



LOCAL ENTERPRISE AUTHORITY



POTATO ENTERPRISE BUDGETS

Prepared as part of

'The study on the Botswana Horticulture Value Chain mapping and Analysis'

(A study Commissioned by Local Enterprise Authority)

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1. INTRODUCTION

This report is part of the study on the Botswana Horticulture Value Chain Mapping and analysis. The study required the preparation of enterprise budgets for the five selected crops (enterprises) namely; cabbage, tomato, potato, onion and rape. This report contains the enterprise budgets for potato production. The purpose of the potato enterprise budgets is to measure the efficiency and relative profitability of potato production in the Districts covered by the study.

2. APPROACH AND METHODOLOGY

In preparing the enterprise primary data was collected from farmers in various districts, randomly sampled from the list of farmers identified for the study. A standard questionnaire –enterprise budget data collection tool, was designed and administered to the respondents. The questionnaire was designed to collect data on the actual yield, unit selling price of produce, variable costs for the crops considered in the study.

The variable costs were standardized and organized into distinctive cost centres, namely; planting material, fertilizers, agro chemicals, labour costs, and other pre-harvest costs, harvest and distribution costs, and other variable costs directly attributable to production. The study did not collect data on the overheads (operational expenses) incurred at each farm, but rather focused only on prime costs. I.e. variable production costs incurred for each enterprise. The decision not to include the overheads is that they are usually incurred at the business level and not crop level.

The gross margins and gross margin percentages (%) were computed for each enterprise budget. The sensitivity analysis was also carried out for each enterprise budget. Sensitivity analysis is a financial model which predicts the outcomes given a specific range of variables. In this report, the model assumes the changes in revenue and variable costs given the changes in the yield achieved by the farmer. The model give scenarios for revenue and total variable costs are different levels of output.

Lastly, the study also considered the common constraints to production experienced by farmers who responded to the questionnaire for enterprise budgets. The respondents were asked to share the constraints to production of potatoes and these are documented on table 3-coinstrants to production of potatoes;

3. ENTERPRISE BUDGET FRAMEWORK

The study adopted a standard format for preparation of enterprise budgets. Extract 1 indicate the format used and followed during preparation of enterprise budgets. Below the extract are the terms, definitions and explanations of items included in the budgets;

Extract 1: Standard format for the enterprise budget

| | | Pula /HA | Unit basis |
|-----|---|----------|------------|
| 1 | REVENUE (R) (yields * unit selling price) | xxx | xxx |
| 2 | LESS TOTAL VARIABLE COSTS (TVC) | | |
| 2.1 | Planting material | xxx | xxx |
| 2.2 | Fertilizers | xxx | xxx |
| 2.3 | Agrochemicals-Pesticides, fungicides, etc | xxx | xxx |
| 2.4 | Labour costs | xxx | xxx |
| 2.5 | Other pre-harvest costs* | xxx | xxx |
| 2.6 | Harvest and distribution costs | xxx | xxx |
| 2.7 | Other variable costs attributable to production | xxx | xxx |
| | Total Variable Costs (TVC) | xxx | xxx |
| 3 | GROSS MARGIN | xxx | xxx |
| 4 | GROSS MARGIN% | Xxx% | Xxx% |

Terms and definitions used in the enterprise budget;

a) Revenue – Revenue represents gross inflows of cash generated from the sale of produce, computed as yield multiplied by the unit selling price.

b) Variable costs – Variable costs are costs directly attributable to production of each selected crop from the planting stage throughout to maturity, harvest and sale to the market. The variable costs are grouped standard cost centres namely; planting material, fertilizers, agro chemicals, labour costs, and other pre-harvest costs, harvest and distribution costs, and other variable costs directly attributable to production.

c) Fixed costs – Fixed costs are all other costs not directly attributable to production. The fixed costs do not vary with the level of production. I.e. they remain constant throughout production and the cropping season.

d) Gross margin –The gross margin is the resulting return from production and sale of produce. It is the difference between the revenue and total variable costs. The gross profit margin is a performance metric which measures the profitability of an enterprise, after taking into account all production costs.

e) Gross margin %- The gross margin percentage (%) is the gross margin expressed as percentage of revenue.

f) Net profit margin – Net profit margin is the resulting profit after deducting total production costs and operating expenses (overheads) from revenue. The net profit margin was not computed since the overheads were not considered during the study. The overheads are non production costs incurred in the ordinary course of running the farming business.

g) Whole farm budget – Is the budget prepared for all farm operations .i.e. considering all enterprises and other revenue streams, together with the farm operational costs.

h) Sensitivity analysis – Sensitivity analysis is a financial model which predicts the outcomes given a specific range of variables. In this report, the model assumes the changes in revenue and costs given the changes in the yield achieved by the farmer. The model give scenarios for revenue and total variable costs are different levels of output.

i) Breakeven price – Is computed as total variable costs divided by the output or (yield). This is the price at which when produce is sold to the market, the revenue generated will fully cover the total variable costs and result in a nil or zero profit.

