SALAAM DEVELOPMENT CENTER

SDC & MOAI JOINT ASSESSMENT REPORT ON DRIP IRRIGATION UNDER THE JRP PROJECT IN GALDOGOB, MUDUG REGION.

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Introduction

SDC, as a cooperating partner (CP) of WFP, is poised to implement the Joint Resilience Program (JRP) in the Galdogob and Bursalah districts of Mudug, Puntland, Somalia in collaboration with MOAI and local authorities. This project focuses on improving agricultural productivity by introducing innovative farming techniques such as drip irrigation to enhance water conservation and optimize crop yields. Drip irrigation, a highly efficient method of delivering water directly to the roots of crops, is ideal for Somalia's semi-arid regions, where water scarcity and erratic rainfall are major constraints to agriculture. By focusing on sustainable water management, the JRP aims to ensure food security and resilience for local communities.

The adoption of drip irrigation in this project is part of a broader effort to empower local farmers with modern agricultural practices, enabling them to produce more food with less water. The project involves consultations with community stakeholders, including farmers' committees, and careful selection of farms based on several key criteria to ensure successful implementation. This report provides an in-depth assessment of the process, challenges, and recommendations related to the distribution and implementation of drip irrigation systems in Galdogob and Bursalah

The Specific Objectives of the assessment.

The primary objective of this assessment is to:

1. Evaluate the suitability of selected farms for drip irrigation installation.
2. Assess the community's involvement in the selection and distribution process.
3. Identify challenges and opportunities for improving the implementation of drip irrigation systems in the JRP project.
4. Provide actionable recommendations for future project phases

The team visited all 35 farms benefiting from the JRP Project and applied a set of agreed criteria to determine which farms would be suitable for the implementation of main production equipment including drip irrigation.

Community consultation on the distribution of the drip irrigation.

Community consultation was a critical component of the assessment process, ensuring that the distribution of drip irrigation systems aligns with the needs and expectations of local farmers. Meetings were held in both Galdogob and Bursalah, involving key stakeholders, including local authorities, agricultural experts, and members of farmers' committees. These consultations aimed to gather insights from the community on the selection of farms and the overall feasibility of implementing drip irrigation in the respective districts.

I. Galdogob

On 5th September 2024, the SDC team visited the Galdogob sites, a key focus area of the JRP project. During this significant occasion, the team engaged with the project's beneficiaries and lead farmers, promoting collaboration and sharing valuable insights. The visit shed light on the undeniable benefits of the highly successful Drip Irrigation System, where comprehensive research verifies key advantages such as optimized water supply, enhanced disease control, enhanced nutrient utilization, and the remarkable reduction of costly farm worker downtimes. This documented evidence further strengthens the implementation of drip irrigation, showcasing its indisputable potential to revolutionize modern farming practices. With firm determination, the JRP project boldly paves the way towards a sustainable agricultural future.

The farmers' committee played a pivotal role in facilitating the consultations in Galdogob sites, the committee helped identify farmers who had sufficient land, access to water, and the willingness to adopt new agricultural practices. The farmers provided feedback on the criteria for farm selection, which included water availability, land size, and the presence of necessary infrastructure such as solar pumps and water tanks.

The farmers' committee in Galdogob, consisting of seven members, was instrumental in organizing community meetings and identifying local needs. They consulted with individual farmers to assess their willingness and capacity to adopt drip irrigation systems. Our team confirmed the need for drip irrigation from the community and discussed the criteria for selecting the farms that will benefit from the project. The community was presented with the allocation for Galdogob district that is supposed to include 6 farms which will be benefiting with drip irrigation. The committee will select the farms that will benefit from drip irrigation, solve any disputes that arise and listen to any complainants related to the allocation of the drip irrigation.

II. Bursalah

On 8th September 2024, the team conducting the assessment related to drip irrigation arrived at the Bursalah site, they went through all the fields that are being implemented with the JRP project, after brief and thorough observation. The assessment team met with the committee who are the leaders of the community benefiting from the project. They were presented with the purpose and objectives of the assessment, and the discussion was the criteria for selecting 4 farms that will benefit from drip irrigation out of 16 target farms in Bursalah.

The active participation of the local farmers' committee ensured transparency in the selection process and built trust among community members. The farmers expressed strong support for the project, recognizing that drip irrigation could significantly improve their crop yields and reduce the burden of water scarcity. They also emphasized the importance of ensuring that all eligible farms have access to the systems to promote equitable development in the region. The farmers' committee in Bursalah, with five members, worked alongside community leaders to evaluate the farms and select those that demonstrated readiness for the system.

Development of drip irrigation distribution selection criteria.

