



Our World, Our Responsibility

Project Concept

**SPRINKLER IRRIGATION
SYSTEM (SIS)**

**Sawula Town,
Pujehun District,
Sierra Leone**

Abbreviations



Abbreviation	Definition
\$	United States Dollar
FTE	Full-Time Equivalent (jobs)
GDfH	Global Development for Humanity
GR	Gross Revenues
ha	Hectare
HH(s)	Household(s)
IMC	Irrigation Management Committee
NR	Net Revenues
SDGs	Sustainable Development Goals

Agenda



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Project Background and Timeline

Project Background

Key Challenges in Sawula, Pujehun District, Sierra Leone



Dry-Season Water Scarcity: Agricultural production in Sawula relies on rainfall. During the dry season, farmers experience yield losses of 60–70%, forcing them to abandon production for up to five months each year.



Single-Season Production: Short and increasingly unreliable rainy seasons (May–September) limit farmers to one production cycle per year, despite fertile soils and strong market demand for vegetables.



Untapped Water Resources: Although the perennial River Wanje flows year-round less than one km from farms, the absence of pumps, pipelines, and irrigation infrastructure prevents its use for agricultural production.



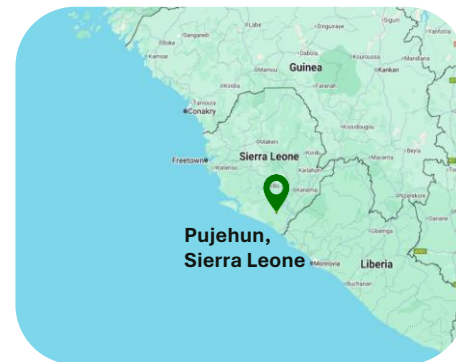
High Labor Burden: Manual watering using buckets is labor-intensive and time-consuming, limits farm size, and disproportionately affects women farmers, reducing productivity and household welfare.



Income Instability: Single-season production leads to low and volatile incomes. Farmers are forced to sell during peak supply periods when prices are lowest, increasing vulnerability to shocks.

SOLUTION

SPRINKLER IRRIGATION SYSTEM (SIS)



Project Background

Strategic Solution – SIS Overview

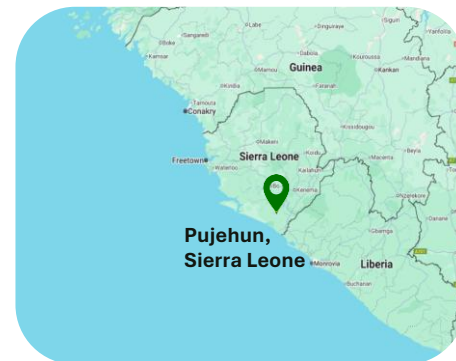


Capacity/Size: This community-managed SIS serves two hectares of communal farmland and consists of a 5-horsepower solar-powered pump and a 4.8 kW solar system (12 panels), high-density polyethylene main and sub-main pipelines, and sprinkler distribution lines.

Water Source & Storage: Water is abstracted from the perennial River Wanje, which is located 700 meters from the farm site. It is then stored in two 5,000-litre tanks, which provide stable pressure and reliable daily irrigation.

Beneficiaries: The system currently benefits 30 farming HHs (180 people). Operating under a common land-use and production model, it has the potential to be scaled up to reach 100 HHs (600 people) through future expansion.

Optimal Location: The SIS will be located on community land in Sawula, Pujehun District, close to both cultivated fields and the water source, enabling efficient system management and strong community ownership.



Project Timeline



#	Project Timeline – Sprinkler Irrigation System (SIS), Sierra Leone	Month 1				Month 2				Month 3				Month 4				Month 5			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Key Implementation Milestones																					
1	Conduct introductory meetings with District & Chiefdom authorities, water regulators, and community stakeholders																				
2	Securing project site boundaries, land documentation, and conducting environmental feasibility																				
3	Conducting technical assessment of the water source (River Wanje), flow measurement, and irrigation layout confirmation																				
4	Tendering, vendor selection, and procurement of materials (pipes, risers, sprinklers, pump, solar panels, fittings, tank, accessories)																				
5	Transport and delivery of irrigation materials, solar components, tank, and fittings to Sawula																				
6	Construction and installation works: river intake, filtration, pump house platform, solar array mounting, storage tank stand																				
7	Installation of mainline & submain pipelines, risers, sprinkler heads, valves, fertigation system, and system pressure testing																				
8	Solar pump integration, electrical control configuration, calibration, water-flow testing, and full commissioning																				
9	Community training: system operation, water management, maintenance routines, fertigation usage, governance setup																				
10	Establish Irrigation Management Committee (IMC) and finalize operations and maintenance schedules, revenue-sharing rules, logbooks, and user protocols																				

