Water Source Sites Assessment Report

For

Improve WASH Systems and Resilience (IWRA) project in East and West Belesa Woredas of Central Gonder Zone, Amhara Regional State

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1. Introduction

CARE Ethiopia through the support of the Austrian Development Agency (ADA) is implementing the project Improved Wash Systems and Resilience in Amhara (IWRA) in East and West Belesa of central Gondar of Amhara regional state which is the second phase of the previously implemented project; "Water for food security, women empowerment, and environmental protection (SWEEP) project. The objective of the project is to strengthen the initial interventions to increase the sustainability of the impact achieved in the intervention areas of SWEEP while expanding the area of intervention by scaling up SWEEP successes. The overall objective of IWRA is to improve the resilience of chronically food insecure households in East and West Belesa woredas in the Amhara regional state. IWRA will focus on reaching particularly marginalized women, girls, and people with disabilities who will comprise more than half of the targeted beneficiary population of 244.117 individuals. The explicit purpose of the IWRA project is twofold: 1) to increase household access to water, sanitation, and hygiene in the targeted woredas by strengthening the capacities of irrigation management and environmental conservation practices in the communities and 2) to use water resources as an entry point to engage with and empower women, girls, and people with disabilities to affect lasting change in the community.

The project plans to construct 60 new water schemes, rehabilitate 80 schemes, upgrade 3 water systems, and expand 3 additional systems from the existing functional schemes.

To meet the first objective, the project conducted a water sources site assessment to identify the potential sites to be constructed as new water schemes or to be rehabilitated. This report presents the number of schemes selected for FY 2022-23.

2. Methods/Approaches

Based on the national water supply implementation guideline and the project's demand-driven approach, every demand for access to water should be raised from the community, and the community should be engaged in every step of the process from planning to post-management of the schemes. Therefore, to ensure community involvement, demand request forms were distributed to the wider community in the intervention kebeles and subsequently analyzed. After the results' analysis, a water sources site assessment was conducted (field level observation) to identify potential sites for the construction of new water schemes. With regard to the rehabilitation of water source sites, woreda water

experts reviewed the list of non-functional water schemes, investigated the level of damage at hand, and listed items that need replacement. Regarding the upgrading and expansion of the existing systems, CARE discussed with the woreda representatives (woreda level technical and steering committee members from different sectors), who then identified the sites by conducting an assessment with the team.

3. Description of Project Interventions

The water sources site assessment for the new construction, upgrading, expansion of systems, and rehabilitation of water supply schemes was conducted from March 2022 – June 2022 in 28 kebeles of East and West Belesa. The project intervention kebeles already identified by the SWEEP project (20 kebeles, with an additional 8 new kebeles) were selected by the woreda steering committee which took its decision based on current water supply coverage, ground and water surface potential, and accessibility, adjacent kebele,[1] and overlapping.[2] The intervention kebeles are characterized by low water coverage, low potential of surface and groundwater, and easy access to construction materials. Furthermore, there are currently no other project interventions in the area that plan to construct or rehabilitate water schemes in the selected kebeles.

4. Water Sources Site Assessment Findings

4.1. Assessment of Sites for New Water Schemes

A. Desk appraisal

To conduct the desk appraisal, community demand request forms were distributed to the wider community in all intervention kebeles. A total of 108 community requests (3 per SWEEP kebele and 6 per new IWRA intervention kebele) were distributed. Interested community members responded to the questionnaire (83.4% of respondents from 90 villages). The objective was to evaluate i) the willingness of the community to contribute to the costs (either in kind or cash), ii) to discover challenges they face with existing water supply schemes, iii) to learn about the communities' opinion on the proposed water technology option, vi) to increase community involvement during the implementation, vii)

[1] An adjacent kebele refers to a kebele that is close or nearby to another kebele. This is important to reduce the overhead cost. Adjacent kebeles are the opposite of scattered/fragmented kebeles.

[2] Overlapping: kebeles in which other similar projects having same objective are not working. This helps to reduce duplication of resources.

to establish committee membership arrangements (number of male and female committee members), and vii) collect other issues raised by the community. Based on analysis of the forms, the appraisal team prioritized a selected number of listed schemes for the field-level evaluation. To minimize subjectivities of the desk appraisal prioritizing the schemes, the following value was given to each parameter.

