kebele Federation Head	CBO	Kebele	✓			✓	
Catholic Development *	NGO	Zone	✓				
Gazer Town Water Utility	Government	Town	✓				
International Rescue Committee/Lowland WASH*	NGO	Zone	✓	✓	✓		
Jinka Town Water Utility	Government	Town	✓				
Jinka TVETC	Academic	Zone					✓
Jinka University	Academic	Zone					✓
Save the Children *	NGO	Zone					✓
South Omo Development Association *	NGO	Zone	✓				✓
Woreda Administration Office	Government	Woreda					✓
Woreda Ag. and Nat. Res. Office	Government	Woreda					✓
Woreda Education Office	Government	Woreda				✓	
Woreda Enterpr. and Industry Dev. Office **	Government	Woreda					✓
Woreda Finance and Econ. Dev. Office	Government	Woreda					✓
Woreda Health Office	Government	Woreda		✓	✓	✓	
Woreda Water, Mine and Energy Office	Government	Woreda	✓			✓	
Woreda Women and Children Affairs Office	Government	Woreda					✓
World Vision	NGO	Zone	✓	✓	✓	✓	
Zone Administration Office	Government	Zone					✓
Zone Ag. and Nat. Res. Dept.	Government	Zone					✓
Zone Education Dept.	Government	Zone				✓	
Zone Finance and Econ. Dev. Dept.	Government	Zone					✓
Zone Health Dept.	Government	Zone		✓	✓	✓	
Zone Water, Mine and Energy Dept.	Government	Zone	✓				
Zone Women and Children Affairs Dept.	Government	Zone					✓

* Not presently a member of the learning alliance.
** Formerly Woreda Microfinance Enterprise.

Actor Type: Table SA-3 (above) summarizes the types of actors surveyed, comparing previous with current members. Four of originally five NGO members left the alliance following the Baseline, while the alliance added two new members following the Midterm. Additionally, Lowland WASH has closed, but project staff participated in the survey via telephone for this SNA. (Lowland WASH is therefore no longer a member of the alliance, but it was included in this SNA.)

Organization Functions and Services: Table SA-4 (following page) displays the functions and services that each current and former Learning Alliance member provided. The enumerator asked this question only the first time an organization participated in an SNA survey. Again, the SWS team later revised the Function designations for many of the actors in the interest of consistency and accuracy; these are the entries shown in the table and used in subsequent analysis.

Table SA-4: South Ari Learning Alliance

Organization Functions and Services

Organization	Monitoring Regulation	Capacity Bldg.	Advocacy	Coordination	Finance	Community Mobilize	Hygiene Promotion	Research	WASH Service Provision	WASH Maintenance Support	WASH Infrastructure Development
Action for Development		✓	✓	✓		✓	✓			✓	✓
AMREF *		✓	✓	✓		✓	✓			✓	✓
Arkisha Kebele Federation Head						✓	✓		✓	✓	
Catholic Development *		✓	✓	✓			✓			✓	✓
Gazer Town Water Utility									✓	✓	✓
International Rescue Committee/Lowland WASH *		✓	✓	✓		✓	✓			✓	✓
Jinka Town Water Utility					✓				✓	✓	✓
Jinka TVETC		✓									
Jinka University		✓				✓		✓			
Save the Children *		✓	✓	✓		✓	✓				
South Omo Development Association *			✓			✓					✓
Woreda Administration Office	✓		✓	✓	✓	✓					
Woreda Ag. and Nat. Res. Office			✓	✓			✓				
Woreda Education Office			✓	✓	✓	✓	✓		✓	✓	✓
Woreda Enterprise and Industry Development Office**		✓									
Woreda Finance and Economic Development Office	✓			✓	✓						
Woreda Health Office		✓	✓	✓	✓	✓	✓		✓	✓	✓
Woreda Water, Mine and Energy Office	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Woreda Women and Children Affairs Office			✓	✓			✓				
World Vision		✓	✓			✓	✓				✓
Zone Administration Office	✓		✓		✓						
Zone Ag. and Nat. Res. Dept.	✓										
Zone Education Dept.	✓						✓			✓	✓
Zone Finance and Econ. Dev. Dept.	✓					✓					
Zone Health Dept.	✓	✓	✓	✓		✓	✓				
Zone Water, Mine and Energy Dept.	✓	✓	✓	✓	✓	✓				✓	✓
Zone Women and Children Affairs Dept.	✓		✓			✓					

* Not currently a member of the learning alliance.

Table SA-4: South Ari Learning Alliance											
Organization Functions and Services											
	Functions and Services										
Organization	Monitoring Regulation	Capacity Bldg.	Advocacy	Coordination	Finance	Community Mobilize	Hygiene Promotion	Research	WASH Service Provision	WASH Maintenance Support	WASH Infrastructure Development

** Previously Woreda Microfinance Enterprise.

South Ari Learning Alliance Network Snapshot

Overall Network Metrics: Table SA-5 (below) provides a comparative summary of network metrics for the South Ari Learning Alliance, following the survey results from the Baseline (gray, second from right) through Midterm (middle) and Endline (right) periods. The table summarizes the network metrics for the overall network (top), and for each relationship type. Only current alliance members are included in Table SA-5.

Metric	Baseline	Midterm	Change	Endline	Change*
Table SA-5: South Ari Network Snapshot					
Metric Changes from Baseline to Midterm to Endline					
Overall Network					
Size (Actors)	22	21	-5%	23	+10%
Connections	148	229	+55%	241	+5%
Information-Sharing					
Connections	143	200	+40%	238	+19%
Density	31%	48%	+55%	47%	-2%
Average Degree	13.00	19.04	+46%	20.70	+9%
Average Distance	1.78	1.32	-26%	1.37	+4%
Direct Coordination					
Connections	87	104	+20%	101	-3%
Density	28%	37%	+32%	20%	-46%
Average Degree	7.56	9.90	+31%	8.78	-11%
Average Distance	1.88	1.60	-15%	1.77	+11%
Problem-Solving					
Connections	93	127	+37%	109	-14%
Density	20%	30%	+50%	22%	-27%
Average Degree	8.46	12.10	+43%	9.48	-22%
Average Distance	2.16	1.53	-29%	1.75	+14%

* Percent change from the Midterm.

Relationships and Connections: Reported connections stayed consistent from the Midterm period, with only small variances: Information-Sharing increased 19 percent; Direct Coordination decreased 3 percent; and Problem-Solving decreased 14 percent. Other metrics deviated to minor extents as well, but overall metrics indicate that the alliance is functioning on par with its efforts during the Midterm. At the same time, there is concern over the alliance's future due to the closeout of both SWS and Lowland WASH.

Metrics: Comparing South Ari to Mille, South Ari has roughly double the Average Degree in all three types of relationships, indicating more cooperation within the alliance. Presently, in Information-Sharing, each actor has an average of 20.7 connections (Average Degree), while in Direct Coordination and Problem-Solving, each has fewer than 10.0 on average.

Core Network Actors

Core-Periphery Analysis: Figure SA-1 shows the core network actors for each type of relationship, and where they overlap. As shown in the diagram, in South Ari three actors appear as cores in all three types of relationships, while eight others appear as cores in two of the three; an additional six appear in only one core. Actors in the periphery are not shown. The three alliance members appearing in all three cores are: Gazer Town Water Utility; Zone Water, Mine and Energy Dept.; and Woreda Water, Mine and Energy Office. Notably, Lowland WASH remains as a core in Information-Sharing and Problem-Solving; again, the

Figure SA-1: South Ari Core Network Actors
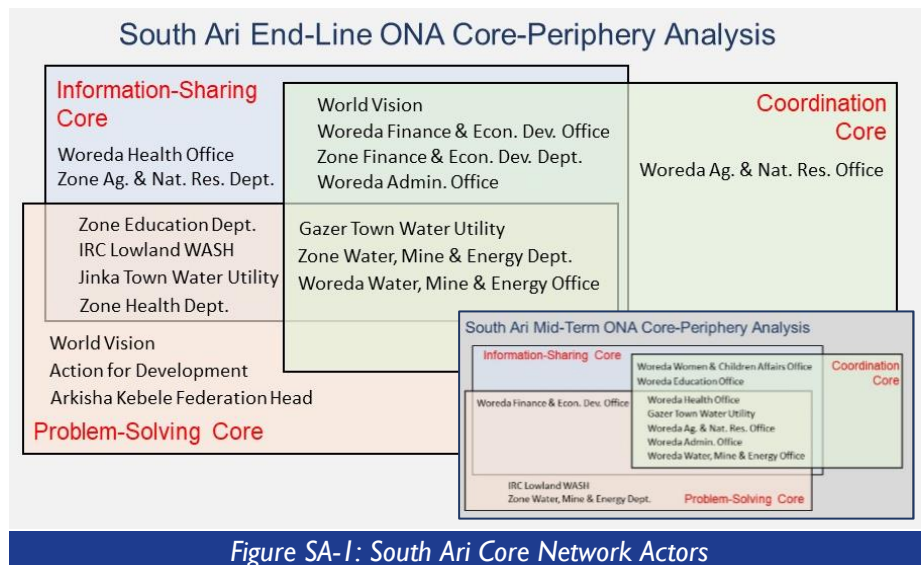
project has recently ended. World Vision newly appears as a core in Coordination and Information-Sharing; perhaps World Vision or another NGO could support a facilitative role with the alliance going forward.

