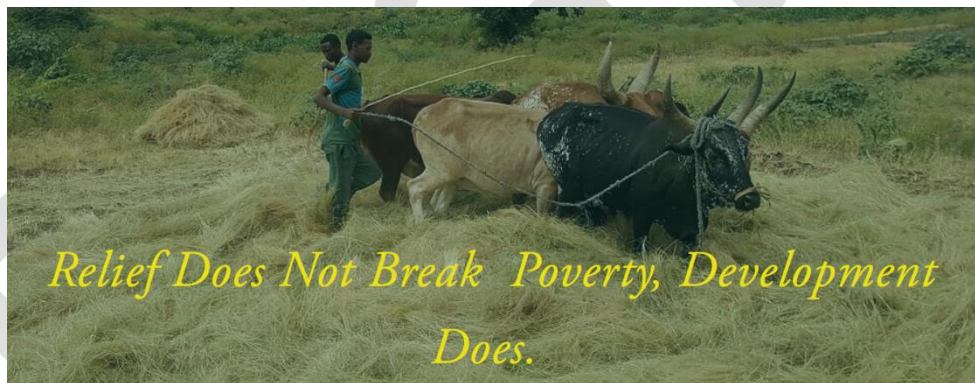




Raya Development Association in Canada

2/15/2024

Implementing Sustainable Irrigation Practices in Raya, Tigray



Our vision is to be an integral part of the Raya people in their effort to overcome the entrenched poverty in their region.



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Project Name: Farmer-Led and Sustainable Irrigation Project in Raya, Tigray

Project Objective

To create a sustainable farming practice in the Raya region that is directly reliant on seasonal rain, thereby eliminating or reducing the risk of dependency on food aid during drought conditions.

Project Approach

The project will utilize existing water boreholes and other water sources near suitable farmlands. On the selected farmlands a pilot program will be conducted utilizing irrigation farming to minimize water use and help reduce farmers reliance on seasonal rain in Raya region. The scalability of the project will be evaluated.

Executive Summary

The project aims to implement sustainable irrigation practices in the Raya region of Tigray, with the objective of creating farming practices less reliant on seasonal rainfall, thus reducing the region's vulnerability to food insecurity during droughts. Leveraging existing water boreholes and other water sources, the project will conduct a pilot program utilizing irrigation farming to minimize water use and enhance crop yields. The scalability of the project will be evaluated to potentially expand its impact. The project will follow a comprehensive approach involving the identification of suitable farmlands, development of selection criteria, assessment of irrigation types, construction of irrigation systems, and collaboration with stakeholders including local farmers, the Raya administration, and academic institutions. By implementing sustainable irrigation practices, the project aims to enhance food security, resilience, and economic opportunities for local farmers in the Raya region.

Task	Performer	Status	Start date	Duration (days)	End date	Estimated Cost (Birr)	Assigned Budget	Spent (Birr)
Initial Survey and Assessment								
Criteria Development and Farmland Selection								
Irrigation System Design and Construction								
Implementation and Monitoring								
Data Collection and Research Support								
Stakeholder Engagement and Communication								
Evaluation and Future Planning								



Project Components

1. **Identification of Water sources and Farmlands:**

There are several water boreholes [need Reference] in Ray region. Create a location map that shows the borehole, water availability including water level, current condition such as pump availability, prior use of the well and who owns the borehole. Determine the usability of the boreholes for farming. Obtain use permission from borehole owner. Survey farmlands near the boreholes. Survey farmlands near the water borehole and assess their suitability for irrigation-based farming.

2. **Development of Farmland Selection Criteria:**

- 1.1. Prioritize farmlands based on their proximity to the identified water borehole/s (high priority).
- 1.2. Consider the size of the farmland, farmer participation willingness, and water volume needed for irrigation.

3. **Selection of Farmland for Irrigation Pilot Program:**

- 3.1. Use the developed selection criteria to choose farmland for the irrigation pilot program.
- 3.2. Collaborate with local farmers and the Raya administration to finalize the selection process.

4. **Assessment of Irrigation Types:**

- 4.1. Evaluate different irrigation methods suitable for the selected farmland, such as drip irrigation or traditional approaches.
- 4.2. Consider factors such as water efficiency, cost-effectiveness, and suitability for local crops.

5. **Construction of Irrigation System:**

- 5.1. Based on the number of selected farmlands, design and construct an appropriate irrigation system within the allocated budget.
- 5.2. Ensure the irrigation system maximizes crop yield while minimizing water usage.

6. **Project Funding and Timeline:**

- 6.1. Allocate the project budget of up to 5,000,000 birr for the entire project, to cover expenses related to land selection, irrigation system construction, needed tools and equipment and project management.
- 6.2. Implement the project within a one-year timeline to meet the funding and completion requirements.

7. **Data Collection for MS Student Research:**

- 7.1. Collaborate with Mekelle University to involve one MS student in the project.



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7.2. Collect data on sustainability farming practices, irrigation methods, crop yields, and water usage for the student's research.