The implementation of drip irrigation on a farm requires careful consideration of various Joint Resilience Project (JRP) criteria. The following factors will be taken into account when selecting suitable farms for drip irrigation equipment:

1. Farmer Requests: Priority will be given to farms that have formally requested inclusion in the drip irrigation initiative. The level of interest and commitment demonstrated by the farmers is crucial in the selection process.

2. Farm Size: Preference will be given to small-scale farms with adequate land size to support both traditional farming practices and the installation of drip irrigation systems. Ideal land dimensions are 50x50 meters or 100x50 meters to optimize the use of the irrigation systems.

3. Water Source: Farms with reliable access to water sources such as wells, boreholes, and water storage facilities will be prioritized. Consistent water availability is essential for the successful implementation of drip irrigation.

4. Land Topography: Preference will be given to farms with flat or gently sloping land, as these terrains are more suitable for the installation of drip irrigation systems and facilitate effective water distribution.

5. Water Availability: Farms that have consistent access to water throughout the year are prioritized to ensure the irrigation system can function effectively.

6. Solar Pump Availability: Farms that are already equipped with solar pumps are preferred, as this minimizes the need for additional resources and promotes sustainable water usage for irrigation.

7. Flood Protection: - Farms with natural or constructed flood protection measures are prioritized, as these features enhance resilience against potential flooding, which could damage the drip irrigation system.

8. Water Tank Availability: The presence of water storage facilities on the farm was a key criterion to ensure a continuous and reliable water supply for the drip irrigation system.

9. Land Availability for installation: Farms with adequate land space to support climate friendly technologies alongside traditional farming practices were favored. Larger farms are better positioned to benefit from the combined technologies of greenhouse and drip irrigation.

In summary, the selection process focused on farms with responsible owners demonstrating an agricultural mindset, sustainable water sources, adequate land and storage capabilities, and suitable environmental conditions. These criteria are essential to ensure the successful implementation and sustainability of the drip irrigation initiative.

Identification of the successful farms based on selection criteria.

Using the criteria above, SDC and MOAI team visited all the target cooperative farms for the JRP project one by one. The team selected ten sites for the initial phase of the drip irrigation distribution as follows: In Galdogob, six sites were chosen, two of which have a land size of 100*50 meters, while the remaining four have a land size of 50*50 meters. These farms met the criteria in terms of water availability, flat topography, and existing infrastructuresuch as solar pumps and water tanks.

Target Drip irrigation Farm - Galdogob District

Farm Information			Assessment criteria								Land availability		Status
S/N	Name of Farm Representatives	Phone number	Requested	farm size (Ha)	water source	land topography	water availability	solar pump	flood protection	water tank	50*50	100*50	

1	**Ahmed Warsame (Iskaahatada Taloole farm leader)**	**7790132**	√	**3**	**Borehole**	√	√	√	√		√		**Accepted**
2	**Jamac Ahmed (Iskaashatadda Isqanbuus representative)**	**6420666**	√	**4**	**Borehole**	√	√	√	√	√		√	**Accepted**
3	**Abdikarem ismaacil daauud (Cooperative representative)**	**7731975**	√	**5**	**Water storage**	√	√		√	√	√		**Accepted**
4	**Abdiqafaar sh ibraahim (Cooperative representative)**	**7791418**	√	**7**	**Borehole**	√	√		√	√		√	**Accepted**
5	**Abdulahi Yusuf Maxamuud (Cooperative representative)**	**7756622**	√	**8**	**Water storage**	√	√		√	√	√		**Accepted**
6	**Abdulaahi Faarax Ali (Cooperative representative)**	**7655149**	√	**5**	**Water storage**	√	√		√	√	√		**Accepted**

Table 1: *Presents the evaluation results of drip irrigation and encompasses eight criteria for selection. The table indicates that cooperative farms that comply with at least five of the established criteria are entitled to receive drip irrigation benefits. As such, according to Table 1 above, 6 farms situated in Galdogob district qualify for the JRP project's drip irrigation system. The selection criteria and implementation plan have both been approved by SDC, lead farmers, and MOAI.*

Assessment criteria												land availability	
S/N	**Name of Farm focal point**	**Phone number**	**Requested**	**Farm Size (Ha)**	**Water Source**	**land topography**	**water availability**	**solar pump**	**flood protection**	**water tank**	**50*50**	**100*50**	
1	**Abdisalam xiif (Cooperative representative)**	**7622382**	√	**2**	**Borehole**	√	√		√		√		**Accepted**
2	**Ali Sh Osman (Cooperative representative)**	**6901590**	√	**3**	**Borehole**	√	√		√			√	**Accepted**
3	**Bishaar abdishire (Cooperative representative)**	**7728747**	√	**7**	**Borehole**	√	√		√			√	**Accepted**
4	**Maryan khelif (Cooperative representative)**	**7701747**	√	**1**	**Borehole**	√	√	√	√	√	√		**Accepted**

Table 2: *Presents the assessment outcomes of drip irrigation and covers eight selection criteria for implementation on the Bursalah site. According to Table 2, farms that meet at least five of the set criteria are eligible for drip irrigation benefits. As per the table 2 above, 4 farms located at the Bursalahsite qualify for the JRP project's drip irrigation system. SDC, lead farmers, and MOAI have endorsed the selection criteria and rollout strategy.*

Challenges in drip irrigation implementations.