Project Objectives and Economic Impact

Key Project Objectives



1

Enable Year-Round Production

A reliable solar-powered SIS that allows farmers to produce agricultural products throughout the year, eliminating dependence on a single rainy-season cycle.

2

Reduce Dry-Season Yield Losses

Reduce dry-season vegetable yield losses by up to 70% by ensuring consistent access to irrigation water during the dry period (November–April).

3

Increase Agricultural Productivity

Increase average yields by at least 40% in the first year, raising productivity from rainfed levels (~3.5 tons/ha/year) to irrigated production (~10.5 tons/ha/year).

4

Stabilize and Increase Household Incomes

Improve income stability and raise household earnings by enabling three production cycles per year, reducing exposure to peak-season price volatility.

5

Reduce Labor Burden

Replace manual bucket irrigation with efficient sprinkler systems to save time, reduce physical labor, expand cultivated area, and improve productivity particularly for women farmers.

6

Strengthen Climate Resilience & Sustainability

Enhance resilience to climate variability by providing a reliable water supply independent of rainfall, supported by community-based management and cost-recovery mechanisms.

Key Economic Impacts



Production Impact (tons)

The SIS will significantly increase annual vegetable production by **14 tons/year** (from 7 tons/year to 21 tons/year) across 2 ha land.



Income Impact (\$)

Annual HHs income increases from \$273 to \$429 (**+\$156, 57%**), driven by year-round agricultural production.*



Employment Impact (FTE**)

The SIS generates **18 full-time equivalent (FTE) jobs** (direct & indirect) in operation, transport, logistics, and marketing activities.



Labor Time Savings

The replacement of manual irrigation with SIS significantly reduces physical labor on watering, particularly for women farmers.



Climate Resilience

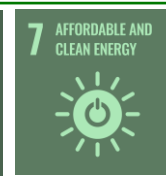
The SIS ensures a reliable water supply independent of rainfall, strengthening resilience to climate variability.



Food Security & Nutrition

20% of total agricultural production is retained for HH consumption, ensuring year-round access to fresh and nutritious food.

The project contributes directly to the key Sustainable Development Goals (SDGs)



* Income estimates are based on 80% of total production marketed; the remaining 20% contributes to household food security and non-cash welfare gains.

** FTE stands for Full-Time Equivalent, meaning a standard full-time job with 172 working hours per month.

Impact on Production, Income, and Employment



Production (tons)

The SIS increases annual vegetable production from 7 tons to **21 tons per year**.

Farmers in Sawula cultivate vegetables such as tomatoes, pepper, okra, cucumber, watermelon, and leafy vegetables. Under rainfed conditions, production is limited to one season per year, with average yields of approximately 3.5 tons/ha.

The introduction of the SIS enables year-round production and 3 cropping cycles annually, increasing yields to approximately 10.5 tons/ha. This results in a substantial increase in total vegetable output and more consistent market supply.



Income (\$)

Estimated increase in farmers' annual income equals + \$156 (**57% ↑**).

In rainfed farming, farmers are forced to sell during the peak harvest period, when prices are at their lowest. The SIS enables farmers to benefit from higher yields, dry-season production and improved timing of market sales.

Household income increases from \$273 to \$429 per year, driven by year-round vegetable production and higher productivity. These income estimates are based on 80% of total production marketed, while the 20% remaining contributes to HH food security and non-cash welfare gains.



Employment (FTE)

Creating **18 FTE jobs** in farming, logistics, and operations.

The SIS will create a total of 18 FTE jobs.

Job Created	FTE
Farmers	15
Transport & logistics	1
Administration	1
Operations & maintenance	1
Total FTE Jobs Created	18

Most of the jobs created relate to farmers, who account for a total of 15 FTEs, representing 83% of total employment. In addition, three other jobs are created to ensure smooth operational management.