1. **Number of beneficiaries – 20%**: This parameter is important as it takes into consideration cost efficiency & effectiveness. The number of people served per scheme may significantly increase gross community contribution per scheme and facilitate better future management. But caution needs to be taken while determining the upper limits of beneficiary numbers, as it is not possible to increase the number without limitations, for fear of potential over-drafting/ mining of groundwater, a declining serving capacity of the scheme, and a diminished efficiency of the scheme management.

2. **Condition and distance of existing water sources – 20%**: This parameter considers the quality and quantity of available water as well as its average distance from the users' village.

3. **Beneficiary participation within project idea discussion and WASH committee selection – 30%:** This parameter considers the number of beneficiaries involved during the discussion and their level of engagement: whether they participated in expressing their need for protected water, reached a consensus on the level of contribution, agreed on a plan for maintenance of the scheme after construction and selected WASH committees by voting. This criterion considers the gender composition of the committee, too.

4. **Beneficiary Contribution - 20%**: This parameter considers the proportion of the total cost the beneficiary is able to contribute in different forms like cash, labor, local material, etc. The level of beneficiary contribution shows the community's commitment to the project and helps to maximize the allocation of scarce resources, thereby possibly increasing the number of constructed schemes.

5. **Kebele WASH team – 10%**: Since the above criteria are not exhaustive and the Kebele WASH team can add knowledge to the relative problems of each village, we

also want to give weight and recognition to the administration's ranking and priority.

Based on the above points water schemes were selected for field-level evaluation.

B. Field-level Evaluation

The field-level evaluation was conducted to validate the findings of the desk-level appraised sites and technically evaluate the potential of the areas for specific technological options.

a) **Several beneficiaries per scheme**: To validate the number of beneficiaries per scheme based on the desk appraisal, the team decided together with the community how many households would be targeted by the project. They identified the location and distance of the household from the proposed water sources and agreed that, in order to be considered a project beneficiary, the house should not be more than one kilometer away from the source.

b) **Challenges:** The technical team evaluated the challenges the community faces in accessing existing sources of water, including their distance to the water source, the physical and biological water quality (protected or unprotected), and the sources' reliability (access required throughout the year). In addition, they calculated that 25 liters of water should be made available to each person per day to satisfy the demand on the ground.

c) **Topography:** Topography is one of the most important parameters to be considered during the site selection of hand-dug wells and boreholes. According to the topography of the area, groundwater flows well unless the aquifer is confined, with shallow groundwater being mostly unconfined. Since groundwater flows from a high topography to a low topography, naturally, any surface and subsurface water follows this direction. Therefore, higher topography serves as groundwater recharge for lowland areas. In addition to the elevation, other contributing areas have been considered. For instance, selected well sites should be located at the foot of a mountain or the bottom of a valley next to the water body (stream), to allow for a greater contributing area of the watershed, to recharge the wells from the upstream and make for a depth of water closer to the surface. Appropriate sites chosen for the wells are next to the water body at a reasonable distance for the community to fetch water (less than 1km).

d) **Geological formation:** The technical team observed and classified the geological formation of the selected sites by collecting strata formation from existing nearby wells, gullies, and riverbanks, conducting both surface and subsurface investigations. Appropriate wells need to be within fractured and weathered rocks that are diggable by hand.

e) **Vegetation patterns:** Vegetation growth patterns are a relevant indicator to evaluate the groundwater table. Mostly if there is a weak lineament or fractured area with a certain orientation, vegetation will grow along the weak zone (straight-line vegetation pattern). This indicates that there will be a good aquifer along the fractured zone, making them a promising spot for hand-dug wells along the weak zone. Additionally, perennial plants are the most useful indicators of groundwater. For the assessment, the team critically observed the vegetation pattern of the watershed to locate the well sites. The wells selected will be built next to vegetation with short and narrow leaves or very thick fleshy leaves with thick cell walls- as this indicates that there is groundwater.

f) **Overall sanitary conditions**: Groundwater may become contaminated due to improper disposal of liquid waste, poor construction quality, and failure to seal abandoned wells. These provide possible openings for the downward movement of water into sub-surface formation without natural filtration. Contamination may also take place through the movement of wastewater through large openings such as animal burrows, coarse gravel formations, or man-made excavation. Another source of pollution nowadays increasing is the use of fertilizers. This should be taken into consideration, especially in spring site selection. Therefore, regarding the water sources site selection for the construction of wells, springs should be located at a safe distance from possible sources of contamination (e.g. latrines, fecal contaminated streams, animal pens, etc.). To ensure the safety of selected sites, a sanitary survey was undertaken during the site selection to address issues of water quality. All the water schemes (60 newly selected water schemes) are safe from potential sources of contamination.

g) **Environmental impact assessment:** Considering the possible impacts the construction of schemes can have on the environment, the following risks were considered when selecting the sites: flood occurrence after constructing new structures; deforestation of indigenous plants around the selected sites; possibility of gully formation due to diversion of incoming floods; impact on ecosystems due to capping of water.