Comparison with Midterm: Comparing the Endline with the Midterm analysis, noticeable differences appear in the Core-Periphery Analysis. The Midterm SNA found 10 cores in one or more relationships, versus 17 in the present Endline. Furthermore, of the 10 Midterm cores, five appeared as cores in all three relationship types. Presently, a diverse group of cores overlap all three relationship types, perhaps providing an opportunity to further develop alliance leadership in priority areas. None of the three new alliance members appear as a core in any type of relationship.

Sector-Based Analysis

Sector-Based Network Metrics:
Figure SA-2 presents the South Ari Learning Alliance sub-networks by actor sector. The map shows the alliance actors working in Water Supply, and the table below the map displays key network metrics for all five WASH sectors (left column). Again, actors could cite multiple sectors, and metrics include all three types of relationships, plus both current and former members.
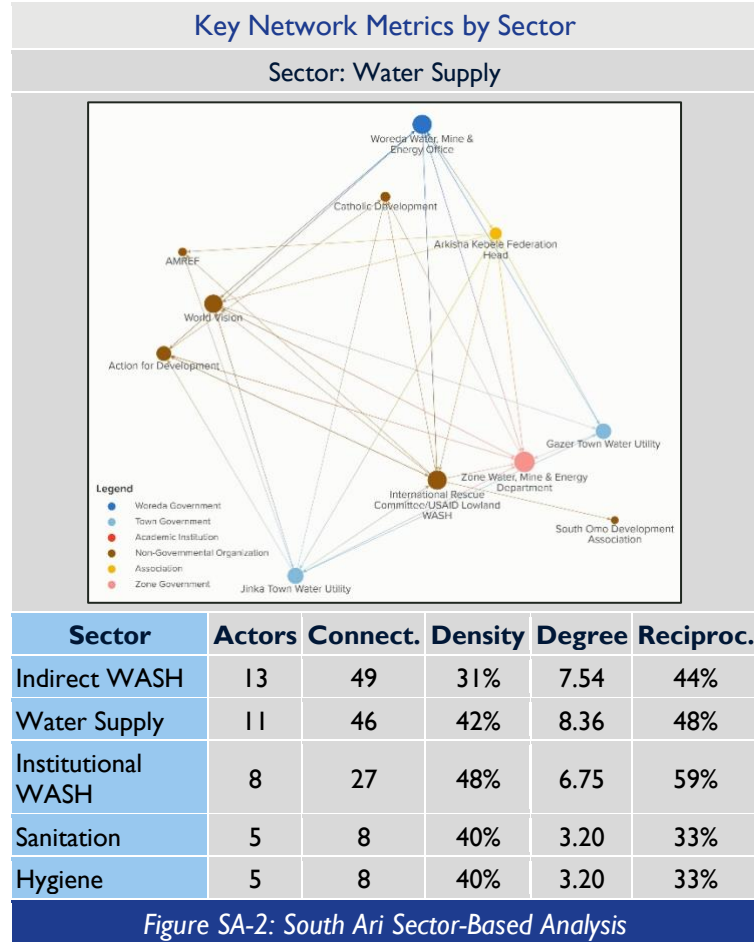
Analysis: Despite the South Ari Learning Alliance focusing on rural Water Supply, more actors identified working on Indirect WASH (13 actors) than Water Supply (11). Most of the actors working in Indirect WASH are various zone- and woreda-level government offices with no direct WASH activities, plus two NGOs/projects, both no longer

Sector: Water Supply

Sector	Actors	Connect.	Density	Degree	Reciproc.
Indirect WASH	13	49	31%	7.54	44%
Water Supply	11	46	42%	8.36	48%
Institutional WASH	8	27	48%	6.75	59%
Sanitation	5	8	40%	3.20	33%
Hygiene	5	8	40%	3.20	33%

Figure SA-2: South Ari Sector-Based Analysis

members. The membership diversity of the South Ari Learning Alliance is clear looking at the Water Supply map in Figure SA-2, with five different types (i.e., legal forms) of actors represented (see Legend).

Sector-Based Metrics: Examining the metrics in Figure SA-2 shows general consistency across all sub-networks. The South Ari Alliance has retained most of the members from the Baseline and generally exhibits strong cohesion metrics. Indirect WASH, with the highest number of actors, has the lowest density, which is logical; given that all these actors work peripherally to WASH, there is no logical reason for them to exhibit high cohesiveness. It is worth noting that the sector designations vary considerably between those self-reported and those the SWS team provided; for instance, only three respondents had self-selected Indirect WASH. This is a clear illustration of the importance of using different data sources to capture the most consistent, accurate data possible.

Function/Mission-Based Analysis

Function/Mission-Based Network Metrics: In Figure SA-3 on the following page, the sub-networks and metrics are examined based on organizational function; again, the enumerator allowed multiple selections in responses, and the SWS team provided the data. In the table, the highest metrics are highlighted (orange). Consult Table SA-4 as a reminder of which actors provide which functions.

Key Network Metrics by Function

	Function: Coordination Sector: Water Supply	Function: Coordination Sector: All Sectors

Mission/Function	Actors	Connections	Density	Avg. Degree	Reciprocity
Advocacy	17	92	34%	10.82	44%
Community Mobilization	16	83	35%	10.38	46%
Coordination	14	73	40%	10.43	40%
Hygiene Promotion	14	62	34%	8.86	32%
WASH Infrastructure Dev.	13	61	39%	9.38	45%
Capacity Building	13	55	35%	8.46	38%
WASH Maintenance Support	12	60	45%	10.00	46%
Monitoring and Regulation	9	51	71%	11.33	70%
Financing	8	30	54%	7.50	67%
WASH Service Provision	6	20	67%	6.67	82%
Research	1	---	---	---	---

Note: Orange-highlighted cells reflect highest figures (see narrative). Sub-networks with the highest numbers of actors logically also have the highest numbers of connections and degrees.

Figure SA-3: South Ari Function-Based Analysis

Most Cited Functions: The most cited organizational functions are Advocacy (17), Community Mobilization (16), and Coordination and Hygiene Promotion (14); these same functions also exhibit the highest number of connections. As a note, the SWS team's more consistent designations most significantly increased the number of organizations with functions of Community Mobilization, Capacity Building, and WASH Maintenance Support compared to those self-reported.

Coordination Function: The two network maps in Figure SA-3 show the Coordination function filtered with the Water Supply sector (left), compared with Coordination in all sectors (right). In this case, the reader can observe how coordination can potentially be enhanced in the Water Supply sector

when key coordinating actors are introduced from other service areas. The Kumu maps can be manipulated in this manner, combining any of the actor or connection attributes collected in the survey.

Monitoring and Regulation: From the interviews conducted with the survey, several respondents mentioned that WUAs in rural areas lack adequate monitoring and evaluation systems following their establishment and that the designated Water Office lacks the resources and commitment to monitor the WUAs. The WUAs are not financially or operationally independent, but rather rely on the Water Office; thus, when a water system breaks down, maintenance support is long delayed. When looking at the alliance by organizational function/mission, nine of the members indicate Monitoring as one of their key functions. The alliance could consider a small pilot project to test an improved finance and maintenance scheme, perhaps one involving the private sector.

Capacity Building: Related to the issue of WUA sustainability, respondents added that training for rural communities to maintain water systems themselves has not been provided. Looking at Table SA-3, the reader can see that 13 members cite Capacity Building as one of their functions. The alliance could facilitate delivery of appropriate training in target communities, using the Capacity Building network to identify collaborators and partners in the effort.

