

An Application of Discounted Cash Flow Techniques in Feasibility Assessment: the Case of Pig Abattoir for Mafutseni Pig Farmers' Associations (MPFA) of Swaziland

¹M.B. Masuku, ¹T. Shabalala and ²A. Belete

¹Department of Agricultural Economics and Management, University of Swaziland,
P.O. Box M205, Luyengo, Swaziland

²Department of Agricultural Economics, University of Limpopo, P/B X1106,
Sovenga 0727, South Africa

Abstract: The Pig is one of the most prolific and efficient feed converting domestic animal amongst the livestock. Pigs grow and mature fast, hence quickly provide maximum returns. Pig meat is tender with appetising flavour, thus it is an essential food item. Pork is considered the most nutritious meat which provides high energy value in human diet. The study aimed at establishing the feasibility of an on-farm pig abattoir for the Mafutseni Constituency pig farmers. A feasibility study was conducted at three levels; namely, the marketing feasibility, technical feasibility and financial feasibility. The on-farm pig project was found to be feasible. The Net Present Value (NPV) of the project at fourteen percent (14%) discount rate was positive (E 14,921, 546.14). The Internal Financial Return (IFR) was high and attractive at 66.5%. The study recommends that more efforts should be focused on the marketing of pigs and that farmers would have to honour their contract conditions with the abattoir to ensure continuous operation of the abattoir.

Key words: Cash flow techniques, discounted cash flow, feasibility assessment, pig abattoir

INTRODUCTION

Pig is one of the most prolific and efficient domestic animal in converting feed amongst the livestock. It grows and mature fast, hence quickly provide maximum returns. Pig meat is a delicacy with appetising flavour, thus it is an essential food item. Pork is considered the most nutritious meat which provides high energy value in human diet. With the increase in population, the demand for meat particularly pork is also increasing.

Commercialization of smallholder pig production in Swaziland was launched in April 1998. According to Nkwanyana (1998), one of the objectives of the programme was to raise the quality of smallholder livestock on Swazi Nation Land (SNL) and Title Deed Land (TDL) in order to meet both local and international demand as well as to promote smallholder livestock enterprises and a spirit of entrepreneurship among livestock farmers in Swaziland (Nkwanyana, 2003a, 2003b).

Community women and youth group schemes were viewed as the key players in the development of pig production in Swaziland (Nkwanyana, 1998). In 1999 a new pig breeding centre was built by government at Mpisi farm. To run the pig breeding centre and thereby support the emerging pig farmers in Swaziland, a total of US\$380, 000.00 was donated by the government of the Republic of

China. Since 1999 an increasing number of farmers in the middleveld on Swazi Nation Land (SNL) were venturing into the pig agribusiness. Before the establishment of the pig breeding centre, the farmers had been growing field crops. One of the reasons for changing from field crops to pig production is the severe recurrent droughts, which resulted in poor performance by field crops (Nkwanyana, 1998).

The increase in the number of farmers venturing in the pig agribusiness has not resulted in improvement of the marketing of the pigs. Currently, farmers sell their pigs either on cash basis or on both cash and credit basis. The main customers in the pig agribusiness are Swaziland Meat Industries, Shamrock butcheries, Swaziland Meat Wholesalers, butcheries and restaurants.

Considerable effort has been put by the Swaziland government to encourage and commercialize pig production and an increasing majority of the Swazi farmers are venturing into the pig agribusiness (Anonymous, 2006). After successfully venturing into the pig agribusiness, the farmers are facing serious marketing problems, which were not foreseen before investing in the pig agribusiness. Moreover, some farmers fail to make profit due to the fact that the income from the sale of pigs does not cover the production costs of pigs on their farms. Farmers also face other costs like cost of slaughtering pigs, which is usually 20% of the price of the pig. As a

result the farmer's share in the pig agribusiness is very meagre and farmers tend to be discouraged from raising pigs. The main challenge for pig farmers is how to maximise their profits. Pig farmers may improve their profit margins through value addition to their pigs (Brown, 1979; Baxter, 2003; Audrey *et al.*, 2007). This can be achieved by processing the pigs on their own instead of selling whole pigs. This may involve establishing an on-farm pig abattoir. However, the feasibility of an on-farm pig abattoir can only be ascertained by conducting a feasibility study. The main purpose of this study was to assess the feasibility of establishing a pig abattoir for the Mafutseni Pig Farmers' Association.