8. Stakeholders:

- Local farmers in Raya, Tigray region
- Southern Zone of Tigray administration
- Wereda Administration for the selected project site.
- Mekelle University (MS student researcher)
- Raya International Development Organization
- Raya Development Association in Canada
- Raya Development Association in Germany

9. Project activities (task), performers, cost and budgeting

Task	Performer	Status	Start date	Duration (days)	End date	Estimated Cost (Birr)	Assigned Budget	Spent (Birr)
Initial Survey and Assessment								
Criteria Development and Farmland Selection								
Irrigation System Design and Construction								
Implementation and Monitoring								
Data Collection and Research Support								
Stakeholder Engagement and Communication								
Evaluation and Future Planning								



Project Implementation Steps:

1. **Initial Survey and Assessment:**

- 1.1. Conduct a survey to identify potential water boreholes and assess their viability. Follow *Appendix A: Stepwise Approach to Create a Location Map of Water Boreholes in Raya Region* for detailed instructions.
- 1.2. Engage with local farmers to gauge their interest and willingness to participate in the project. Follow *Appendix B: Stepwise Process to Identify and Assess Farmlands for Irrigation-based Farming near Water Boreholes*.

2. **Criteria Development and Farmland Selection:**

- 2.1.1. Develop farmland selection criterion in consultation with stakeholders.
- 2.1.2. Apply the criteria to select suitable farmland for the irrigation pilot program.

3. **Irrigation System Design and Construction:**

- 3.1.1. Collaborate with irrigation experts to design and construct the irrigation system.
- 3.1.2. Ensure adherence to sustainability principles and efficient water usage.

4. **Implementation and Monitoring:**

- 4.1.1. Implement the irrigation pilot program on the selected farmland.
- 4.1.2. Monitor crop growth, water usage, and overall project progress throughout the implementation phase.

5. **Data Collection and Research Support:**

- 5.1.1. Collect relevant data for the MS student's research on sustainable farming practices.
- 5.1.2. Provide support and resources to facilitate the student's research objectives.

6. **Stakeholder Engagement and Communication:**

- 6.1.1. Maintain regular communication with local farmers and the Raya administration to ensure their involvement and support.
- 6.1.2. Provide updates on project milestones and outcomes to all stakeholders.



7. Evaluation and Future Planning:

- 7.1.1. Evaluate the effectiveness of the irrigation pilot program in increasing crop yield and reducing dependency on seasonal rain.
- 7.1.2. Use lessons learned to inform future sustainability initiatives and agricultural practices in the region.

By following this project plan, we aim to implement sustainable irrigation practices in the Raya region, ultimately improving food security, reducing vulnerability to drought, and promoting economic resilience among local farmers.

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Appendix A: Stepwise Approach to Create a Location Map of Water Boreholes in Raya Region:

1. **Research and Data Collection:**

- 1.1. Gather information on the location of water boreholes in the Raya region from local authorities, water resource management agencies, or existing databases.
- 1.2. Collect data on water availability, including water level measurements, from relevant sources such as hydrological reports or previous studies.
- 1.3. Obtain information on the current condition of the boreholes, including pump availability, maintenance history, and prior use.

2. **Geographic Information System (GIS) Mapping:**

- 2.1. Utilize GIS software or online mapping platforms to create a geographical map of the Raya region.
- 2.2. Input the coordinates or addresses of the water boreholes into the mapping software to mark their locations on the map.

3. **Data Integration and Visualization:**

- 3.1. Integrate the collected data on water availability, borehole conditions, and ownership into the GIS platform.
- 3.2. Use different symbols or color codes to represent various attributes such as water level, pump availability, and ownership on the map.

4. **Field Verification and Ground Truthing:**

- 4.1. Conduct field visits to verify the accuracy of the mapped borehole locations and gather additional information.
- 4.2. Validate the water availability data by measuring water levels directly at the borehole sites.
- 4.3. Assess the current condition of the boreholes on-site and document any visible issues or maintenance needs.

5. **Usability Assessment for Farming:**

- 5.1. Analyze the data collected to determine the usability of the boreholes for farming purposes.
- 5.2. Consider factors such as water availability, depth of the water table, and reliability of the borehole infrastructure.
- 5.3. Evaluate the suitability of the boreholes for irrigation based on their capacity to provide sufficient water for agricultural activities.

6. **Engagement with Borehole Owners:**

- 6.1. Identify the owners or stakeholders responsible for managing the boreholes in the Raya region.
- 6.2. Reach out to the borehole owners to obtain permission to use the boreholes for farming purposes.
- 6.3. Discuss the proposed usage plan, including the volume of water needed, maintenance responsibilities, and any associated costs.

7. **Documentation and Reporting:**

- 7.1. Document the findings of the location mapping and usability assessment in a comprehensive report.
- 7.2. Include detailed information on each borehole, its current condition, water availability, and ownership status.
- 7.3. Provide recommendations for utilizing the boreholes for farming based on the assessment results and engagement with borehole owners.

8. **Stakeholder Engagement and Decision-Making:**

- 8.1. Share the location map and assessment report with relevant stakeholders, including local farmers, agricultural organizations, and government authorities.