Risk Types	Number of schemes to be affected by risks	Proposed mitigation measure
Flooding	10 hand-dug wells and four springs located near flood areas	Construction of flood protection walls and diversion ditches to collect water and safely divert to natural drainage systems
Gulley formation	4 hand dug wells and 4 springs	Construct proper drainage ditches and waterways to remove excess water.

Table 1 Risks, number of water schemes possible affected by risks and mitigation measures

4.2. Selection of Schemes for Rehabilitation

Detailed assessments were undertaken to find out the reasons for non-functionality of existing water schemes, which include: i) poor construction (a problem-related to the quality of construction skills, quality of construction material), ii) poor management (problem-related to the lack of a maintenance budget, lack of preventive risk monitoring, and minor maintenance, improper management of schemes like fencing, fetching time, overloaded/pumped by kids, etc,…), iii) natural hazards (landslides, flooding), and iv) shortage of water (production of wells /springs not meeting the requirements of the communities).

Based on these findings, the detailed costs needed to rehabilitate each scheme were defined.

4.3. Upgrading and Expansion of Systems

The study team visited the 3 proposed sites for upgrading and the 3 sites for expansion and developed a plan based on their findings. Knowing the usage and functioning of these schemes up to now, it was understood that the schemes have sufficient and potable water for drinking and other uses.

1. **Guhala scheme upgrade**: Guhala water supply was constructed by the government to serve 23,340 people living in Guhala town. However, due to frequent breakage/damage of the pumps, the community was unable to retrieve water for 8 months per year. The major causes related to the pump damage were power fluctuations from the grid system. In addition to problems related to power supply,

the community's unwillingness to cover the diesel cost (too expensive) was another challenge to make the scheme consistently functional.

2. **Kalay and Ferfer Baja schemes upgrade:** Previously, these schemes were constructed by the government and were operated by diesel power. The community is unable to cover the cost of diesel due to price increase and poor access to fuel stations. As a result, the schemes did not function after 5 months and 2 weeks of construction, in Kalay and Ferfer Baja respectively.
3. **Scheme expansion**: The team checked the availability of water sources for newly expanded community services and approved the expansion of 3 sites in Arbaya, Worahela, and Arba tseguar.

4.4. Cost-benefit, the Feasibility of the Project regarding Future Management

The number of beneficiaries is important when evaluating the cost-benefit analysis of the schemes which refers to the total scheme cost divided by the number of beneficiaries per scheme, resulting in our case to not more than 623 ETB/11.75USD. The project team identified 60 new schemes and 80 rehabilitated schemes that are within that do not exceed that threshold.

Minor operation and maintenance costs of the rural water supply should be covered by the community. Based on our experience, water schemes selected for rehabilitation and construction should be managed by at least 25 households each. All the selected schemes of the project have a number of beneficiaries greater than 25 households and less than 50 households.

5. Final Selection

5.1. Assessment of Sites for New Water Sources

Considering the appraisal of the communities' responses and technical field evaluations of the potential of source areas 60 new water schemes were selected to be constructed by the project (30 in East and 30 in West Belesa). All the new schemes in West Belesa are hand-dug wells, whereas in East Belesa, 10 are springs and 20 of them are hand-dug wells.

5.2. Rehabilitation of Existing Water Supply

Based on the extent of damage and the material requirements identified by the project staff in collaboration with government staff, 80 water schemes were identified for rehabilitation (40 in West Beleza, 40 in East Belesa). All the scheme types are hand-dug wells in the case of West Belesa and 15 of them are spot spring developments in the case of East Belesa.