4. SAMPLING OF RESPONDENTS

The respondents to enterprise budgets were sampled randomly from various districts across the country. Table 1 below; indicate that the enterprise budget for potato was prepared from the data collected from one farmer based in the Central District.

Table 1: Districts selected for enterprise budgeting -Potato enterprise budgets

| Potato |
|------------------|
| Central District |

5. LIMITATIONS TO ENTERPRISE

a. The enterprise budgets are prepared using the historical data collected from the sampled farmers. The data on yields, revenue and costs shared by the farmers may not be a true reflection of the actual results realized by the farmer.

b. The allocation of costs such as fertilizers, agro-chemicals and labour to a single enterprise may not be accurate since it is spread to multiple enterprises, in instances where a farmer produce other enterprises alongside the selected crop. The failure to allocate and apportion costs accurately has the potential to distort the bottom line gross margins presented in each enterprise budget.

c. Other costs relating to production may have been omitted by the farmers during the study, thereby distorting the gross margins.

d. The farmers were not able to provide data on the crops they had no prior production experience on. It was difficult therefore difficult to source information on all the crops from one farmer. The study had to approach a sizeable number of farmers to collect data. For example; in most Districts, the majority of farmers did not have financial records or data for potatoes owing to low production activity for potatoes.

e. Other respondents were reluctant to share their revenue and costs, citing confidentiality as the main reason for non response.

f. Time factor may have played a role in the study not being able to collect data for all crops in all districts.

6. POTATO ENTERPRISE BUDGETS

The production costs and returns for potatoes were established from the data collected from farmers with actual farming records on potato production. The study only managed to construct one enterprise budget owing to low response rate from the sampled farmers. Other respondents in potato production did not respond the questionnaire despite several attempts to have them completed. This report therefore, presents only one budget from a farmer in the Tuliblock, Central District.

6. 1 Potato Enterprise Budget –Central District (Tuli-Block)

Total costs of production;

Total costs of production for potatoes include planting material, fertilizers, agro chemicals, direct labour costs, other pre-harvest costs, harvest and distribution costs and other variable costs.

| | Pula | % of total costs |
|--------------------------------|-------------------|------------------|
| Planting material | 69,000.00 | 36% |
| Fertilizers | 26,408.96 | 14% |
| Agrochemicals | 3,785.00 | 2% |
| Labour costs | 18,000.00 | 9% |
| Other pre-harvest costs* | - | 0% |
| Harvest and distribution costs | 76,721.05 | 40% |
| Other variable expenses | - | 0% |
| | 193,915.01 | 100% |

Distribution of production costs for potato production Figure 1 indicate that planting material make up the largest percentage of the total production costs at 36%, while fertilizers, agro chemicals, labour costs, other pre-harvest costs, harvest and distribution costs and other variable costs constitute 14%, 2%,9%,0%,39% and 0% of the total production costs respectively;

