MOSHAKARA FUND FOR SOLAR POWERED COLD STORAGE

INVESTMENT THESIS

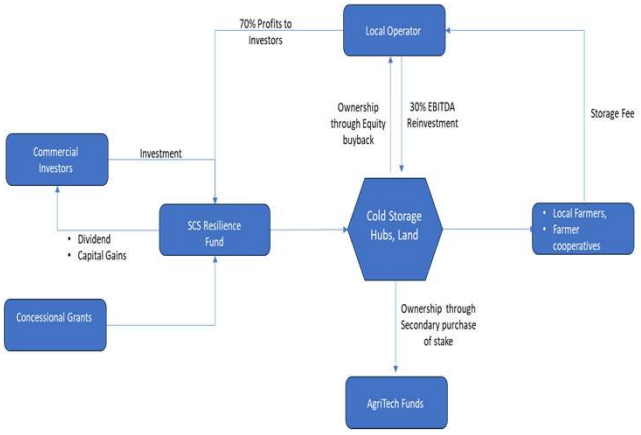
The Mushakara Fund tackles Nigeria's **₦3.5 trillion ($4 billion)** annual post-harvest loss crisis by scaling solar-powered cold storage for smallholder farmers. Using a blended finance model, the Fund combines commercial capital with concessional grants to de-risk investments and deliver **12–15% IRR**. Partnering with proven operators like ColdHubs and SolarFreeze, the Fund builds scalable, sustainable infrastructure that reduces spoilage, boosts farmer incomes, and strengthens Nigeria's agricultural value chain.

PROBLEM STATEMENT

Nigeria faces a severe post-harvest loss (PHL) crisis, with over **60%** of crops wasted, significantly impacting food security and farmer livelihoods. Agriculture, contributing **28.65%** to the GDP and employing over 60% of the rural population, is at risk due to poor harvesting methods, inadequate storage, pest infestations, and inefficient distribution systems. Nigeria's annual PHL is valued at **N3.5 trillion**—more than nine times the government's 2024 agriculture budget—making it one of the most significant threats to the nation's food security and economy. On a state level, the average loss of **N94.6 billion** exceeds individual state agriculture budgets, highlighting the devastating economic impact. These losses perpetuate poverty, reduce marketable surplus, and inflate consumer prices, even as urban demand for fresh produce grows.

OPPORTUNITY STATEMENT

Nigeria's ₦3.5 trillion ($4 billion) annual post-harvest loss crisis presents a major investment opportunity. Solar-powered cold storage solutions have proven to reduce spoilage by 30–50%, potentially recovering ₦1–₦2 trillion ($0.5–$1.3 billion) annually. Pilot projects have demonstrated a 90% reduction in grain losses using hermetic storage bags and a 21-day extension in tomato shelf life through decentralized solar cold chains.



INVESTMENT STRATEGY

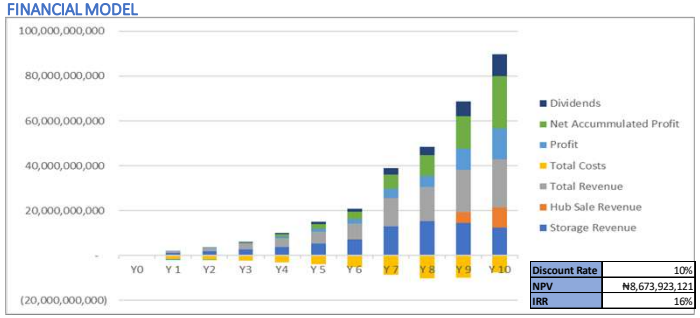
- **Operating Partners**:
  - **ColdHubs**:
    - 15 operational hubs in Nigeria, 80% reduction in tomato spoilage, serves 2,000+ farmers.
    - Modular units cost ₦45M–₦300M (30K–30*K*–200K) with 90% uptime (Siemens batteries + MTN Mobile Money payments).
    - Seeks ₦1.8B ($1.2M) to expand to **20 new hubs** (Kano–Lagos corridor), targeting 5,000+ farmers.
  - **SolarFreeze**:
    - 30 hubs in Kenya (95% uptime), expanding into Northern Nigeria with ₦600M ($400K) for maize/rice storage.
    - In-house team of 100+ technicians ensures technical independence.
- **Geographic Focus**:
  - Areas with high solar potential, high-loss regions (e.g., Kano–Lagos corridor).
  - Future expansion to Ghana/Kenya post-Nigeria validation.
- **Funding**
  - Commercial capital from institutional investors, impact funds, and farmer cooperatives.
  - Concessional Grants from AfDB, IFAD, AGRA, and NATIP.
- **Government Support**
  - Access to grants from NATIP, Anchor's Borrowers Program, AGRA, and access to subsidized lands
  - Tax Incentives: Tax holidays, import duty exemptions, pioneer status incentives.
- **Investment Allocation**
  - Land Purchase: For establishing solar-powered cold storage hubs.
  - Solar-Powered Cold Hubs: High-efficiency solar PV systems + lithium-ion battery storage (30-year lifespan, 0.5% annual efficiency loss).