Network Metrics: All the function-based sub-networks exhibit consistent and high levels of density and reciprocity, indicating high network cohesiveness across all WASH functions. Reciprocal relationships indicate consistency in stakeholders' responses related to their relationships with other actors over the previous period; also, numerous actors serve multiple, and similar, functions (see Table SA-4).
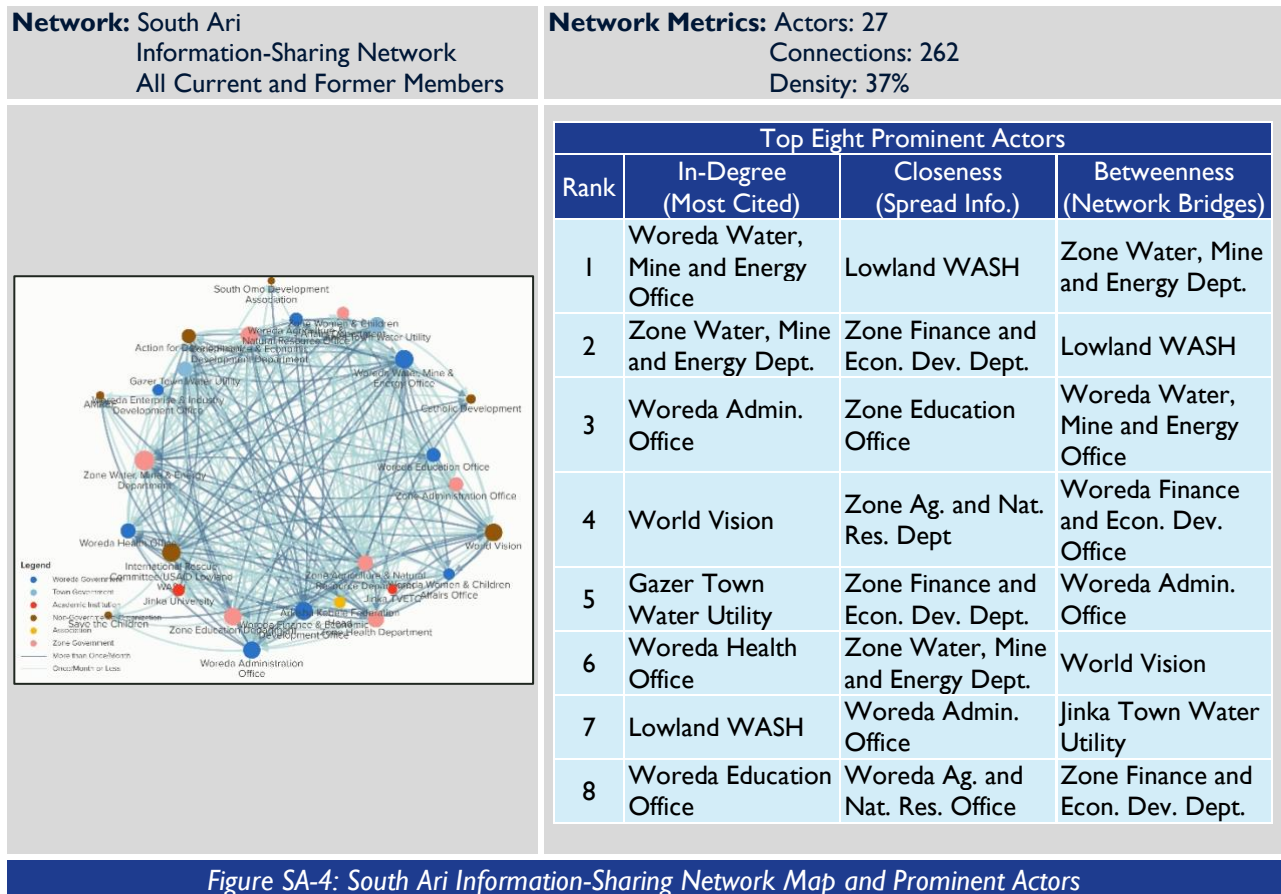
Information-Sharing Relationships

Information-Sharing Network: Figure SA-4 below presents the Information-Sharing sub-network map and prominent network actors according to In-Degree (most oft-cited); Closeness Centrality (information spreaders); and Betweenness Centrality (bridging actors).

Prominent Actors: The top-most cited actors in terms of In-Degree (named by others) are the Woreda and Zone Water, Mine and Energy Department (both In-Degree=18); and Woreda Administration Office and World Vision (both In-Degree=14). The top actors in Closeness (information spreaders) are Lowland WASH, Zone Finance and Economic Development Department, and the Zone Education Office. The top actors in Betweenness (bridging) are Zone Water, Mine and Energy Department and Lowland WASH.

Learning Alliance Facilitation Going Forward: The prominence of Lowland WASH is notable and expected, given its active role in helping facilitate capacity building and water scheme maintenance in coordination with the alliance. Furthermore, despite a lower In-Degree (perhaps due to the project recently ending) it figures prominently as an information spreader and bridging actor. The absence of Lowland WASH could impact the learning alliance going forward. As mentioned, the plan is to transition organization responsibilities to the Woreda Administration Office and/or the Woreda Water, Mine and Energy Office, logical choices given their relative prominence in the network. World Vision newly joined

the alliance prior to the Endline analysis and has secured a prominent role in a short time; it might also be approached to provide some facilitation and/or logistical support in the short-to-medium term.

Network: South Ari Information-Sharing Network All Current and Former Members	Network Metrics: Actors: 27 Connections: 262 Density: 37%

Top Eight Prominent Actors			
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Woreda Water, Mine and Energy Office	Lowland WASH	Zone Water, Mine and Energy Dept.
2	Zone Water, Mine and Energy Dept.	Zone Finance and Econ. Dev. Dept.	Lowland WASH
3	Woreda Admin. Office	Zone Education Office	Woreda Water, Mine and Energy Office
4	World Vision	Zone Ag. and Nat. Res. Dept	Woreda Finance and Econ. Dev. Office
5	Gazer Town Water Utility	Zone Finance and Econ. Dev. Dept.	Woreda Admin. Office
6	Woreda Health Office	Zone Water, Mine and Energy Dept.	World Vision
7	Lowland WASH	Woreda Admin. Office	Jinka Town Water Utility
8	Woreda Education Office	Woreda Ag. and Nat. Res. Office	Zone Finance and Econ. Dev. Dept.

Figure SA-4: South Ari Information-Sharing Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Betweenness Centrality for the Information-Sharing relationships; Table SA-6 compares the top five Betweenness (bridging) actors from the Baseline, Midterm, and Endline SNAs. The Woreda Water, Mine and Energy Office has consistently remained one of the top actors in Betweenness throughout the implementation period. As a consistent bridging actor, it seems logical for them to assume a key role in facilitating the alliance going forward, perhaps other high-ranking Betweenness actors can assist with certain responsibilities.

Table SA-6: South Ari Prominent Actors		
Betweenness Centrality (Bridging Actors)		
Baseline	**Midterm**	**Endline**
Woreda Water, Mine and Energy Office	Woreda Water, Mine and Energy Office	Zone Water, Mine and Energy Dept.
Zone Water, Mine and Energy Dept.	Woreda Health Office	Lowland WASH
Zone Admin. Office	Zone Admin. Office	Woreda Water, Mine and Energy Office
AMREF *	Zone Water, Mine and Energy Dept.	Woreda Finance and Econ. Dev. Office
Zone Health Dept.	Gazer Town Water Utility	Woreda Admin. Office

* No longer learning alliance member.

Frequency of Information-Sharing: The enumerator asked respondents which other alliance members they shared information with during the past six months outside of their organized meetings, and how often they engaged—more or less than once per month. Results are presented in Figure SA-5, alongside the results from the Baseline and Midterm. It is noted that the Baseline and Midterm

Figure SA-5: South Ari Information-Sharing
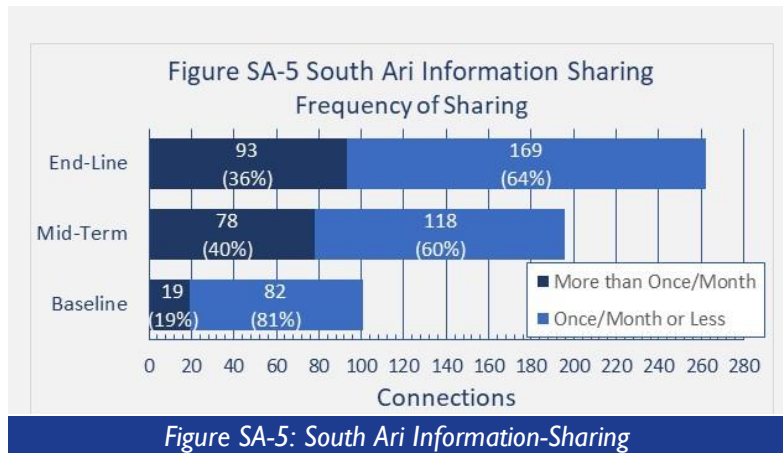
surveys phrased the question in terms of information requests *from others to the respondent* (only one direction). As shown, Information-Sharing between South Ari Learning Alliance members increased consistently from the Baseline to Midterm to Endline. In the most recent six-month period, learning alliance members shared information with one another on 262 occasions (equivalent to about 1.5 times per day); this is the most of all four learning alliances. The proportion of frequent (>1/month) to infrequent (<1/month) also increased considerably from the Baseline (19 percent >1/month) to 40 percent and 36 percent, respectively, during the Midterm and Endline periods.