Operational and Implementation Framework

Major Operational Aspects



Water Pressure Management

The quality and sustainability of the water pressure will be continuously monitored to ensure the smooth functioning of the system.



Distribution Pipelines

The design and layout of mains, bypasses, and the right materials are essential to minimize losses and ensure consistent coverage.



Planning and Control

A rotating irrigation schedule (2 hours per plot per day) managed by the ICM to ensure equitable access, stable pressure and a reliable daily water supply.



System Monitoring

The records maintained by the IMC, including irrigation schedules, harvest calendars, maintenance logs, and fee contributions, promote transparency and planning.



Capacity Building

Farmers are trained in irrigation operations, maintenance, crop planning, and water efficiency. GDfH ensures continuous technical monitoring.



Maintenance

Regular maintenance (clogging prevention, leak repair, nozzle replacement), user training and cost recovery are essential for long-term functionality and sustainability.

Project Implementation Framework



Community Engagement



Formation and training of the Irrigation Management Committee (IMC), including farmers, local leaders, and the GDfH team to ensure ownership, transparency, and accountability.

Operations & Service Model



Farmers receive scheduled access to irrigation under a two-group system (15 farmers per hectare). They plan the water schedule, and each group retains full ownership of the crops and production decisions.

Capacity Building



Farmers will be trained in irrigation system operation, maintenance, water-use efficiency, crop planning, fertigation practices, and basic record-keeping to ensure sustainable system use.

Maintenance & Technical Oversight



The IMC oversees routine system maintenance, supported by GDfH for technical supervision, troubleshooting, and periodic system inspections to ensure uninterrupted operation.

Farmer Contribution



Farmers contribute under agreed conditions through labor, maintenance works, and compliance with water-use rules. As a group, they transfer the agreed share of net revenue to GDfH each season.