5.3. Upgrading and Expansion of Systems

After discussions with the woreda steering committee and the technical committee, 3 sites were identified for upgrading from a diesel power-based system to a solar-powered ones. Two schemes were selected in East Belesa, and one scheme was selected in West Belesa for an upgrade of the existing systems. Additionally, the technical team studied the possible expansion of three schemes (two in West Belesa and 1 in East Belesa).

6. Conclusions and Recommendations

6.1. Conclusions

Through this participatory water sources site assessment, 146 schemes in total were identified to be rehabilitated (80), upgraded (3 schemes), expanded (3 schemes), and newly constructed (60) in 2022-23. The construction and rehabilitation will take place during dry seasons.

Woreda	New Hand-dug wells	New spring development	Rehabilitation of hand-dug wells	Rehabilitation of spot spring	Upgraded sites	Expansion sites	Total
East Belesa	20	10	25	15	2	1	73
West Belesa	30	0	40	0	1	2	73
Total	50	10	65	15	3	3	146

Table 2: Number of schemes selected for rehabilitation and new construction for SWEEP project in East and West Belesa in 2022-2023

6.2. Recommendations

During the rehabilitation and construction of schemes, the following points should be considered:

- During the construction of the water schemes, consider the mitigation measures identified by the environmental impact assessment.
- The community should be involved in the construction and rehabilitation of water schemes.
- Construction should be completed before the rainy season.
- Close supervision of the constructed/rehabilitated water schemes by Woreda water office experts is needed

Annex 1 Sanitary Survey

1. GENERAL CONSIDERATIONS.

1.1 Zone_____ 1.2. Woreda_____

1.3 Kebele_____ 1.4. Gott_____

2. Do potential sources of contamination exist Yes No

a) above the site or in the watershed? _____ _____

b) at the site? _____ _____

If yes, determine these sources and

a) remove sources of contamination, and/or
b) protect the water supply, or
c) find a more acceptable water supply,

3. Does the water source have unpleasant physical qualities such as. Yes No

a) color? ____ ____

b) unpleasant odor? ____ ____

c) taste? ____ _____

Annex 2: Water Point Site Selection Report/ Sitting Report Formats

1. GENERAL CONSIDERATIONS.

1.1 Zone_____ 1.2. Woreda_____

1.3 Kebele_____ 1.4. Gott_____

1.5 Location of the community from the woreda capital (how to get there) _____

1.6 Total number of beneficiaries within 1km_____, Male_____, Female_____

2. TOPOGRAPHICAL LOCATION OF THE VILLAGE.

A. In a valley B. On a ridge C. On a plain.

3. CLIMATE.

A. Dega B. Wayne dega C. Kola.

Name of the months of wet seasons_____

Name of the months of dry seasons_____

4. SANITATION.

4.1 Main water borne/related diseases in the area_____

4.2 What measures did the community take to alleviate the above-mentioned diseases?

_____

_____

5. EXISTING WATER SUPPLY SYSTEM

Type of water source _____

Average distance from the community_____

Adequacy of the water _____

Reliability of the source_____

Quality of water _____

Accessibility of the source_____

Problems with the existing water supply systems _____.

6. RECOMMENDED WATER SOURCE

Hand dug well_____, Spring_____

Remarks on the recommended water source _____

_____

_____

7. SKETCH OF THE VILLAGE

In this sketch the following should be included a) roads in the village, b) settlement patterns (location of houses), c) location of the existing source and d) location of the proposed source concerning the settlements and other important features.

Annex 3: Environmental Impact Checklist

1) General information.

1.1 Zone_____ 1.2. Woreda_____

1.3 Kebele_____ 1.4. Gott_____

2) Is there an indigenous plant around the proposed schemes? Yes No
3) Does it need deforestation of indigenous plants for construction? Yes No
4) If the answer is yes, state your reason for site selection.
5) List watershed interventions to be implemented in the upstream and downstream of the watershed:

   _____

   _____
6) Likelihood of possible occurrence hazards due to construction or rehabilitation of schemes?
7) What are the main hazards and degradation features such as gullies, areas affected by flooding or landslides, or sedimentation (Approx. within 50 m radius)
8) List of degradation features that might not pose a threat to the water point right now, but if untreated might be a hazard in the future (e.g. cattle tracks developing into a gully, etc.)
9) Is there a gully on the proposed site? Yes No
10) Where is it located? Upslope Downslope
11) When will it be treated? Before construction During construction After construction
12) State mitigation measure _____

    _____

    _____

    _____