Figure 1-Distribution of production costs for potatoes –Central District

Distribution of production costs for Potato enterprise

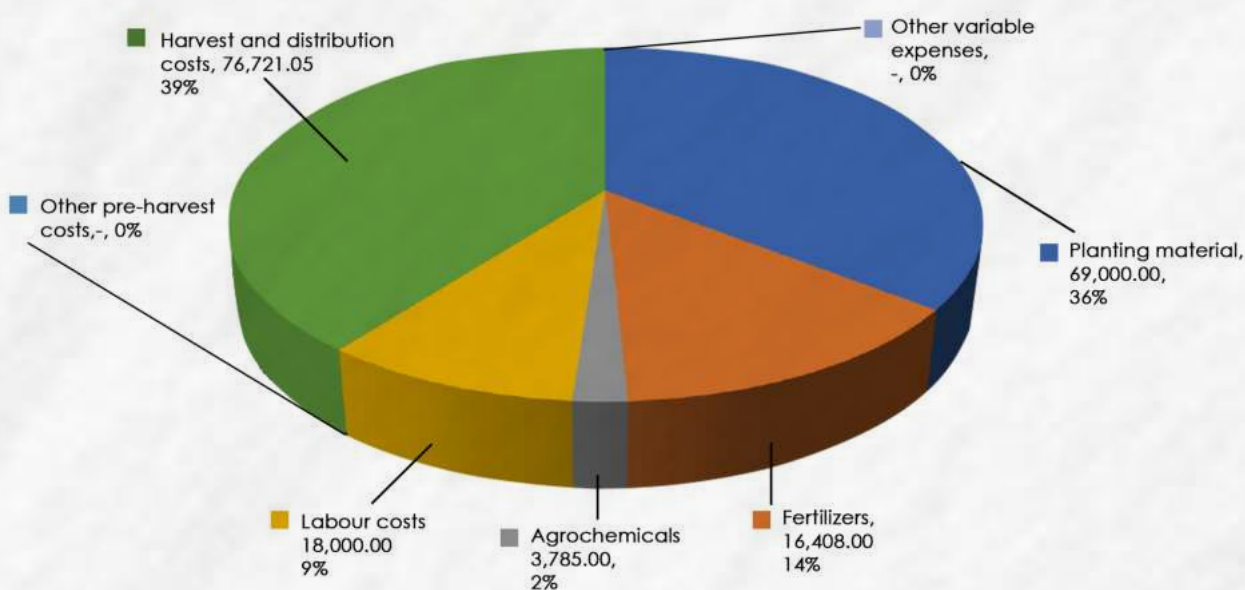


Figure 3: Detailed enterprise budget for Potato in Central District

| Potato enterprise BUDGET | | Central District -Tuliblock | | | | | |
|--------------------------|---|-----------------------------|------------------|------------------|---------------|-------------------|--------------------|
| Sr.no | Cropping Area-1 HA | | | | | Per HA | Unit value / |
| | Cropping in months | 3 months | | | | | |
| | Item description | Unit | Output in Tonnes | Output in Kgs | Unit SP P/ Kg | Value in BWP | Yield BWP/ unit |
| 1 | Revenue from produce | basis Kgs | 45.00 | 45,000.00 | 8.50 | 382,500.00 | 8.50 |
| 2 | VARIABLE COSTS (VC) | | Quantity | Unit cost | | Total cost | Cost / unit |
| 2.1 | PRODUCTION COSTS | | | | | | |
| 2.1.1 | Planting material | | | | | | |
| | Seedlings | Seedlings | 300 | 230.00 | | 69,000.00 | 1.53 |
| | | | | | | - | - |
| 2.1.2 | Fertilizers | | | | | | |
| i | Basal-dressing 2:3:2. | 50Kgs | 14 | 974.64 | | 13,644.96 | 0.30 |
| ii | MAP | 50Kg | 6 | 394.33 | | 2,366.00 | 0.05 |
| iii | Super grow | 50Kg | 10 | 465.90 | | 4,659.00 | 0.10 |
| iv | Potassium Nitrate | 25Kg | 8 | 218.00 | | 1,744.00 | 0.04 |
| v | Potassium Sulphate | 25Kg | 8 | 250.00 | | 2,000.00 | 0.04 |
| vi | Magnesium | 50Kg | 4 | 498.75 | | 1,995.00 | 0.04 |
| 2.1.3 | Herbicides | | | | | | |
| i | Late blight | litres | 50 | 9.16 | | 458.00 | 0.01 |
| ii | Early blight | litres | 50 | 9.16 | | 458.00 | 0.01 |
| 2.1.4 | Pesticides Insecticides | | | | | | |
| i | Nametate | 10 litres | 1 | 1,510.00 | | 1,510.00 | 0.03 |
| ii | Cutworm | 2 litres | 1 | 229.00 | | 229.00 | 0.01 |
| iii | Potato moth | 1 litre | 1 | 376.00 | | 376.00 | 0.01 |
| iv | Ball worm | 5 litres | 1 | 754.00 | | 754.00 | 0.02 |
| 2.1.5 | Permanent farm workers | | | | | | |
| | Direct Labour (10% to potato enterprise) | Per month | 3 | 6,000.00 | | 18,000.00 | 0.40 |
| 2.1.6 | Casual labour | | | | | | |
| | Labour planting | man days | | | | - | - |
| | Labour fertilization and chemicals | man days | | | | - | - |
| | Labour weeding | man days | | | | - | - |
| | Labour irrigation set up and management | man days | | | | - | - |
| 2.1.7 | Other Pre Harvest costs | | | | | | |
| | TOTAL PRODUCTION COSTS | | | | | 117,193.96 | 2.60 |
| 3 | POST HAVERST COSTS (VC) | | | | | | |
| 3.1 | Harvest and distribution costs | | | | | | |
| | Packaging material -10 Kg bags | 10 kg bags | 5,000 | 2.90 | | 69,600 | 1.55 |
| | Potato bag wire ties (100 in pkt) | units | 5,000 | 0.95 | | 4,750 | 0.11 |
| | Chemical used to kill potato plant before harvesting P7113.15/3 | unit | 1 | 2,371.05 | | 2,371 | 0.05 |

