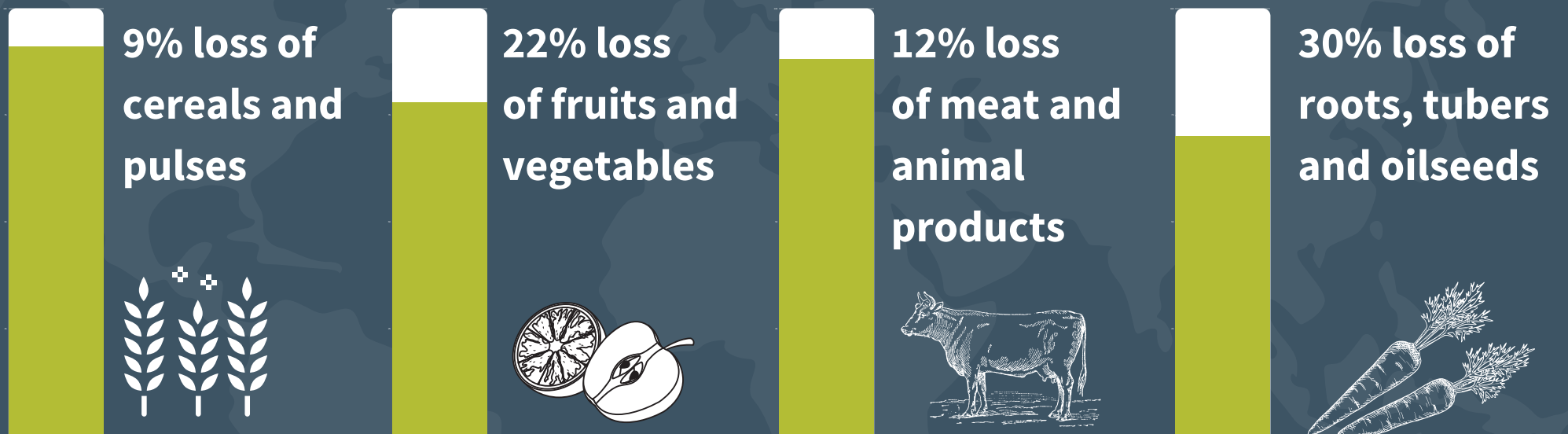


DECENTRALIZED COLD STORAGE FOR AGRICULTURE

Cold storage involves the use of electric powered facilities to store fresh and/or frozen perishable fruits or vegetables, meat, seafood, or dairy products, at a desired temperature to maintain the quality of products for sale. It can have a positive impact on food security by extending the shelf-life, reducing losses, and retaining nutrients in food.

GLOBAL FOOD LOSS DUE TO INAPPROPRIATE HANDLING PROCESS¹



REFRIGERATION SAVES 1/3 OF FOOD LOSS IN SUB-SAHARAN AFRICA (SSA)



DECENTRALIZED COLD CHAIN TECHNOLOGIES

Cold chain involves a range of technologies along the agricultural value chains, including walk-in cold rooms, refrigerated trucks, and freezers. These solutions, however, favor larger, commercial farmers. Case studies show that the economic viability of solar-powered cold storage depends on the utilization rates. Business model innovations such as "cooling as a service" help improve access for smallholder farmers.



230 million tons of food are produced in Africa each year,¹ 14% of which is lost. Refrigeration can save 30% of the post-harvest food loss.²

SERVICEABLE MARKET FOR SOLAR-POWERED REFRIGERATION IN SSA

Serviceable market takes into consideration access to grid electricity and ability to pay. Of the 10 million smallholder farmers in SSA who are farming fresh produce that needs cold storage, 36% have access to grid and 62% could not afford the technology. The remaining 2% is serviceable and constituted by 225K farmers in 2018.



In 2018, 225K farmers could be serviced, representing a market opportunity of US\$ 191 million.³



By 2030, 1.5 million farmers will be serviceable, creating a US\$ 1.32 billion market opportunity.³

BUSINESS CASE:

Mini-grid-connected fish freezer⁴



CAPEX	US\$365
Capacity	90L
Payback Period	10 months
Value add	From \$2.75/kg to \$3/kg

BUSINESS CASE:

Standalone milk chiller⁵



CAPEX	US\$1,700–31,000
Capacity	50–2,500L
Solar capacity	75W–8,500W
Payback period	2–7 years assuming 25% spoilage rate

Sources:

- 1 "The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction." FAO. 2019..
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- 4 "Mapping of Cereals, Fisheries and Other Productive Use Businesses for Village Mini-Grids." Energy 4 Impact and Inensus. February 2019.
- 5 "Productive use of off-grid energy: The business case in Uganda's dairy value chain." UOMA. August 2019.