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- 8.2. Facilitate discussions and decision-making processes to determine the optimal utilization of the boreholes for farming and ensure alignment with community needs and priorities.
9. **Implementation and Monitoring:**
 - 9.1. Implement the approved usage plan for utilizing the boreholes for farming activities.
 - 9.2. Establish monitoring mechanisms to track water usage, borehole performance, and overall impact on agricultural productivity.
 - 9.3. Periodically review and update the location map and assessment findings to reflect any changes or developments over time.

By following this stepwise approach, we can create a comprehensive location map of water boreholes in the Raya region, assess their usability for farming, and obtain necessary permissions for their utilization, ultimately contributing to the promotion of sustainable agriculture and water resource management in the area.

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Appendix B: Stepwise Process to Identify and Assess Farmlands for Irrigation-based Farming near Water Boreholes:

1. **Location Mapping:**

- 1.1. Utilize existing data or conduct field surveys to identify water boreholes in the target area.
- 1.2. Map out the vicinity surrounding each borehole to delineate potential farmlands.

2. **Engagement with Farmers:**

- 2.1. Reach out to local farmers in the vicinity of each water borehole to discuss the project and assess their interest in participation.
- 2.2. Gather information on farmers' family size, types of crops grown, and their willingness to participate in irrigation-based farming.

3. **Farm Size and Land Ownership:**

- 3.1. Determine the size of each farmer's landholdings and verify land ownership status.
- 3.2. Assess the availability of contiguous land parcels suitable for collective irrigation efforts.

4. **Soil Condition Assessment:**

- 4.1. Conduct soil tests in selected farmlands to assess soil fertility, texture, and drainage characteristics.
- 4.2. Evaluate the suitability of soil for irrigation-based farming and identify any potential soil amendments needed.

5. **Water Usage and Availability:**

- 5.1. Survey farmers to understand their current water usage practices, including sources of water and irrigation methods used.
- 5.2. Estimate the volume of water required for irrigation based on crop water requirements and farm size.

6. **Crop Suitability and Diversification:**

- 6.1. Analyze the types of crops currently cultivated by farmers and assess their suitability for irrigation-based farming.
- 6.2. Identify opportunities for crop diversification to optimize water usage and enhance farm productivity.

7. **Topographical Survey:**

- 7.1. Conduct a topographical survey of the selected farmlands to assess land slopes and drainage patterns.
- 7.2. Determine areas prone to waterlogging or erosion and plan accordingly for irrigation infrastructure placement.

8. **Infrastructure Assessment:**



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- 8.1. Evaluate existing infrastructure such as access roads, pathways, and utilities to ensure logistical feasibility for irrigation projects.
- 8.2. Identify any potential challenges or constraints that may need to be addressed during project implementation.
- 9. Community Consultation and Consent:**
 - 9.1. Organize community meetings or focus group discussions to seek input from farmers and address any concerns or questions.
 - 9.2. Obtain formal consent from farmers for the use of their land for irrigation-based farming and project participation.
- 10. Data Compilation and Analysis:**
 - 10.1. Compile all gathered data including farm size, crop types, soil condition, water availability, and farmer willingness.
 - 10.2. Analyze the data to identify suitable farmlands for irrigation-based farming based on predefined criteria.
- 11. Final Selection and Prioritization:**
 - 11.1. Prioritize farmlands based on factors such as proximity to water boreholes, soil fertility, farmer willingness, and logistical feasibility.
 - 11.2. Finalize the selection of farmlands for inclusion in the irrigation project based on the assessment outcomes.
- 12. Documentation and Reporting:**
 - 12.1. Document the findings of the farmland survey and suitability assessment in a comprehensive report.
 - 12.2. Provide recommendations for the selection and prioritization of farmlands for irrigation-based farming, along with any necessary action plans or mitigation measures.

By following this stepwise process, you can effectively identify and assess farmlands near water boreholes for irrigation-based farming, ensuring the successful implementation of sustainable agricultural practices in the target area.



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Initial Survey and Assessment:

Conduct a survey to identify potential water boreholes and assess their viability.

Engage with local farmers to gauge their interest and willingness to participate in the project.

Criteria Development and Farmland Selection:

Develop farmland selection criterion in consultation with stakeholders.

Apply the criteria to select suitable farmland for the irrigation pilot program.

Irrigation System Design and Construction:

Collaborate with irrigation experts to design and construct the irrigation system.

Ensure adherence to sustainability principles and efficient water usage.

Implementation and Monitoring:

Implement the irrigation pilot program on the selected farmland.

Monitor crop growth, water usage, and overall project progress throughout the implementation phase.

Data Collection and Research Support:

Collect relevant data for the MS student's research on sustainable farming practices.

Provide support and resources to facilitate the student's research objectives.

Stakeholder Engagement and Communication:

Maintain regular communication with local farmers and the Raya administration to ensure their involvement and support.

Provide updates on project milestones and outcomes to all stakeholders.

Evaluation and Future Planning:

Evaluate the effectiveness of the irrigation pilot program in increasing crop yield and reducing dependency on seasonal rain.

Use lessons learned to inform future sustainability initiatives and agricultural practices in the region.