Connections: In the current Endline survey, all 23 stakeholders surveyed indicated an average of 11.4 Information-Sharing relationships (Out-Degree) with other members. Visually, the reader can observe the high density in the Information-Sharing map shown above in Figure SA-4. The high number of

connections and other metrics indicate a high level of communication and Information-Sharing between the alliance members (nearly twice per month per actor, on average). Given this high level of communication, it seems that even a modest level of effort would help the alliance to sustain its productive efforts.

Information-Sharing with Former Learning Alliance Members: Table SA-7 presents the former alliance members (In-Degree) that current members named. As noted, the South Ari Learning Alliance has retained most of its members throughout the entire period, with only four actors having left the alliance, each of the four prior to the Midterm SNA. Note that these actors shown in Table SA-7, have high In-Degrees, indicating a level of communication and Information-Sharing despite their not participating in the alliance. Lowland WASH is included in this table, even though it was surveyed as a current member.

| Table SA-7: South Ari Information-Sharing	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
Lowland WASH *	12
Catholic Development	9
AMREF	6
Save the Children	5
South Omo Development Association	4

* Current member at time of survey; project has since ended.

Coordination Relationships

Coordination Network: Figure SA-6 illustrates the Coordination sub-network map and prominent network actors according to In-Degree, Closeness (information spreaders), and Betweenness (bridging). While there are fewer Coordination connections (106) than Information-Sharing (262), the number of connections is still significant and indicates a high degree of coordination between members; in the South Ari Learning Alliance, Coordination relationships are the least common. The top Coordination actors are similar in prominence and order to those in Information-Sharing. Here, Lowland WASH does not appear as a top Coordination actor, perhaps due to its closeout.

Network: South Ari	Network Metrics: Actors: 27
Coordination Network	Connections: 106
All Current and Former Members	Density: 15%
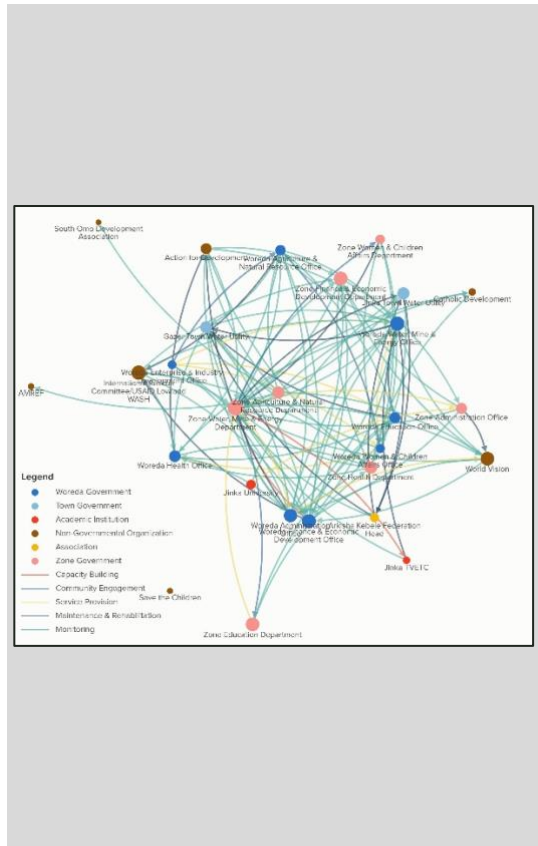
<table>
<tr><td colspan="4" align="center">Top-Eight Prominent Actors</td></tr>
<tr><td>Rank</td><td>In-Degree
(Most Cited)</td><td>Closeness
(Spread Info.)</td><td>Betweenness
(Network Bridges)</td></tr>
<tr><td>1</td><td>Zone Water, Mine and Energy Dept.</td><td>Zone Ag. and Nat. Res. Dept.</td><td>Zone Water, Mine and Energy Dept.</td></tr>
<tr><td>2</td><td>Woreda Water, Mine and Energy Office</td><td>Woreda Ag. and Nat. Res. Office</td><td>Woreda Water, Mine and Energy Office</td></tr>
<tr><td>3</td><td>Woreda Admin. Office</td><td>Zone Water, Mine and Energy Dept.</td><td>Woreda Finance and Econ. Dev. Office</td></tr>
<tr><td>4</td><td>Gazer Town Water Utility</td><td>Woreda Water, Mine and Energy Office</td><td>Woreda Ag. and Nat. Res. Office</td></tr>
<tr><td>5</td><td>Woreda Finance and Econ. Dev. Office</td><td>USAID Lowland WASH</td><td>Woreda Admin. Office</td></tr>
<tr><td>6</td><td>Zone Finance and Econ. Dev. Dept.</td><td>Woreda Enterprise and Industry Office</td><td>Zone Women and Children Affairs Dept.</td></tr>
<tr><td>7</td><td>Action for Development</td><td>Woreda Finance and Econ. Dev. Office</td><td>Zone Health Dept.</td></tr>
<tr><td>8</td><td>Woreda Health Office</td><td>Woreda Admin. Office</td><td>Jinka Town Water Utility</td></tr>
</table>

Figure SA-6: South Ari Coordination Network Map and Prominent Actors

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Closeness Centrality for the Coordination relationships; Table SA-8 compares the top-five Closeness (Information-Sharing) actors from the Baseline, Midterm, and Endline SNAs. Both the Zone Agriculture and Natural Resources Department and the Woreda Agriculture and Natural Office currently rank as the top two in Closeness and are both new additions to the top five from previous surveys. Lowland WASH rounds out the top five.

Coordination Types: The enumerator asked respondents about what types of activities they cooperated with other learning alliance members. Results are presented in Figure SA-7, alongside the results from the Midterm analysis (results were not collected in the Baseline), together with a network map of Service Provision actors that highlights several points. Direct Coordination increased across all five activity areas, with the most significant increase in Maintenance and Rehabilitation (135 percent), followed by Monitoring (97 percent), and Capacity Building (82 percent). In the Endline survey, all 23 stakeholders indicated multiple Coordination relationships, with an average of 4.6 relationships (Out-Degree) with other actors; this figure is in line with the average number from the Midterm SNA of 5.0.

Table SA-8: South Ari Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	**Midterm**	**Endline**
Woreda Water, Mine and Energy Office	Zone Finance and Econ. Dev. Dept.	Zone Ag. and Nat. Res. Dept.
Zone Water, Mine and Energy Dept.	Woreda Ag. and Nat. Res. Office	Woreda Ag. and Nat. Res. Office
Zone Finance and Econ. Dev. Dept.	Woreda Health Office	Zone Water, Mine and Energy Dept.
Catholic Development *	Woreda Women and Children Affairs Office	Woreda Water, Mine and Energy Office
Zone Health Dept.	Zone Education Dept.	Lowland WASH

* No longer learning alliance member.

Figure SA-7: South Ari Coordination Activities
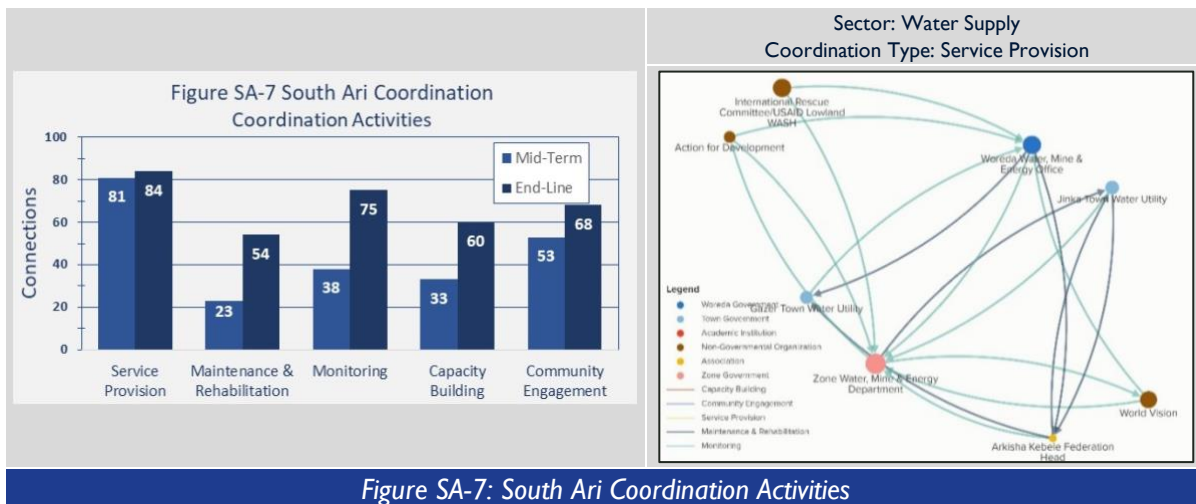
Increases in Priority Areas: The increase in Coordination in Maintenance and Rehabilitation (135 percent) is a positive sign, as maintenance, rehabilitation, and spare parts supply are considerable areas of need in South Ari, according to feedback from the respondents during the survey. Increases in Monitoring (97 percent) and Capacity Building (82 percent) are also reassuring to note because they are identified areas of high need, particularly with respect to WUAs. These data indicate that alliance members are working to coordinate in areas of identified need.