METHODOLOGY

The study area and data collection: The target population for this study were 35 pig farmers belonging to Mafutseni Pig Farmers' Association. These farmers were purposely selected because they are more organized. The study aimed at interviewing all the farmers, however, a total of 28 pig farmers were interviewed instead of 35 because the others farmers were not accessible.

A descriptive research design was used for this study. The feasibility study was divided into three major sections; namely the marketing feasibility, technical feasibility and financial feasibility. Marketing feasibility is essential in determining the potential markets and marketing strategies for the pork. The field work involved collection of secondary data, informal discussions with key informants such as the Manzini pig officer, the chairperson of the pig association in the area, and village officials at Mafutseni. Personal interviews were also conducted with individual pig farmers as well as telephone interviews with potential customers.

Data analysis: Primary data were analysed using descriptive statistics. The three criteria commonly employed to evaluate the financial feasibility of private investment in any business are Discounted Net Present Value (NPV), the Internal Rate of Return (IRR) and the Benefit/Cost Ratio (Gittinger, 1982; Ortmann, 1981). Using this information the financial feasibility of the project was determined by subtracting the costs from the benefits on a year-to-year basis to arrive at the incremental net benefit stream (cash flow) and then discounted the net benefit stream. For this study only the Net Present Value (NPV) and the Internal Rate of Return (IRR) were used to determine the financial feasibility of the pig abattoir. According to Ortmann (1981) the standard models for determining the profitability or otherwise of an on-farm pig abattoir can therefore be written as follows:

$$NPV = -CAP + NCF_1(1+r)^{-1} + \dots + NCF_n(1+r)^{-n} + SV(1+r)^{-n}$$

The IRR is the discount rate which equates the NPV to zero and the model for the IRR is stated as:

$$CAP = NCF_1(1+r)^{-1} + \dots + NCF_n(1+r)^{-n} + SV(1+r)^{-n}$$

where;

CAP = initial capital investment

NCF_i = net cash flow in period i

r = interest rate

SV = salvage value in year n

n = number of years (planning period)

A proposed project is considered economically feasible if the NPV is positive and is rejected if it is negative. The IRR is compared with the Required Rate of Return (RRR), which is the opportunity cost of capital before a final decision is made. If the IRR is greater than RRR the project is considered to be financially feasible and vice versa.

It is worth noting that NPV is problematic to employ in project ranking when the appropriate discount rates are not used in evaluation. Generally, long gestation periods for projects lead to lower profitability for a given discount rate, while short gestation periods improve its profitability. It is also known that higher discount rates tend to lower the profitability of projects. The appropriate rate for government owned projects is the social discount rate, which is equivalent to the rate paid by government to service its long-term loans. On the other hand, the discount rate for private sector is close to the market rate of interest which varies among investors. The IRR has an advantage over other indices since it does not require the selection of a discount rate and the values are not affected when benefits and costs are computed on a gross or on a net basis. The IRR simply measures the return earned on an investment. Thus, the relationship between the IRR and the NPV equals zero. The financial evaluation of the on-farm pig abattoir employed the NPV and IRR with a number of assumptions.

RESULTS AND DISCUSSION

Description of the proposed project and assumptions:

The project is an on-farm abattoir for the processing of pigs. It also has an element of marketing of other related products such as pork or pig meat. A tri-partite contract farming model as shown in Fig. 1 illustrates the operation of the association. The proposed abattoir will be located in the Mafutseni Constituency, with a minimum site area of 1800 m². The abattoir layout is based on a site of 30 m × 60 m which is required to accommodate all units. The abattoir capacity would be sixty (60) livestock units per day, resulting in a maximum number of 120 pigs slaughtered in a day, since one pig is equivalent to 0.5 livestock unit (Edwards *et al.*, 1979; Dreweatt, 2000).