- **Water Availability:** The assessment indicates that all cooperative farms under consideration have access to a reliable water source, ensuring an adequate water supply for irrigation purposes. This is a favorable condition for implementing drip irrigation systems.
- **Solar Pump:** The evaluation reveals that a majority of the sites are equipped with solar pumps. Solar-powered irrigation systems provide a sustainable and cost-effective solution for pumping water, reducing dependency on traditional energy sources and minimizing operational costs.
- **Water Tank:** Some cooperatives have water tanks in place, which can serve as an additional water storage facility. Water tanks are beneficial for maintaining a consistent water supply during periods of lower water availability or during peak irrigation demand. They enhance water management and can support efficient drip irrigation practices.
- **Flat Land:** The assessment confirms that the land on the sites is relatively flat. Flat terrain simplifies the installation and layout of drip irrigation systems, ensuring uniform water distribution across the crop area and minimizing potential challenges related to uneven land contours.
- **Solar Pump Availability:** While some cooperatives are equipped with solar pumps, it is found that only a few of them have this infrastructure in place. Solar pumps offer the advantage of utilizing renewable energy for water pumping, reducing operational costs and environmental impact. However, the limited presence of solar pumps among the farms emphasizes the need for considering alternative water pumping solutions.

- **Restricted root development**: The research reveals that crop roots are restricted on the wet zone and limited to the moist. This may weaken the roots and reduce the ability to withstand the strong wind and the ability to withstand drought. Careful planning of irrigation system will reduce the magnitude of problems.
- **Hot sun effect:** It was also noticed that hot sun can affect tubes and may shorten usable life. This can be done by covering the pipes.
- **Inadequate trenching:** The research also noticed that trenching is very common in drip irrigation installation and very expensive and it can result in pipes puncture mostly in areas where there are stones. Pipes should be trenched below the surface to avoid more punctures.
- **Emitters Clogging:** The research also indicates that clogging happens because of small holes of outlets and can easily be clogged by suspended materials e. g (Sand and silt) this can create poor uniformity of water application. If clogs are not cleared right away, water pressure can build up to cause damages. Proper filtration will be required to correct clogging.
- **Salt accumulation at the root zone periphery**: In arid areas, salt normally accumulates towards the periphery of the wetted zones. Leaching will be required after sometimes artificially.
- **High cost of drip irrigation system**: The system is very expensive compared to sprinkler irrigation. This comes because of the requirements of large quantities. Other areas will require sprinkler irrigation to reduce salinity.

FINDINGS.

This agricultural technology assessment has yielded several significant findings, as outlined below:

I. Request from Target Community:
During the assessment period, the team approached the target community and successfully conveyed the benefits of utilizing drip irrigation in agricultural practices. As a result, the community requested installation of the technology due to its potential to reduce labor costs, control pests and disease, and enhance nutrient and water efficiency in farming.

II. Land Topography:
The assessment identified that all targeted land sites are flat and suitable for the installation of drip pipes. It was observed that **35** farms out of the total assessed were eligible for drip irrigation.

III. Flood Protection:

The success of a drip irrigation system depends on implementing measures to protect the infrastructure from flooding. The assessment confirmed that all areas where drip irrigation pipes will be installed will not be affected by flooding.

IV. Land Availability:
During the assessment period, we visited 35cooperative owned farms, 30 of which correspond to 90% have access to $50x50M^2$, while 5 farms have access to $100x50M^2$, equivalent to 10%. The farmers expressed that they need more a $50x50M^2$ area of drip irrigation is manageable compared to large area that may be notsufficient enough.

V. Water Sources:
The assessment revealed that 35 target farms were evaluated for drip irrigation, with 28 having Boreholes and 7 having water storages. It was also observed that all target farms possess sufficient water for production when using a drip irrigation system.

VI. Water Tank:
The assessment discovered that only 14 of the 35 target (30%) farms have water tanks while 21 (70%) do not have any water storage facility. However, the target community expressed a willingness to fund 50% of the cost of water tank installation.