Network Map: The network map in the bottom of Figures SA-7 combines the use of multiple filters in Kumu and shows how this SNA can be used to provide practical input into the strategic alliance development processes. The map shown includes current alliance members working in the Water Supply Sector (Figure SA-2) and in Service Provision (Coordination Type). This and other user-defined maps could be used to assist the alliances going forward, helping them to better define and plan activities as well as inform roles and responsibilities, task leaders, working groups, and other dynamics that both improve the outcomes of activities and strengthen member coordination. In this example, the reader can readily observe the prominence of the top two members: Zone and Woreda Water, Mine and Energy Department and Office, respectively. The reader can also see that this sub-network includes three NGOs and an association. While Lowland WASH has only three connections (Degrees) the metrics show that it does figure prominently in Betweenness (bridging) and Closeness (information-sharing). World Vision also figures prominently in all metrics, again illustrating the potential value added in the alliance.

Table SA-9: South Ari Coordination	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
Catholic Development	3
Lowland WASH *	2
AMREF	1
South Omo Development Association	1
Save the Children	0

** Current member at time of survey; project has since ended.*

Coordination with Former Alliance Members: Table SA-9 presents the indicated Coordination relationships with actors that previously participated in the alliance (In-Degrees named by current members). All five former members are shown in the table. Note that the In-Degree is significantly lower for Direct Coordination with former members than it was with Information-Sharing. Except for Lowland WASH, all these actors left the alliance prior to the Midterm SNA.

Problem-Solving Relationships

Problem-Solving Network: Figure SA-8 below illustrates the Problem-Solving sub-network map and prominent network actors according to selected metrics. Problem-Solving relationships (115) were reported slightly higher than Direct Coordination (105) — another positive indicator that the alliance is proactively working to address identified challenges and priorities. The most prominent actors are again generally consistent with those from the other types of relationships, although several warrant mention Lowland WASH ranks at or near the top in Closeness and Betweenness, again indicating its prominence in supporting Problem-Solving efforts (although it places eighth in In-Degree, indicating that its placement in the network is more prominent than the rate at which it is called upon). The Zone Education Department is ranked second in Closeness (information-spreading) and could therefore be supported to provide a more active role in the alliance. The Arkisha Kebele Federation Head, which has a high In-Degree, is a form of WUA situated outside of Jinka town; its former head (interviewed during the Midterm SNA) has opened a private enterprise dealing in water supply spare parts; this enterprise does not appear to be a part of the learning alliance. The NGO Action for Development also has a high In-Degree. In the Endline survey, all 23 stakeholders surveyed indicated an average of 5.0 Problem-Solving connections with other current and former learning alliance members, representing a 17 percent decrease from the number of (6.0 average) from the Midterm SNA.

Network: South Ari	Network Metrics: Actors: 27
Problem-Solving Network	Connections: 115
All Current and Former Members	Density: 16%
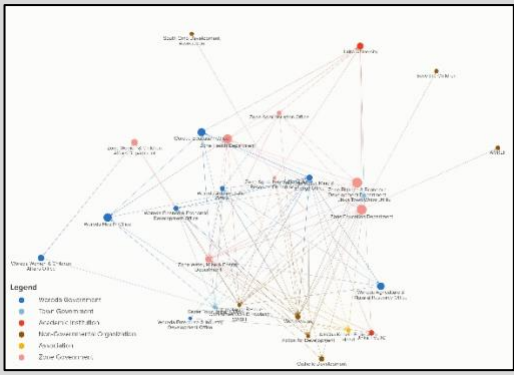
	Top-Eight Prominent Actors		
Rank	In-Degree (Most Cited)	Closeness (Spread Info.)	Betweenness (Network Bridges)
1	Zone Water, Mine and Energy Dept.	Lowland WASH	Zone Water, Mine and Energy Dept.
2	Woreda Water, Mine and Energy Office	Zone Education Dept.	Lowland WASH
3	World Vision	Woreda Water, Mine and Energy Office	Woreda Water, Mine and Energy Office
4	Action for Development	Zone Water, Mine and Energy Dept.	Zone Education Dept.
5	Gazer Town Water Utility	Gazer Town Water Utility	Gazer Town Water Utility
6	Arkisha Kebele Federation Head	Jinka Town Water Utility	Jinka Town Water Utility
7	Jinka Town Water Utility	Zone Health Dept.	Zone Women and Children Affairs Dept.
8	Lowland WASH	Zone Admin. Office	Zone Ag. and Nat. Res. Dept.

*Figure SA-8: South Ari Problem-Solving Network Map and Prominent Actors*

Prominent Actor Comparison with Previous SNAs: The Baseline and Midterm SNAs examined the Closeness Centrality for the Problem-Solving relationships. Table SA-10 compares the top-five closeness (information-spreading) actors from the three periods. Again, the prominence of International Rescue Committee/Lowland WASH is noted, as well as the Zone Education Department and the Woreda and Zone Water, Mine and Energy Office and Department, respectively.

Problem-Solving Resolution: The enumerator asked respondents which other

Table SA-10: South Ari Prominent Actors		
Closeness Centrality (Information-Spreading Actors)		
Baseline	Midterm	Endline
Zone Water, Mine and Energy Dept.	Zone Finance and Econ. Dev. Dept.	Lowland WASH
Lowland WASH	Lowland WASH	Zone Education Dept.
Woreda Water, Mine and Energy Office	Zone Education Dept.	Woreda Water, Mine and Energy Office
Zone Finance and Econ. Dev. Dept.	Woreda Ag. and Nat. Res. Office	Zone Water, Mine and Energy Dept.
AMREF *	Woreda Education Office	Gazer Town Water Utility

* No longer a learning alliance member.

current and former members they either sought, or received requests to provide, Problem-Solving assistance during the previous 6 months, and whether the assistance had been provided and the issue resolved. Results for the Endline survey are presented in Figure SA-9. In 47 percent of 115 reported requests, the support had been provided and the issue resolved, while in 34 percent of cases

the support had been provided but the issue remained unresolved. In seven cases (6 percent) support is ongoing; and in 15 cases (13 percent) respondents reported no support had been provided at all. Comparing this with the Midterm SNA, out of a total of 87 requests, 66 (76 percent) had been either resolved or remained ongoing; and 21 (24 percent) had been either unresolved or not provided. In the Baseline period, of 71 reported requests, 46 (65 percent) had

Figure SA-9: South Ari Problem Solving

been resolved or remained ongoing. Again, the increase in Problem-Solving connections is notable and positive in the context of the challenges facing the South Ari and South Omo water supply.
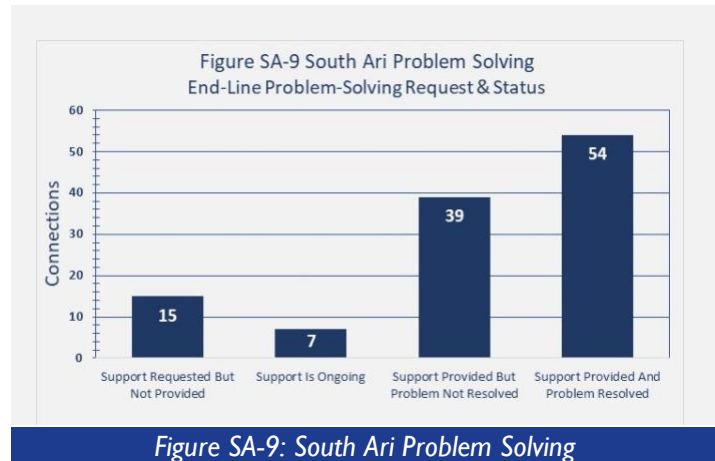
Support Provided and Resolved: Looking at the top-three learning alliance members in In-Degree (named actors for requesting Problem-Solving assistance): Zone Water, Mine and Energy Department fielded 14 requests for assistance: four resolved, eight provided but not resolved, one ongoing, and one not addressed. Woreda Water, Mine and Energy Office fielded 11 requests: five resolved, five not resolved, and one not provided. World Vision fielded 10 requests: five resolved, two not resolved, two not provided, and one ongoing. Actors that reportedly addressed and resolved all, or a high percentage of, Problem-Solving requests include Gazer Town Water Utility (7 of 8 resolved); Arkisha Kebele Federation Head (5 of 6 resolved); Woreda Health Office and Woreda Education Office (both 3 of 4 resolved); and Jinka Town Water Utility (4 of 6 resolved). There is no significant trend of any organization not providing requested support. Alliance members failed to provide assistance for six out of 10 reported requests that the Zone Education Department made.