FINANCIAL STRUCTURE

- Fund size of ₦22.5 billion ($15 million) composed of a blend of commercial capital and concessional grants
- Per-Project Allocation: ₦450 million–₦3 billion ($300,000 – $2million)
- Investment Type:
  - Majority equity stakes (51–70%) for early-stage projects.
  - Minority stakes (20–30%) for regional expansions.
- Revenue Stream: Farmers pay ₦150/kg/week ($0.10/kg) via mobile platforms.
- Operator Margins: ₦112.5 million–₦150 million ($75,000 – $100,000) annual EBITDA per hub.
- Investor Returns: 12–20% IRR, driven by storage fees and operational efficiencies.

- Overhead Mitigation:
  - Blended finance: 30–40% of costs subsidized by grants (e.g., AfDB, IFAD).
  - Cost-sharing: Operators contribute 15% to training/logistics.
  - AI-driven audits reduce monitoring costs by 25%.
- Risk Mitigation:
  - AfDB guarantees ₦7.5 billion ($5 million) against payment defaults.
  - Maintenance reserves: ₦75 million ($50,000) annually per hub.
  - Currency hedging to stabilize Naira volatility.
- Exit Strategies:
  - Equity buybacks (7-12 years, funded by operator profits).
  - Secondary sales to regional agritech funds (e.g., Africa Finance Corporation).
- Break-Even: 3–4 years per hub.

FINANCIAL MODEL



Discount Rate	10%
NPV	₦8,673,923,121
IRR	16%

Assumptions

- Fund Tenure: 15 years
- Initial deployment of 10hubs
- Reinvestment of 30% of Operator annual Profit into new Hubs
- Year 1–3: Ramp-up (50% capacity in Year 1, 75% in Year 2, 90% from Year 3).
- Year 4–15: 90% capacity (100% = ₦150M EBITDA/hub).
- Costs to Include: Management fee of 3% of commercial capital (~405M annually).
- Maintenance of ₦75M/hub annually; Currency hedging of ₦50M
- Hubs exit via buybacks from Year 10; Remaining via secondary sales in Year 15.

SCALABILITY

The Mushakara Fund's solar-powered cold storage solutions are highly scalable, leveraging proven pilot successes like ColdHubs and modular, off-grid technology that can be rapidly deployed across Nigeria's high-loss agricultural corridors. Strategic partnerships with DFIs, government initiatives, and a phased expansion plan into Ghana and Kenya ensure replicable growth, addressing a $4 billion annual crisis while delivering robust returns through a market-driven model backed by first-loss guarantees.

Sources:
1. Nigerian Bureau of Statistics Q3 2024 GDP Report.pdf
https://www.researchgate.net/publication/365055741_Post_Harvest_Losses_and_Food_Security_in_Nigeria_An_Empirical_Review
2. https://www.premiumtimesng.com/agriculture/agric-special-reports-and-investigations/724953-investigation-how-nigeria-can-resolve-its-multi-trillion-naira-post-harvest-losses-iv.html?tztc=1

RISK AND MITIGATION

Risk	Consequences	Mitigation Strategy
Market Acceptance Risk	Farmers may be reluctant to use cold storage due to cost concerns or lack of awareness.	- Collaborate with agricultural cooperatives and unions to promote adoption.
Farmer Default Risk	Farmers may be unable to pay for storage and logistics services.	- Facilitate direct sales to the wholesale buyers of the farm produce so that their fee would cover the cost of the farm produce and the cold storage fees, thereby, eliminating farmer default risk.
Operational & Maintenance Risk	Breakdowns in cold storage units and refrigerated trucks may disrupt services.	- Implement preventive maintenance schedules and include insurance coverage for major breakdowns in the equipment.
Climate & Weather Risk	Extreme heat could increase cooling costs and damage stored produce.	- Utilize **energy-efficient insulation** and **thermal batteries**.
Exchange Rate & Inflation Risk	Cost of importing refrigeration equipment may rise, affecting investment feasibility.	- Hedge against currency fluctuations using futures contracts and negotiate bulk purchase discounts with suppliers. - Source local alternatives where feasible.
Security & Theft Risk	Vandalism of cold storage assets.	- Install **24/7 surveillance** and **smart locks**. - Include insurance coverage for theft/ vandalism.

INTENDED IMPACT

SDG	Intended Impact	Measurement of Success
2	Reduce hunger by cutting post-harvest losses (PHL) of perishable crops by 50% by 2030.	1.2 million metric tons of food saved annually.
		- PHL reduced from 50% to 30% for key crops (e.g., tomatoes, fruits).
7	Deploy 500 solar-powered cold storage units by 2030, providing clean energy access to rural farming communities.	25 MW of solar capacity installed.
		- 80% reduction in diesel dependency for cold storage
8	Create 10,000 jobs in cold-chain logistics, maintenance, and agro-processing and Solar tech sectors.	20 jobs created per storage unit.
		- 35% increase in farmer incomes by 2030.
9	Modernize agricultural infrastructure using IoT-enabled cold storage and solar technology.	- 100% of units equipped with IoT monitoring.
		- 70% reduction in spoilage during storage.
12	Cut food waste by 500,000 tons/year, promoting sustainable consumption.	- 300,000 tons of GHG emissions avoided annually.
		- 50% reduction in landfill waste from spoilage.
13	Avoid 300,000 tons of CO2 emissions annually by displacing diesel-powered storage.	90% adoption of solar over diesel.
		- 95% emissions reduction per storage unit.