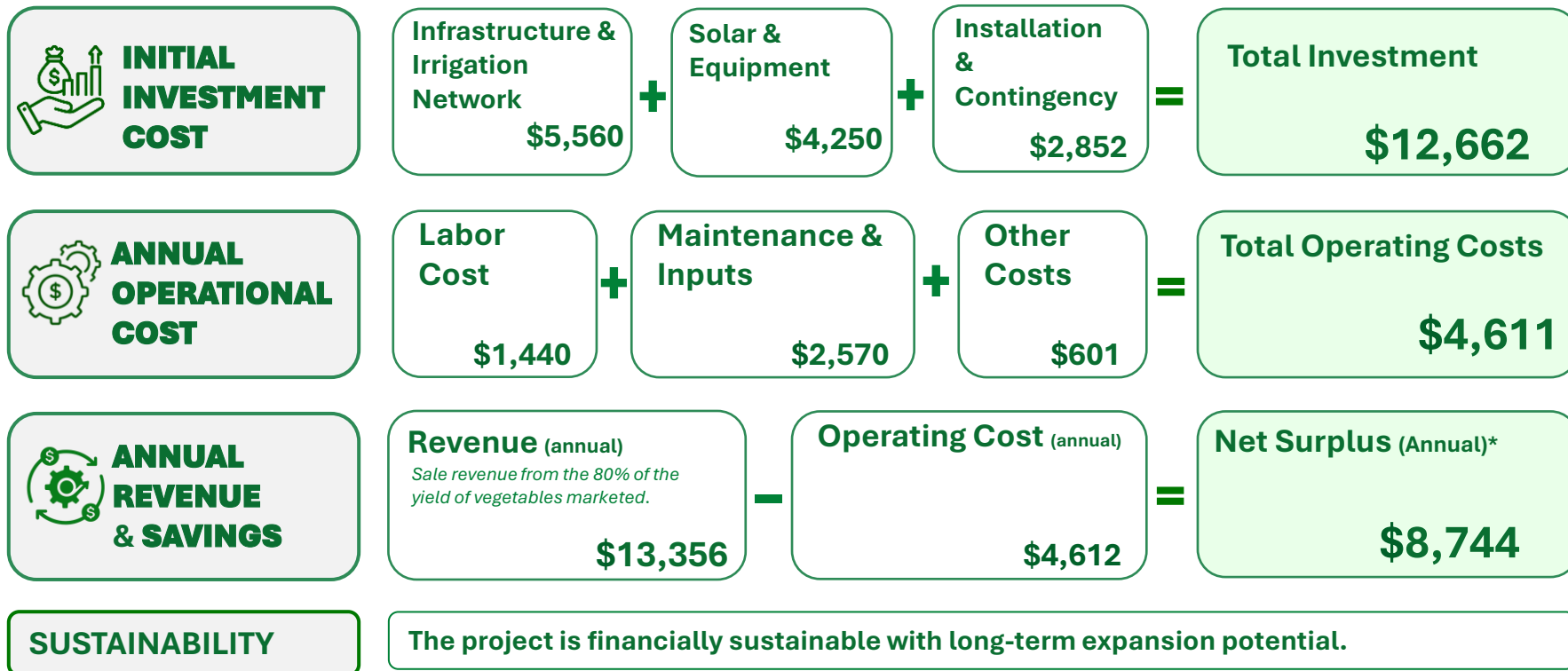
Financial Sustainability



The net savings of the project will be used to support expansion and additional development projects, reinforcing the self-sustaining character of GDfH projects.

Project Financials

Overview of Project Financials



* 60% of the surplus is divided among the farmers, and the remaining 40% is repaid as operative cost recovery and expansion of similar projects by the GDFH.

Project Financials

Total Initial Investment Costs

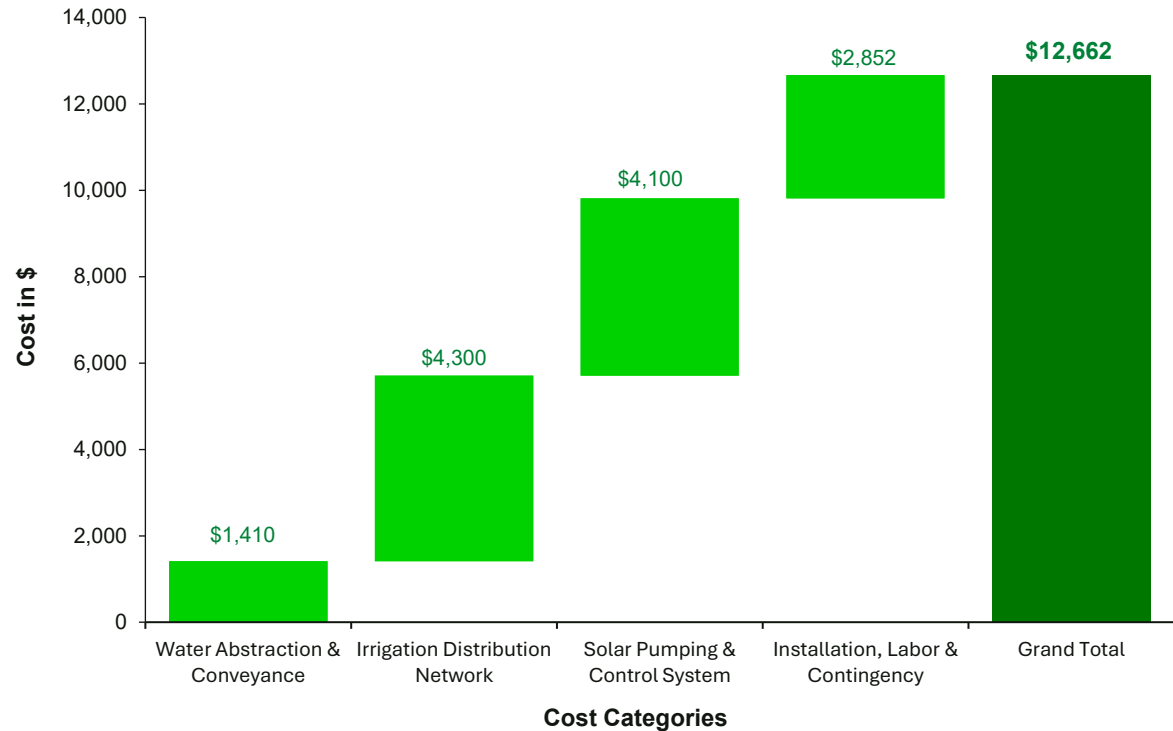


The chart illustrates the initial capital investment required to establish a solar-powered sprinkler irrigation system (SIS) on 2 hectares of community land in Sawula, Pujehun District.