Problem-Solving with Former Learning Alliance Members: Table SA-11 presents the indicated Problem-Solving relationships of all former members of the learning alliance. Only Lowland WASH and Catholic Development had multiple requests for Problem-Solving assistance (Lowland WASH was in the process of closeout). For reference, the average In-Degree for all actors remaining in the learning alliance (Lowland WASH included) is 4.7.

Table SA-11: South Ari Problem-Solving	
Former Learning Alliance Members	
Former Learning Alliance Member	**In-Degree**
Lowland WASH *	5
Catholic Development	3
AMREF	1
Save the Children	1
South Omo Development Association	1

* Current member at time of survey; project has since ended.

Reflections on the SNA

Reflections: The South Ari Learning Alliance has the highest number of members (23) of the four learning alliances, is diverse in terms of its membership, and has also had the least attrition since its inception. Staff turnover in public institutions, on the other hand — and as with the other alliances — is

persistent in South Ari and has remained a challenge for the alliance. The numbers of reported connections between alliance members stayed roughly consistent and healthy from the previous period, with only small variances. At the same time, concern over the alliance's future remains due to the closeout of both SWS and Lowland WASH, which supported alliance members with capacity building and water scheme maintenance.

Conclusions

Cross-Learning Alliance Findings: The findings and observations for each learning alliance have been provided separately, in large part because it is difficult to compare results across learning alliances. Each operates within a different context, includes a different mix of members, and exists to achieve different goals based on the most pressing local needs. This is especially true at the Endline given that over time the alliances had the opportunity to diverge further in terms of their goals, activities, and membership.

Based on the analysis conducted for this Endline, and a comparison of key metrics included in the table below, some broad observations can be made.

Generally, all the learning alliances continue functioning at generally healthy — albeit varying — levels of interaction, particularly when considering the COVID-19 challenges of 2020. All learning alliances saw an increase in overall network density since baseline, a good indication that the network has increased cohesion over the course of SWS. In some cases, most notably in Debre Birhan (urban sanitation) and South Ari (rural water), the overall metrics showed a more consistent improvement, while in others, changes included some jumps or shifts in direction from Baseline to Midterm and Midterm to Endline. Losing (and/or gaining) key members affected some alliances, notably NGOs and projects. Information-Sharing connections represented the most common type of relationship across all networks. All four learning alliances are, to some extent, struggling with common issues, including questions about their sustainability going forward, turnover of individual representatives attending alliance meetings, delays in completing action items committed to, and follow-through on decisions.

Observing the differences in the key actors in each network at the time of the Endline SNA, LINC analysts found public sector actors to be the most common actors forming the core network. For the small-town learning alliances, this primarily included municipal offices and kebeles. For the rural woreda learning alliances, core actors came from varying levels including zone, region, woreda, and town. Of note, while some project-based actors served a central role in some networks, they seldom served as core actors for all three relationship types. And in each case where project-based actors played a central role, far more public sector actors appeared central to the network. Very few NGOs and private sector actors were central or core to the four learning alliances.

Table: Comparison of Key Metrics Over Time, Across All Four Learning Alliances

Metric	Debre Birhan				Woliso				Mille				South Ari			
	Baseline	Midterm	Endline	Change	Baseline	Midterm	Endline	Change	Baseline	Midterm	Endline	Change	Baseline	Midterm	Endline	Change
Overall Network																
Size (actors)	16	19	21	31%	14	19	14	0%	21	16	11	-48%	22	21	23	10%
Connections	96	208	205	114%	80	152	125	56%	117	144	66	-44%	148	229	241	5%
Density	40%	61%	49%	22%	44%	44%	69%	56%	28%	60%	60%	115%	32%	55%	48%	49%
Information-Sharing																
Connections	77	142	202	162%	68	136	124	82%	122	109	65	-47%	143	200	238	19%
Density	28%	47%	48%	71%	37%	48%	68%	84%	29%	45%	59%	103%	31%	48%	47%	-2%
Average Degree	9.06	14.2	19.24	112%	9.72	13.6	17.71	82%	5.81	6.81	11.82	103%	13	19.04	20.7	9%
Direct Coordination																
Connections	20	78	86	330%	31	81	45	45%	62	76	30	-52%	87	104	101	-3%
Density	22%	35%	20%	-9%	29%	49%	25%	-14%	26%	42%	27%	4%	28%	37%	20%	-46%
Average Degree	2.86	6.32	8.19	186%	7.42	9.4	6.43	-13%	5.14	6.25	5.45	6%	7.56	9.9	8.78	-11%
Problem-Solving																
Connections	71	81	97	37%	67	102	53	-21%	67	61	27	-60%	93	127	109	-14%
Density	26%	21%	23%	-12%	31%	27%	29%	-6%	16%	25%	25%	56%	20%	30%	22%	-27%
Average Degree	8.36	8.1	9.24	11%	8.54	10.2	7.57	-11%	3.19	3.81	4.91	54%	8.46	12.1	9.48	-22%

* Change indicated is measured from Baseline to Endline

Lessons Learned on SNA Application

Overview: This SNA proved to be an interesting and thought-provoking assignment; it is a rare opportunity to follow a development project through from start to finish with Baseline, Midterm, and Endline SNAs, providing an excellent research and learning opportunity on the use of SNA as a network-evaluation instrument. Along the way, SNA experience, processes, and technology platforms evolved, allowing the team to incorporate the latest thinking and methods into the analysis. This section provides some lessons learned and recommendations related to applying the SNA tool, and what the team learned through the process.

Involving Field Teams in SNA: Determining how best to involve the SWS field teams in the data analysis proved to be one of the biggest challenges of conducting the SNAs. The field team raised the issue after both the Baseline and Midterm SNAs, and LINC attempted to improve the process for this Endline. The initial plan included collecting, cleaning, and importing the data into Kumu; conducting a quick analysis; and then presenting the data and maps to the SWS team virtually, to make the process more participatory and validate (or dispute) the findings. Due to various issues and delays related to COVID-19, civil unrest, and data re-checking and cleaning, LINC proceeded through to a draft version of this report. The SWS team's review of the draft identified some basic issues that altered findings and interpretations. For this SNA, LINC provided a debriefing and initial draft report to the SWS teams concurrently. While this may have limited participation in the analysis process, LINC has attempted to incorporate all subsequent inputs. While there is perhaps no "right" answer how best to involve in-country teams and stakeholders given individuals' time, interest, and availability, the issue is something to consider as the SNA process continues to be evaluated. Cooperating in this context is a learning exercise itself, and one that should result in improved learning products that contextualize the findings.

Reflections from SWS Field Teams: Following circulation of the draft of this report, LINC solicited feedback from the IRC and Tetra Tech teams in the field; two staff members replied. Their thoughts, which echo some of the challenges LINC has observed and highlight important considerations for future efforts, are summarized below:

Integration of SNA into Activities: The level of interaction, coordination, and collaboration could have been improved throughout the Baseline, Midterm, and Endline SNA process. Having a separate team (LINC) lead the analysis created a lack of integration of the SNA into the activities of the learning alliances, and a gap in knowledge on the part of the alliances. There are other ways to conduct SNA that more directly engage the stakeholders themselves. The field teams wished to be more directly engaged in the analysis as well (see LINC's reflection on this above). This lack of integration made it difficult to fully apply the results and recommendations coming out of the SNAs.

Audience of the SNAs: The SNAs and resulting reports/findings do not appear targeted to the learning alliances as an audience. The field teams expressed uncertainty about who was meant to be the target audience for these studies — local stakeholders, implementing teams in the field, or international WASH practitioners. They felt that this was an important question to answer for future similar studies.

***Purpose of the SNAs:** The field teams also felt that the SNA appeared to be more focused on evaluating the change in network over time, rather than for planning/design or to support network facilitation. This also reinforced, or was reinforced by, the lack of integration into the activities mentioned above. One field team member noted that SNA is valuable for a project, because it is one of the best ways to start a collective action discussion with a group, though they did not feel this opportunity had been fully applied to the four alliances.*

Coordination and Communication: Conducting this Endline SNA during the COVID-19 pandemic, presented additional challenges in coordination and communication among LINC, their in-country enumerator, and the SWS team. Careful reviews of the survey and rosters and coordination between the SWS team and the enumerator eliminated some of the previous issues that the enumerator and SWS team reported; despite this, some corrections still needed to be made regarding actor names, institutional restructuring of some actors, verifying the status of formal (or informal) learning alliance members, as well as the accuracy and consistency of certain attributes. These issues highlight the importance of coordination and communication for effective SNA in planning, as well as in interpreting and contextualizing the findings.

Node Attribute Consistency: This SNA shows how results can change when organizations offer different interpretations of attributes when they are questioned. LINC asked organizations to self-report the Sectors and Functions their organization works on, as well as other attributes. The SWS field teams raised concerns about the accuracy of some of those responses; in particular, they felt that some actors inaccurately portrayed their own sectors and functions of work. In this report, SWS field teams modified those Sector and Function designations that the respondents provided. In all four learning alliances, this had the effect to increase — in some cases significantly — the selections for many of the actors. The issue to be considered here is which data to use — data the actors supply themselves, or data that experts provide, which are likely to be more consistent. A lesson learned is to consider carefully at the outset how the most accurate data can be collected. Oftentimes, that means strict reliance on survey results, which may not consider how different respondents might interpret the question, even something as simple as what activities they engage in.

