

COST BENEFIT ANALYSIS OF WARE POTATO STORES

Elgon Region of Uganda



This technical note covers;

The cost benefit analysis of ten ware potato stores in the Elgon region in three districts; five in Kween, three in Kapchorwa and two in Mbale.

PNSP in collaboration with farmers constructed the stores under a cost share agreement of 70%:30% of total cost respectively. PNSP therefore, sought to assess the performance, and economic viability of the investment.

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Context

Potato is an important food and cash crop for small holder farmers in the Elgon region. The seasonal disparity of potato demand and supply result in price fluctuations. During the harvesting period, there is excess supply that lowers prices; vice-versa when the crop is in the field. Price fluctuation negatively affects all value chain actors.

Price fluctuation negatively affects farmers and all value chain actors.

Promoting ware potato storage presents as a solution to reducing post-harvest losses and managing price fluctuations.

PNSP therefore, co-invested with individual farmers to construct 10 ware potato stores with a capacity of over 10MT in three districts of Mbale, Kapchorwa and Kween district in the Elgon region.

Objectives

The Cost Benefit Analysis aims to;

- Assess and compare the monetary costs versus economic benefits of constructing the ware potato stores.
- Estimate the value created in terms of increased income, reduced post-harvest losses in the short term and long term for households.



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Methods

The tool adopted in this analysis was developed by World Food Programme (WFP) in Partnership with Boston Consulting Group (BCG). It is based on academic evidence, WFP's experience and country specific data on nutrition, health, education, and income transfers.

The economic model underlying this analysis assesses the effects of the ware potato intervention as quantifiable outcomes valued in Uganda shillings.

It is important to note that, results of tool should be used only for advocacy purposes and not for program design.

Costs

Initial cost

Includes the total cost of establishing the ware potato stores, including the value of materials purchased and its actual prices.

Storage and handling costs

including everything that is needed to care for the potatoes while in the store.

Benefits

The ware potato intervention benefits are broken down into 2 benefits drivers as follows:



To assess the performance of ware potato stores, beneficiaries were interviewed, and data was collected from 10 beneficiaries, 2 in Mbale District, 3 in Kapchorwa and 5 in Kween district from 28th Feb 2022 to 3rd of March 2022. The analysis considered all quantifiable benefits and all the costs of establishing and maintaining the stores throughout a period of 10 years. The benefits are discounted at their net present value (NPV). The analysis considers the following cost and benefits during the analysis.

Return on investment

The value constituted by the store to the households may generate additional resources which household can invest in other productive assets.

Value Transfer

The construction of the storage facility is a value transfer to the households of an amount equivalent to that of the cost of store. This value transfer can be considered as an additional income for the household.

Results

Economic Value Added

Economic value added induced by the project will be Shs.58,436,580/-, resulting from an investment of Shs.114,434,200/-, that generates the income of Shs.172,778,580/-.

Discounted Payback period

The project will take approximately c to pay back the funds used in the establishment of the stores as initial cost of investment.



Discounted Payback period

Discounted payback period

$$= 5\text{years} + \frac{(11,434,200 - 11,069,727)}{1,598,867}$$

$$= 5\text{ years} + 0.228$$

$$= 5.0228$$

(This is approximately 5 years and 3months)

Return on investment

The value constituted by the store to the households will generate additional resources which household can invest in productive assets.

Return on investment (ROI)

$$= \frac{\text{Current value of investment} - \text{Cost of investment}}{\text{Cost of investment}}$$

$$= \frac{17,524,844 - 11,434,200}{11,434,200} = \frac{6,090,644}{11,434,200}$$

$$= 53.3\%$$

Table 2. Discounted Payback Period

Year	Cashflows	Cumulative Cashflows
1	2,511,771	2,511,771
2	2,515,022	5,026,793
3	2,246,493	7,273,286
4	2,005,685	9,278,971
5	1,790,756	11,069,727
6	1,598,867	12,668,594
7	1,427,492	14,096,086
8	1,274,738	15,370,824
9	1,138,080	16,508,904
10	1,015,940	17,524,844
11	(247,988)	17,276,856

Results

The table below shows the net income generated by farmers who used the ware potato stores during 2021A. The results indicate positive benefit of the store. For example, Alex Chele gained UGX. 3,060,000/= after storing 18 tons of ware potato store for a period of two months.