The **total** initial investment amounts to **\$12,662**, covering irrigation infrastructure, solar pumping and control systems, and distribution networks.

Major cost components include **water abstraction and conveyance \$1,410**, **irrigation distribution network \$4,300**, **solar pumping and control system \$4,100**, and **installation, labor, and contingency \$2,852**.

All cost estimates are based on supplier quotations and local market rates, with community land contributed in kind, significantly reducing overall project costs and improving financial viability.



Project Financials

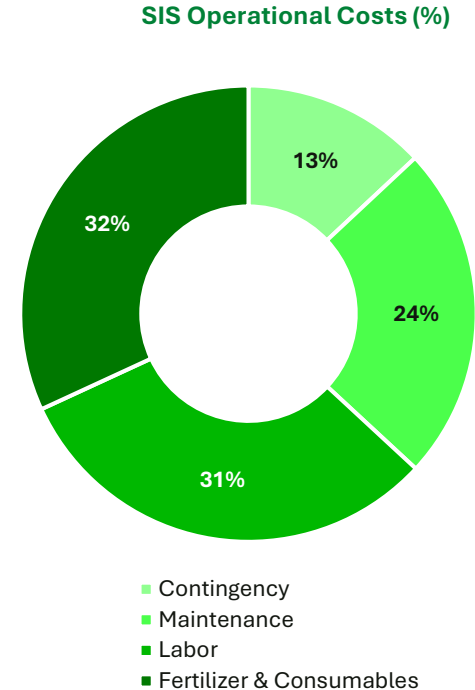
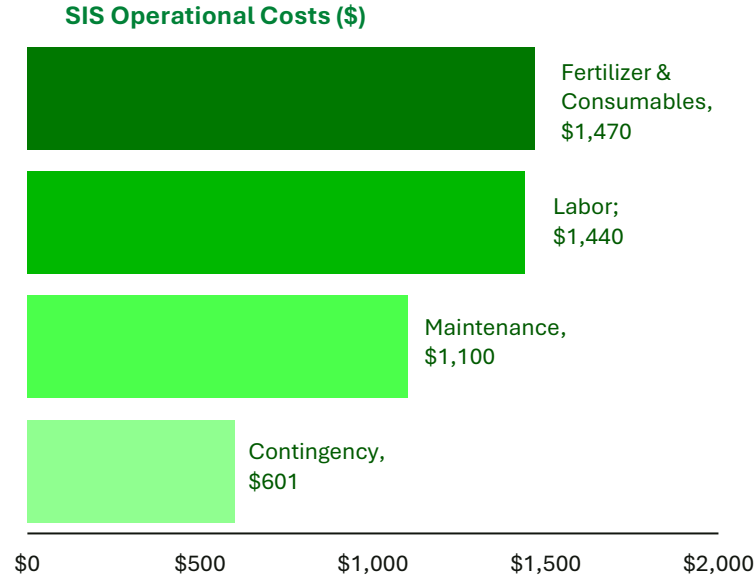
Annual Operating Costs



The charts illustrate the **annual operating costs** of the Sprinkler Irrigation System (SIS), totaling **\$4,611**.

Fertilizer and consumables represent the largest share of SIS operating costs (**\$1,470; 32%**). **Labor** accounts for **\$1,440 (31%)** to support system operation and monitoring, while **maintenance** costs total **\$1,100 (24%)** for the upkeep of pumps and irrigation infrastructure. A contingency allocation of **\$601 (13%)** covers unforeseen operational needs.

Together, these costs ensure efficient, reliable, and sustainable operation of SIS.