Data Collection, Entry, and Cleaning: The usefulness of any SNA is dependent on the quality of data going into the system. For SNA, the process involves defining needs; designing and conducting a survey or other data collection instrument; and "cleaning" the data of erroneous entries (e.g., duplicates, changing names or terminology, network "orphans," or any of several data entry issues. From the Baseline, some organizations changed their names, individual representatives had changed or been replaced, organizations changed, and some new actors emerged. These and other issues presented numerous challenges at critical points in the process, and the analysts have attempted to be accurate with respect to all these issues. In cases where a decision had been required, LINC analysts supplied a rationale. LINC conducted the Endline SNA analysis entirely remotely as planned; however, some of the issues that arose would have been identified and resolved more efficiently and sooner through a few working meetings. While this may always be a challenge, perhaps the experience with COVID-19 can help organizations to become more creative and disciplined in efficiently identifying and resolving issues that arise.

Evolving Platforms and Technology: The changing technology and applications for network analysis presented one of the interesting challenges in conducting the three SNAs for SWS (Baseline, Midterm, Endline). During the Baseline, LINC used NodeXL (Excel-based add-on) for network maps and UCINet (Windows-based) for metrics. Since then, LINC has transitioned primarily to web-based Kumu for most analysis. Going back to compare earlier results, this Endline required using, at different times, all three platforms. During this process, LINC gained considerable insight regarding metric comparisons, platform capabilities, and consistency across platforms. Though mostly consistent, some outliers and differences exist between metric values generated, some specific terminology used, and how the three platforms treat "orphans" (network actors with no connections to the other actors). The lesson here is to be cognizant of the issue that metric values calculated by different SNA software may not always be consistent. It is noteworthy that on this subject, LINC's network analysis specialist raised several technical issues with Kumu including a data transfer issue that can result in faulty relationship data. Kumu addressed these issues through its technical support team; this analysis, therefore, contributed to broader SNA learning.

Interpreting the Data: Even on SNAs like this with limited actors and attributes, there are a tremendous number of ways to filter and analyze the data, allowing practitioners to sort and combine attributes to consider new findings and recommendations. For example, an analyst might filter actors working in the water supply sector, involved in capacity building and community mobilization, and who have coordinated previously (three filters involved) to provide feedback to those actors on how their relationship has evolved and to identify activities and opportunities going forward. In this report, LINC has presented analysis of each attribute on its own, plus provided several examples and analyses using combined filters. This report by no means provides an analysis of all possibilities, but again emphasizes the improvement in the analysis that can be gained by working closely with the field teams to make the SNA process useful for their project and beneficiaries.

Annex 1:
Endline SNA Survey Form

Endline Survey, October 2020

Enumerator Read: *My name is [NAME]. I am working with a consortium including IRC WASH, Tetra Tech, LINC, and the University of Colorado Boulder, surveying organizations in [WATER/SANITATION] service delivery in [TOWN OR WOREDA NAME]. The results from this survey will support the continued collaboration efforts of the local learning alliance to help improve sustainability of local [WATER/SANITATION] services. Your organization has been identified as a key stakeholder.*

There are two parts to this interview. First, we are interested to hear your perspective on how to make [WATER/SANITATION] services more sustainable in [TOWN OR WOREDA NAME]. I will ask you three questions regarding your opinion of challenges to achieving sustainable water and sanitation services and how you think challenges can be overcome. The second part of the survey will include questions on how your organization interacts with other organizations in the water/sanitation sector.

*Your participation is voluntary. I am going to record the first part of this interview; the recording will only be shared with IRC WASH, Tetra Tech, and the University of Colorado Boulder for this project. They may use your responses to advise the activities for the learning alliance, but your responses will **not** be connected to your name. Do I have your permission to record this part of the survey?*

Do you have any questions before we begin?

I will start the recording now [HIT RECORD].

Pre-Survey: Factor Analysis Questions

Instructions for Enumerators: Ask the questions below in context to *sanitation* or *water*. Note that Debre Birhan and Woliso alliances concern sanitation, and Mille and South Ari concern water; try to keep the conversations focused on the area concerned.

Enumerator Read: *Please say your name, organization, and your position.*

1) *In your opinion, what are the main problems of sanitation/water service sustainability in your town/woreda? [Note to enumerators: If shallow response, such as "limited capacity," follow up to make this clear: "Limited capacity of what?" One way to also get more information is to ask this as, "Why is that challenging to sustainability?"]*

2) *What ideas or recommendations do you have about solutions to these problems?*

3) *Of the solutions you listed, which is the most important? Can you walk me through what next steps would happen if the solution occurs?*

Enumerator Read: *Thank you for sharing your perspective. I will now stop the recording and begin the second part of the interview.*

[STOP RECORDING]

Survey: ONA

Enumerator Read: *This section will help us map relationships among learning alliance members, understand how relationships may have changed since the learning alliance was formed, and help develop new activities that strengthen relationships. Our analysis will be presented back to the learning alliance. In presenting the information, we will refer to the organization names rather than individual respondents' names; for example, we would refer to the "Woreda Water Office" rather than the person who represents that office. Your responses will be fully anonymous. The survey should take about 20 minutes. Do you have any questions before we begin?*

Part 1: Respondent and Organizational Information

Instructions for Enumerators: Read aloud each prompt. Record the response exactly as stated by the respondent. For all names, ask to ensure the spelling is correct. Make sure to record the following "Roster Data" and/or confirm the information you have is correct.

Enumerator Read: *First, I would like to get some information on you and your organization. Your personal information will not be shared outside of the analysis team and may be used only to follow up.*

Roster Data (Short Answer):

1. *Organization (from pre-populated list):*
2. *Individual Name:*
3. *Position:*
4. *Individual Phone:*
5. *Individual Email:*
6. *Is anyone else from this organization present?*
   a. *[IF YES] Please enter the names and positions of the other individuals present from the organization.*

Part 2: Organization Attributes

Instructions for Enumerators: These questions will only be asked to learning alliance members for whom we do not have data (those that are newly added). The tablet software will lead you through those for which it is required.

Enumerator Read: *I will ask you two questions about your organization and give you a list of possible responses. Indicate which best match your organization.*

Questions:

1) *In which of the following sectors is your organization currently working? (Check all that apply.)*
   a. *Water Supply*
   b. *Sanitation*
   c. *Hygiene*
   d. *Institutional WASH*
   e. *Indirectly Support WASH Sector*

2) *Indicate your organizational functions or missions with regards to water/sanitation in [GEOGRAPHY]. (Check all that apply.)*
   a. *Monitoring and Regulation*
   b. *Capacity Building*

c. *Advocacy*
d. *Coordination*
e. *Financing*
f. *Community Mobilization*
g. *Hygiene Promotion*
h. *Research*
i. *Water/Sanitation Service Provision (including hygiene extension workers)*
j. *Water/Sanitation Maintenance Support (including spare parts provision, water supply maintenance, and removal of waste)*
k. *Water/Sanitation Infrastructure Development*
l. *Other (Specify)*

Part 3: Organizational Relationships

Enumerator Read: *Now I will ask you some questions about the nature of [ORGANIZATION NAME] interactions with other learning alliance members and stakeholders. These questions will help us understand how we can build on strengths and address gaps in the learning alliance. We understand that you may not know all the interactions that members of your organization have with others, but please answer to the best of your knowledge and experience.*

Instructions for Enumerators: Share with the respondent a laminated list with all the organizations on the roster and provide them time to review the complete list.

Enumerator Read: *I am giving you a list of organizations currently and previously in the learning network. I will ask you which of these organizations you have had a relationship with over the past 6 months. We will consider three types of relationships: sharing information, coordinating, and problem-solving. I will then ask you a short follow-on question about each of these relationships.*

Questions:

1) From the list of organizations on the sheet, which ones does your organization have an **information-sharing relationship** with (providing information, receiving information, or both) on [WATER/SANITATION] in the past 6 months. This includes face-to-face meetings, phone calls, emails, and any other sharing; but **not including** learning alliance meetings, or instances where information was shared generally with a broad group rather than directly with the other organization (for example, a presentation at a conference or larger gathering).

   How frequently does information-sharing take place with [ORGANIZATION]: once per month or less, or more than once per month?

Organization Name	Once/Month or Less	More than Once/Month
Organization X		
Organization Y		

2) *Looking again at the same list, with which organizations on the list did your organization **directly coordinate** with within the past 6 months? This includes planning joint activities, input and coordination sharing responsibility; working on synergistic activities; evaluating progress; or other activities that required joint efforts. Do not include it if the coordination is limited only to participation in the learning alliance meetings.*

2a. In your Coordination with [ORGANIZATION], which types of activities did you coordinate on, from the following: service provision; maintenance and rehabilitation; monitoring; capacity building; community engagement? (Check all that apply.)