| | | | | | | | |
|-----|---------------------------|--|--|--|--|------------|------|
| 3.2 | Other variable costs | | | | | - | |
| | TOTAL POST HAVERST COSTS | | | | | 76,721.05 | 1.70 |
| 4 | TOTAL VARIABLE COSTS (VC) | | | | | 193,915.01 | 4.31 |
| 5 | OTHER VARIABLE COSTS | | | | | - | - |
| 6 | GROSS MARGIN | | | | | 188,584.99 | 4.19 |
| 7 | GROSS MARGIN % | | | | | 49% | 49% |

Key assumptions

a. The yield is approximately 45 TONNES / 45,000 Kgs in a cropping area of one (1) hectare (HA). The yield, has taken into account the normal and abnormal losses / wastage experienced during production.

b. The gross revenue is calculated by multiplying the yield with the farm gate price. The produce is sold in bags of 10kgs predominantly to the retail market. The farm gate price was established to be P85 per bag or P8.50/kg. This is the price at which produce is sold to the market.

c. The gross margin is calculated by subtracting the variable costs from the revenue. The gross margin % is the gross margin expressed as percentage of revenue.

d. The farm reported a gross margin of P188, 584 for a one HA production.

e. The gross profit margin % achieved is approximately 49%, as indicated in the enterprise budget.

f. Net profit margin is calculated by subtracting the fixed costs from the gross margin. The net profit margin was not computed, since overheads or fixed costs were not collected during the study.

g. It is evident that the yields, revenue and variable costs collected during the study vary from one farmer to the other, as seen in enterprise budgets of other crops.

h. The yields are dependent on other variables such as climatic conditions in each ecological zone, farming practices, and the choice of inputs (fertilizers and agro chemicals) applied.

i. It is important to note that overheads or other operational costs are not included in the budget. These costs should be accounted for when compiling the whole farm budget. Examples of overheads include costs such as; depreciation of assets, interests / finance charges, bank charges, stationery, salaries of non production employees, etc

Sensitivity analysis: Below is the sensitivity analysis for the actual output of rape for an enterprise budget in figure 3.

| | | Revenue | | | | | | | |
|-------|---------|--------------------------------------|-------------|-------------|-------------|-------------------|------------|------------|------------|
| | | Decrease (-) | | | Actual | Increase (+) | | | |
| | | 30.0% | 20.0% | 10.0% | Price | 10.0% | 20.0% | 30.0% | |
| | | Output | -5.95 | -6.80 | -7.65 | 8.50 | 9.35 | 10.20 | 11.05 |
| | | Revenue at different level of output | | | | | | | |
| MINUS | 30% | 31,500.00 | -187,425.00 | -214,200.00 | -240,975.00 | 267,750.00 | 294,525.00 | 321,300.00 | 348,075.00 |
| | 20% | 36,000.00 | -214,200.00 | -244,800.00 | -275,400.00 | 306,000.00 | 336,600.00 | 367,200.00 | 397,800.00 |
| | 10% | 40,500.00 | -240,975.00 | -275,400.00 | -309,825.00 | 344,250.00 | 378,675.00 | 413,100.00 | 447,525.00 |
| | Revenue | 45,000.00 | -267,750.00 | -306,000.00 | -344,250.00 | 382,500.00 | 420,750.00 | 459,000.00 | 497,250.00 |
| PLUS | 10.0% | 49,500.00 | -294,525.00 | -336,600.00 | -378,675.00 | 420,750.00 | 462,825.00 | 504,900.00 | 546,975.00 |
| | 20.0% | 54,000.00 | -321,300.00 | -367,200.00 | -413,100.00 | 459,000.00 | 504,900.00 | 550,800.00 | 596,700.00 |
| | 30.0% | 58,500.00 | -348,075.00 | -397,800.00 | -447,525.00 | 497,250.00 | 546,975.00 | 596,700.00 | 646,425.00 |