VII. Solar Panels:
The assessment team visited 35 farms, 12 of them have solar systems, equivalent to 28%, we also found out that the majority of farms assessed lacked solar system, with 23 out of 35 farms requiring solar system installation equivalent to 72%. The assessment found that solar panels are critical for farms implementing drip irrigation as it requires sufficient water to be effective.

Overall, these findings support the adoption of drip irrigation in the assessed agricultural community and emphasize the need for infrastructure such as water tanks and solar panels for the successful implementation of the technology.

Recommendations.

1. Recommended for the Target Community:

It is recommended that the drip irrigation system is utilized at a high level by the target community, as it has applied for irrigation and is ready to benefit from this technology. Adequate training should be provided to the beneficiaries on the proper cultivation methods of drip irrigation as the area where salinity is cultivated is abundant. This would enable them to produce quality products. Furthermore, drip irrigation can address many issues that exist in farms such as reducing labor costs, pesticide and disease control, water efficiency usage, and nutrient deprivation. Therefore, it is highly recommended that farmers be given drip irrigation.

2. Land Availability:

Based on the assessment findings, it is recommended that the criteria for land size connected to drip irrigation be at least 50x50M^2, as 90% of the 30 farms that have opted for drip irrigation have chosen to connect it to an area of 50x50M^2. This would also enable farmers to easily control and maintain the drip irrigation system.

3. Water Sources:

Given the research findings, it is recommended that farms which have drip irrigation installed also have a reliable water source such as shallow wells or boreholes. In combination with drip irrigation, solar panels, and water tanks, this could lead to a substantial increase in production as per the project target. The following areas require water tanks based on evaluations for drip irrigation:

4. Water Tank:

It is recommended that cooperatives selected for drip irrigation systems should have a water tank constructed to enhance the effectiveness of both the drip irrigation and solar systems. The assessment outlines the following recommendations:

It is essential to construct water storage facilities for farms without water tanks to fully maximize the benefits of drip irrigation. These water storage facilities must have a capacity of at least 2M^3 to ensure adequate water supply for the drip irrigation system. Each farm should be connected to a drip irrigation water tank that is not less than 2M^3 to ensure that drip irrigation can provide nutrients and pest and disease control for each crop.

5. Solar Panel:

It is highly recommended that 23 farms, equivalent to 72% of the drip irrigation target farms to provide a complete solar system. This is because solar panels complement the water and the drip irrigation system along with the water tank. Reliable sources of water with accompanying solar panels, drip irrigation, and water tanks can lead to high yields. A water assessment should be conducted to determine the capacity and quality of the solar panels needed by the target farms.

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6. Proper maintenance of Drip irrigation system:

To enhance the efficiency and durability of drip irrigation systems, proper maintenance is crucial. Regular inspection and cleaning of the system components, including filters, emitters, and pipes, can prevent clogging and ensure optimal water flow. Additionally, periodic checks for leaks or damages and timely repairs or replacements are necessary to maintain the system's performance and longevity.

8. Effective training for drip irrigation technology:

Providing valuable training to farmers is essential for increasing the productivity and efficiency of drip irrigation. Training programs can educate farmers on the correct usage and management of drip irrigation systems, including proper scheduling and timing of irrigation, appropriate selection of crop-specific emitters, and optimal water and nutrient management practices.

Conclusion.

The introduction of drip irrigation in the Galdogob and Bursalah districts represents a significant step toward sustainable agriculture in Puntland, Somalia. Through careful selection and community involvement, the project has identified 10 farms that are well-positioned to benefit from the system. However, to fully meet the needs of the farming community, further investment in infrastructure and capacity-building is essential. Expanding the system to more farms will not only improve food security but also enhance the resilience of local farmers to the challenges posed by climate change and water scarcity.

The successful selection of 10 cooperative farms highlights the importance of community involvement in the distribution process, with farmers' committees playing a crucial role. While challenges remain, particularly in meeting the demand for more systems, the positive reception from farmers underscores the needto expand the program and provide additional support to ensure its sustainability.

Annex: Pictures related to the Assessment Activities.

Figure 1: Farmers committee meeting and Approving Selected farm at Galdogob.

Figure 2: Farmers Committee Meeting to Identified the successfully farms based on selection criteria of drip irrigation system At Bursalah.

Figure 3 Drip irrigation Site verification for both farmers committee and SDC at Bursalah.

Figure 4 Drip irrigation team led by SDC with the beneficiaries for Drip irrigation.

Figure 5 Selected farm for drip irrigation – listening and verification with SDC.

Figure 6: Selected Land to be installed drip irrigation system based on selection criteria at Bursalah site.

Figure 7: One of the farm land eligible to be implemented drip irrigation system at Galdogob site.