Table 1: Ware Potato Store Profitability Season 2021A

Details	Beneficiaries Name									
	Liabich James	Chele Alex	Sande Joseph	Kiplangat Michael	Cherop Dorothy	Cherotin Wilfred	Yeko Juliet	Chirotin Hellen	Namakoye Sulaina	Nabende Fred
Quantity Stored (KGs)	2,000	18,000	30,000	20,000	16,000	12,000	3,800	2,000	3,500	1,00
Price after storage (Shs)	400	400	500	550	570	650	450	500	500	500
Revenue after storage (Shs)	800,000	9,000,000	15,000,000	11,000,000	9,120,000	7,800,000	1,710,000	1,000,000	1,750,000	500,000
Price before storage (Shs)	200	300	300	300	280	400	280	250	400	400
Revenue before storage (Shs)	440,000	5,760,000	9,600,000	6,400,000	4,800,000	5,040,000	1,140,000	540,000	1,470,000	420,000
Gross revenue (Shs)	360,000	3,240,000	5,400,000	4,600,000	4,320,000	2,760,000	570,000	460,000	280,000	80,000
Less operating expenses (Shs.10/kg)	20,000	180,000	300,000	200,000	160,000	120,000	38,000	20,000	35,000	10,000
Net income (Shs.)	340,000	3,060,000	5,100,000	4,400,000	4,160,000	2,640,000	532,000	440,000	245,000	70,000

With the Return on investment (ROI) of 53.3%, the ware potato store serves to alleviate the lost income and post-harvest losses incurred by the households.

The store, therefore, works to mitigate the losses during the season of harvest due to low prices as well as the opportunity cost of lost income to the household.

Without a storage facility, a typical household will be forced to sell their produce at the prevailing market prices making a loss of Shs.2,098,700/- on average per season.

By investing in the storage facility, household can earn additional average income of Shs.2,098,700/= in a period of 60 days depending on the quantity stored.



Value Transfer

The value of the storage facility provided equals the cost a household would need to bear to provide an equivalent storage facility. The storage facility creates a value transfer of Ugx. 8,003,940/= per store or 70% of the total value provided. Totals are not discounted because we consider this amount to represent value and not price. If the price of produce increase in 5 years, the household will earn more from the storage facility, but the value in today's Uganda shillings will remain the same.

Net Present Value

PNSP and the farmers invested in the construction of ware potato stores and is expected to reduce post-harvest handling and therefore increase farmers revenue.

The project initial capital investment of 11,434,200. On the basis of accounting information provided, cashflow were generated and discounted at 12% being cost of debt.

The project viability was evaluated using NPV technique and NPV of positive 5,843,656 was obtained.

Initial cost of investment = 11,434,200, and Net Present Value PV(B) = 17,276,856

$NPV = \sum PV(B) - PV(C)$

Where NPV is Net Present Value

PV(B) is Present Value benefits

PV (C) is Present Value Costs

$NPV = 17,276,856 - 11,434,200 = 5,842,658/-$

Basing on the NPV acceptability criteria, this implies that the project is financially viable and therefore should be undertaken for its strategic importance. In the current state, the value of the business will increase by 5,843,656. Given that the financial evaluation deals with quantitative information only, other qualitative information should be evaluated and collaborated with the financial evaluation results to come up with total evaluation.

Conclusions

The cost benefit analysis provides evidence of economic viability of the ware potato stores. Eventually, the store reduces post-harvest losses and increases household incomes that can be invested in other household assets. Continued integration efforts are necessary to ensure that the ware potato store delivers maximum synergy to all key stakeholders of the potato value chain.

Special attention needs to be paid to the owners' financial management; to facilitate better control over their operating expenses. Also, to offer clarity of tangible returns of the store to their households. Importantly too, the duration of storage which ranges from 60 days to 90 days depending on the household needs.

Market information is key if the store is to bring in the desired additional benefits.

The Cost Benefit Analysis builds a compelling case for storage facilities especially since not all intervention benefits are equitable.



References

1. Regina Akello, Alice Turinawe, Pieter Wauters and Diego Naziri (2022), *Factors Influencing the choice of Storage Technology by Smallholder Potato Farmers in Eastern and Southwestern Uganda*