| | | Total Variable Costs (TVC) | | | | | | | |
|-------|------------|---|-------------|-------------|-------------|-------------------|------------|------------|------------|
| | | Decrease (-) | | | Actual | Increase (+) | | | |
| | | 30.0% | 20.0% | 10.0% | Cost | 10.0% | 20.0% | 30.0% | |
| | | Output | -3.02 | -3.45 | -3.88 | 4.31 | 4.74 | 5.17 | 5.60 |
| | | Total Variable costs at different level of output | | | | | | | |
| MINUS | 30.0% | 31,500.00 | -95,018.35 | -108,592.41 | -122,166.46 | 135,740.51 | 149,314.56 | 162,888.61 | 176,462.66 |
| | 20.0% | 36,000.00 | -108,592.41 | -124,105.61 | -139,618.81 | 155,132.01 | 170,645.21 | 186,158.41 | 201,671.61 |
| | 10.0% | 40,500.00 | -122,166.46 | -139,618.81 | -157,071.16 | 174,523.51 | 191,975.86 | 209,428.21 | 226,880.56 |
| | Total Cost | 45,000.00 | -135,740.51 | -155,132.01 | -174,523.51 | 193,915.01 | 213,306.51 | 232,698.01 | 252,089.51 |
| PLUS | 10.0% | 49,500.00 | -149,314.56 | -170,645.21 | -191,975.86 | 213,306.51 | 234,637.16 | 255,967.81 | 277,298.46 |
| | 20.0% | 54,000.00 | -162,888.61 | -186,158.41 | -209,428.21 | 232,698.01 | 255,967.81 | 279,237.61 | 302,507.42 |
| | 30.0% | 58,500.00 | -176,462.66 | -201,671.61 | -226,880.56 | 252,089.51 | 277,298.46 | 302,507.42 | 327,716.37 |

7. CONSTRAINTS TO PRODUCTION OF POTATOES.

Table 3; indicate the constraints to production of potatoes in the selected District. As indicated in the table below, the farmer did not respond to the question requiring the sharing of constraints to potato production.

Table 3: Constraints / challenges to production potatoes;

| Name of crop | Constraints to production of potatoes | |
|--------------|---------------------------------------|--|
| Potato | Central District –Tuli Block | <input type="checkbox"/> The farmer did not share the constraints to production of potatoes. |

ANNEXURE 1: Enterprise Budget Data collection tool

| | |
|--|--|
| Name of respondent | |
| Farm Location | |
| District | |
| Name of crop / vegetable | |
| Months taken from planting to harvest | |

A. Collect data on quantities sold for a 1 HA production and the unit selling price for the product;

| | Item description (vegetable) | Unit | Output | Output | Unit SP |
|----|------------------------------|--------------|-----------------------------------|------------------------------|-----------------------------------|
| | | <i>basis</i> | <i>in Tonnes / heads/ bundles</i> | <i>in Kgs/ heads/ bundle</i> | <i>P/ Kg , head, bundles, etc</i> |
| 1. | | | | | |

B. Collect data on cost of seeds, fertilizers, pesticides and labour for 1 HA production

| 2 | VARIABLE COSTS (VC) | Basis | Quantity | Unit cost |
|-------|--------------------------------|-------|----------|-----------|
| 2.1 | PRODUCTION COSTS | | | |
| 2.1.1 | Planting material | | | |
| | Seed / seedlings | | | |
| 2.1.2 | Fertilizers | | | |
| | i | | | |
| | ii | | | |
| | iii | | | |
| | iv | | | |
| | v | | | |
| 2.1.3 | Herbicides | | | |
| | i | | | |
| | ii | | | |
| | iii | | | |
| | iv | | | |
| 2.1.4 | Pesticides Insecticides | | | |
| | i | | | |
| | ii | | | |
| | iii | | | |
| | iv | | | |
| 2.1.5 | Fungicides | | | |
| | i | | | |

| | | | | |
|--------------|--|-----------------------------|--|--|
| ii | | | | |
| iii | | | | |
| iv | | | | |
| | | | | |
| 2.1.6 | Permanent farm workers | | | |
| | Direct Labour | <i>man days</i> | | |
| | | | | |
| 2.1.7 | Casual labour | | | |
| | Labour planting | <i>man days</i> | | |
| | Labour fertilization and chemicals | <i>man days</i> | | |
| | Labour weeding | <i>man days</i> | | |
| | Labour irrigation set up and management | <i>man days</i> | | |
| | | | | |
| 3 | Marketing and distribution costs | | | |
| | Transport to market | <i>Per trip / fuel cost</i> | | |
| | Airtime used | <i>Per month</i> | | |
| | Packaging materials used | | | |
| 4 | Other variable costs | | | |
| | Diesel for borehole engine (if any) | | | |
| | Transporting inputs to farm | | | |
| | Other costs _____ list them | | | |

Notes:

a. Enquire on the rate for casual labour, and the number of days / hours engaged at each stage of production.

C. Constraints to production

Ask the farmer on constraints to production, affecting the production and yields. (Production related challenges only)