Project Financials

Annual Revenues and Savings

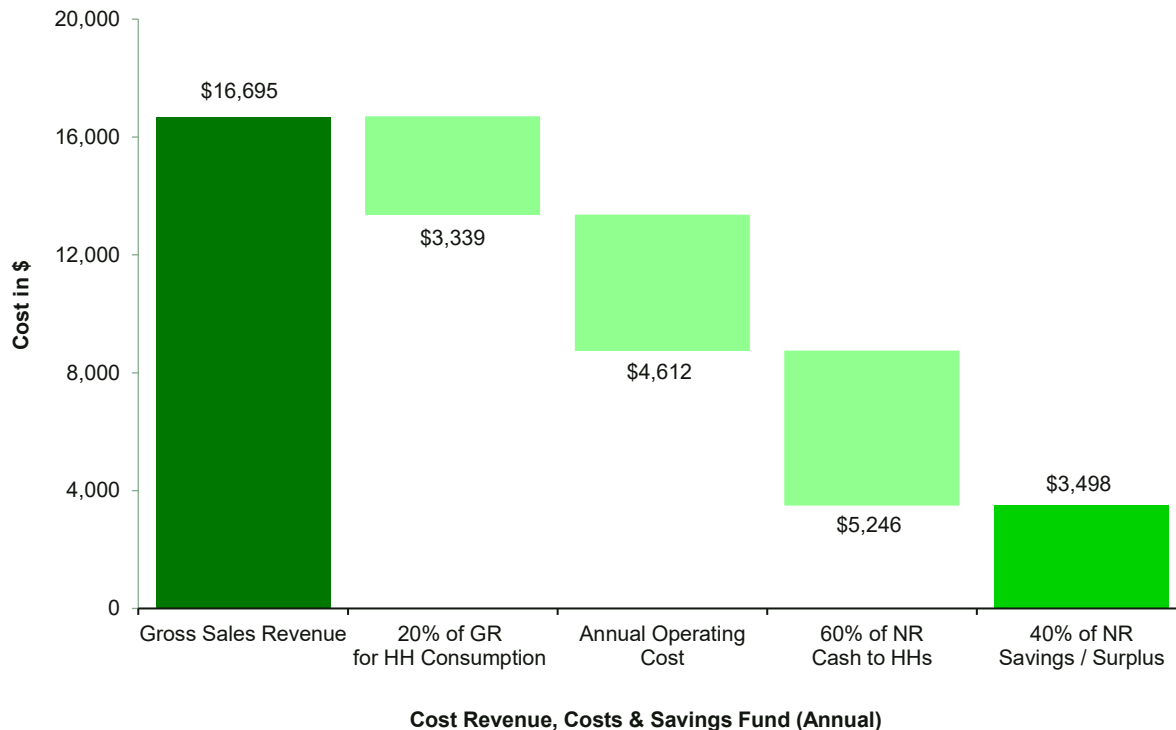


The chart presents the project's annual financial performance and long-term sustainability.

Annual revenue is generated from year-round vegetable production on 2 hectares of irrigated land, totaling **\$16,695**. Of this, **20% (\$3,339)** is retained for **direct household consumption**, delivering important food security and nutrition benefits. The main expense is the **annual operating cost** of **\$4,612**, covering labor, maintenance, inputs, consumables, and contingency to ensure reliable system operation.

After these deductions, the project generates a **net annual revenue** of **\$8,744**, of which 60% (**\$5,246**) is distributed as **cash income** to 30 households, while 40% (**\$3,498**) is retained as **savings and surplus**.

This annual surplus demonstrates the project's financial sustainability and its capacity for cost recovery, system expansion, and support to similar development initiatives.



Key Impact

Overview Project Impact



Local Agro-Food System

The SIS enables year-round vegetable production on 2 hectares of communal land, increasing output from 7 to about **21 tons** per year and reducing dry-season crop losses through reliable irrigation.



Income Growth for Farming Households

With three cropping cycles per year, household incomes increase by over 57% compared to rain-fed farming, generating **\$156** per household annually in cash income, plus food consumption benefits.



Job Creation and Labor Productivity

The project creates approximately 18 full-time equivalent (FTE) jobs across farming, logistics, and system management, while reducing manual watering labor, particularly for women farmers.



Food Security & Nutrition Improvement

About 20% of total production is retained for direct household consumption, ensuring year-round access to fresh vegetables and improved nutrition for the participating HHs and surrounding community members.



Financially Sustainable and Scalable Development Model

The SIS generates an annual net revenue of **\$13,356**, an annual surplus of **\$8,744**, and a savings fund of **\$3,498**. It achieves cost recovery in approximately 3.5 years and can be expanded to serve up to 100 households through phased system scaling.

Thank You!



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