Organization Name	Service Provision	Maintenance and Rehabilitation	Monitoring	Capacity Building	Community Engagement
Organization X					
Organization Y					

3) *Lastly, again looking at the list, with which did your organization work with to **resolve a problem or issue**, either them requesting your assistance, or your organization requesting their assistance?*
3a. With [ORGANIZATION], was the requested support provided, and was the problem resolved? Choose from the following responses.

Organization Name	Support Requested but Not Provided	Support Provided but Problem Not Resolved	Support Provided and Problem Resolved	Support Is Ongoing
Organization X				
Organization Y				

Wrap-Up

Enumerator Read: *Thank you for your time. Are there any comments or recommendations you would like to add to help us strengthen the learning alliance network or future cooperation?*

Instructions for Enumerators: Record any final responses and make any notes or other feedback from the interview, including information on any other members of the organization who provided input.

Actors to be Surveyed by Region

Instructions for Enumerators: Some of the actors that will be surveyed have changed between the Midterm and the current survey. Specifically:

- Some of the previously surveyed actors are no longer part of the learning alliance. Those actors who are no longer a part of the alliance will not be surveyed this time.

- A few new actors have been added for each region. Only new actors will need to answer the Part 2: Organizational Attributes questions. These will be programmed into the tablet so that the enumerators are automatically prompted for responses for these actors. Those actors are also indicated in the tables below.

- All of the actors — both the current ones and those previously part of the learning alliance— will remain in the roster. Thus, surveyed actors can still report relationships with those actors who no longer remain part of the learning alliance, and who are not now being surveyed.

To provide clarity, the tables below provide enumerators with lists of actors to be surveyed, and indicate the new actors that should respond to the Part 2 questions.

No.	Organizations to Survey	New Organizations (Complete Section 2)
	Debre Birhan	
1	Agriculture and Environmental Protection Land and Construction Management Core Process	
2	Amanuel Development Organization	
3	Culture and Tourism Office	
4	Dashen Brewery	✓
5	Debre Berhan Town Health Office	
6	Debre Berhan University	
7	Debre Birhan World Bank Project UWSSP-II (Govt-Implemented)	✓
8	Finance and Local Economic Development Office	
9	Habesha Brewery	✓
10	Kebele 02	
11	Kebele 03	
12	Kebele 05	
13	Kebele 06	
14	Kebele 07	
15	Municipality (Sanitation and Beautification Core Process)	
16	North Shewa Zone Land Administration and Use	
17	Public Latrine Operator (Chair)	
18	Trade and Industry Office	
19	Urban Land Registration and Information Office	
20	Water Supply and Sewage Enterprise	

Woliso		
No.	Organizations to Survey	New Organizations (Complete Section 2)
1	Ayetu Kebele (Previously Kebele 01)	
2	Burka Gudina Kebele (Previously Kebele 03)	
3	Ejersa Kebele (Previously Kebele 02)	
4	Hora Kebele (Previously Kebele 04)	
5	Municipality (Sanitation and Beautification)	
6	Public Latrine Representative	
7	Town Communications Affairs Office	
8	Town Construction Bureau	
9	Town Culture and Tourism Office	
10	Town Environmental Protection and Climate Change Authority Office	
11	Town Finance and Development Office	
12	Town Health Office	
13	Town Micro and Small Enterprise Office	
14	Water Supply and Sewage Utility	

Mille		
No.	Organizations to Survey	New Organizations (Complete Section 2)
1	Mille Town Water Utility	
2	Mille Woreda Maintenance and Spare Part Enterprise	✓
3	Regional Water Resource Bureau	
4	WASHCO	✓
5	Woreda Administration Office	
6	Woreda Agriculture and Pastoralist Development Office	
7	Woreda Education Office	
8	Woreda Finance and Economic Development Office	
9	Woreda Health Office	
10	Woreda Water Office	
11	Woreda Women and Children Affairs Office	

South Ari		
No.	Organizations to Survey	New Organizations (Complete Section 2)
1	Action for Development	✓
2	Arkisha Kebele Federation Head	✓
3	Gazer Town Water Utility	

No.	South Ari	
	Organizations to Survey	New Organizations (Complete Section 2)
4	International Rescue Committee/ Lowland WASH	
5	Jinka Town Water Utility	
6	Jinka TVETC	
7	Jinka University	✓
8	Woreda Administration Office	
9	Woreda Agriculture and Natural Resources Office	
10	Woreda Education Office	
11	Woreda Finance and Economic Development Office	
12	Woreda Health Office	
13	Woreda Microfinance Enterprise	
14	Woreda Water, Mine and Energy Office	
15	Woreda Women and Children Affairs Office	
16	World Vision	✓
17	Zone Administration Office	
18	Zone Agriculture and Natural Resources Department	
19	Zone Education Department	
20	Zone Finance and Economic Development Department	
21	Zone Health Department	
22	Zone Water, Mine and Energy Department	
23	Zone Women and Children Affairs Department	

Annex 2:
Organizations Included in Potential Responses

(Laminated lists provided to facilitate responses.)

Debre Birhan Learning Alliance

1. Agriculture and Environmental Protection Land and Construction Management Core Process
2. Amanuel Development Organization
3. Communal Latrine Operator (Selassie Orthodox Church)
4. Culture and Tourism Office
5. Dashen Brewery
6. Debre Berhan Town Health Office
7. Debre Berhan University
8. Debre Birhan World Bank Project UWSSP-II (Govt-Implemented)
9. Finance and Local Economic Development Office
10. Habesha Brewery
11. Health Extension Office (Kebele 06)
12. Health Office
13. Housing Development Core Process
14. Kebele 02
15. Kebele 03
16. Kebele 05
17. Kebele 06
18. Kebele 07
19. Kebele 09
20. Municipality (Sanitation and Beautification Core Process)
21. North Shewa Zone Land Administration and Use
22. Public Latrine Operator (Chair)
23. Trade and Industry Office
24. Urban Land and Housing Management Office
25. Urban Land Registration and Information Office
26. Vacuum Truck Emptying Company
27. Water Supply and Sewage Enterprise

Mille Learning Alliance

1. Afar Community Initiative Sustainable Development Association
2. AMREF
3. CARE Ethiopia
4. Lay Volunteers International Association
5. Mille Town Water Utility
6. Mille Woreda Maintenance and Spare Part Enterprise
7. Pastoralist and Agriculture Bureau
8. Pastoralist Community Development Program
9. Regional Education Bureau
10. Regional Finance and Economic Development Bureau
11. Regional Health Bureau
12. Regional Water Resource Bureau
13. Save the Children
14. Semera University
15. UNICEF
16. WASHCO
17. Woreda Administration Office
18. Woreda Agriculture and Pastoralist Development Office
19. Woreda Education Office
20. Woreda Finance and Economic Development Office
21. Woreda Health Office
22. Woreda Water Office
23. Woreda Women and Children Affairs Office

South Ari Learning Alliance

1. Action for Development
2. AMREF
3. Arkisha Kebele Federation Head
4. Catholic Development
5. Gazer Town Water Utility
6. International Rescue Committee
7. Jinka Town Water Utility
8. Jinka TVETC
9. Jinka University
10. Save the Children
11. South Omo Development Association
12. Woreda Administration Office
13. Woreda Agriculture and Natural Resources Office
14. Woreda Education Office
15. Woreda Finance and Economic Development Office
16. Woreda Health Office
17. Woreda Microfinance Enterprise
18. Woreda Water, Mine and Energy Office
19. Woreda Women and Children Affairs Office
20. World Vision
21. Zone Administration Office
22. Zone Agriculture and Natural Resources Department
23. Zone Education Department
24. Zone Finance and Economic Development Department
25. Zone Health Department
26. Zone Water, Mine and Energy Department
27. Zone Women and Children Affairs Department

Woliso Learning Alliance

1. Ambo University
2. Ayetu Kebele (Previously "Kebele 01")
3. Burka Gudina Kebele (Previously "Kebele 03")
4. Ejersa Kebele (Previously "Kebele 02")
5. Hora Kebele (Previously "Kebele 04")
6. Municipality (Sanitation and Beautification)
7. Public Latrine Representative
8. Town Communications Affairs Office
9. Town Construction Bureau
10. Town Culture and Tourism Office
11. Town Environmental Protection and Climate Change Authority Office
12. Town Finance and Development Office
13. Town Health Office
14. Town Infrastructure Development Office
15. Town Land Administration Office
16. Town Micro and Small Enterprise Office
17. Town Municipal Services Office
18. Waste Collection Service Provider
19. Water Supply and Sewage Utility
20. Women's Association/Communal Latrine