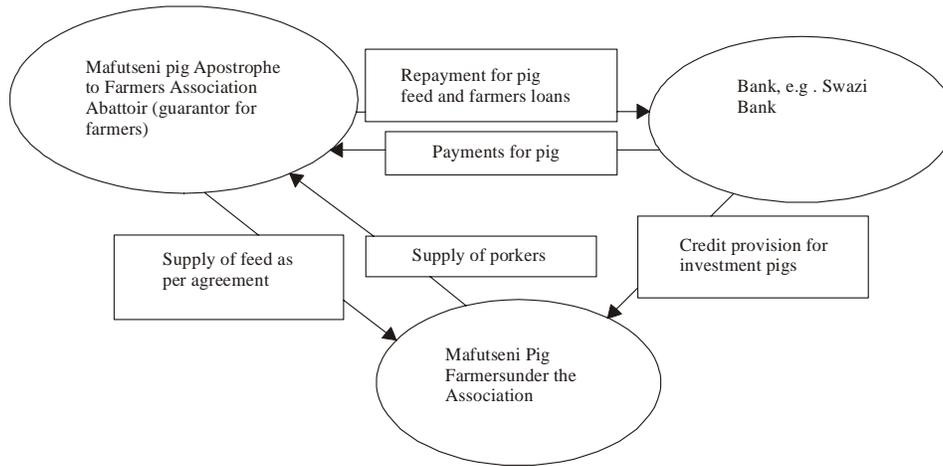


Fig. 1: Proposed tri-partite contract farming model to be used by MPFA abattoir

The main output of the abattoir would be dressed pigs which would be sold directly to butcheries within a 25 km radius (mainly in the Manzini region), which is the primary market of the project. Secondary markets include the butcheries and other pork outlets in the whole of Swaziland. In the second year of operation, the abattoir would start exporting the pork to the neighbouring markets, more especially to Mozambique. The abattoir shall receive the pigs primarily from the members of the association who already keep pigs. The abattoir would also process (dress) pigs for other farmers in neighbouring communities at a fee. This will be more common during the early stages of the project, since the members of the association would not utilise the abattoir to its full capacity during the initial stages of the operation.

In terms of personnel, the abattoir would require a manager, an extension officer, a clerk, four slaughter men but rising to seven at full capacity, two labourers rising to three at full capacity, two heavy duty drivers and two night watchmen.

Situation analysis: Currently, there are three abattoirs involved in dressing pigs in the country and all of them are located in the Manzini and Mbabane Municipalities and Swaziland Meat Industries (SMI). The municipality abattoirs usually slaughter cattle and pigs. The closest abattoir to the farmers' association pig abattoir is in the Manzini Municipality and it slaughters 100 to 200 porkers a week. The Swaziland Meat Industries (SMI) abattoir at Simunye currently supplies two thirds of Swaziland's 673 metric tonnes of pork per year.

Market feasibility: A quick look at market feasibility before the implementation of the on-farm pig slaughtering and processing is necessary (Gue, 1998; Maseko, 2000). Regarding marketing of processed pork the majority of

Table 1: Number of pigs demanded and primary market per week.

Customers	No. of pigs (Manzini)	No. of pigs (Ngogola)	Total no. of pigs
Central meat wholesalers	-	20	20
Down town butchery	50	-	50
Hillview butchery	5	-	5
Manzini meat market	35	-	35
Mazezulu butchery	5	-	5
Swaziland meat wholesalers	40	-	40
Zamimpilo butchery	5	-	5
Total	140	20	160

the customers comprise those who were already buying the pigs from farmers in the Mafutseni constituency. Customers include butcheries and meat wholesalers within a 25 km radius (mainly in the Manzini region). Table 1 presents the estimated weekly demand of pigs from MPFA.

The MPFA shall serve its primary market for two years. In the early stages, especially during the first year and a few months in the second year, the abattoir would not be able to satisfy the primary market demand. By the end of the second year, the abattoir would be able to satisfy the primary market demand. In the third year, the abattoir would be able to sell its pork to other butcheries in Swaziland. In the fifth year, the abattoir would operate at full capacity. As it is an export oriented abattoir, the pork carcasses would be exported to markets in the neighbouring countries. The carcasses would mainly be exported to Mozambique, and possibly South Africa. These would constitute the foreign market of the MPFA abattoir.

Considering that the abattoir would start by operating below full capacity, but would reach its full operation capacity in the fifth year, MPFA shall be able to accumulate the market such that it matches its abattoir output. A major portion of the pork carcasses would be marketed at the foreign market when operating at full capacity.

Table 2: Projected weekly demand of whole pigs in MPFA markets (2008 -2022)

Market	Year															
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Primary	91	150	160	160	160	160	160	160	160	160	160	160	160	160	160	
Secondary	0	0	127	331	160	140	90	40	40	40	40	40	40	40	40	
Foreign	0	0	0	0	280	300	350	400	400	400	400	400	400	400	400	

Table 3: Projected number of sows and porkers (2008-2012)

Year	Sow population	Average sows	Porkers supplied	Assumptions
2008	145 – 218	182	4,550	Sows increase by 50%
2009	218 – 382	300	7,500	Sows increase by 75%
2010	382 – 764	573	14,325	Sows increase by 100%
2011	764 – 1200	982	24,550	Sows increase by 57%
2012	1200	1,200	30,000	Sows at full abattoir capacity

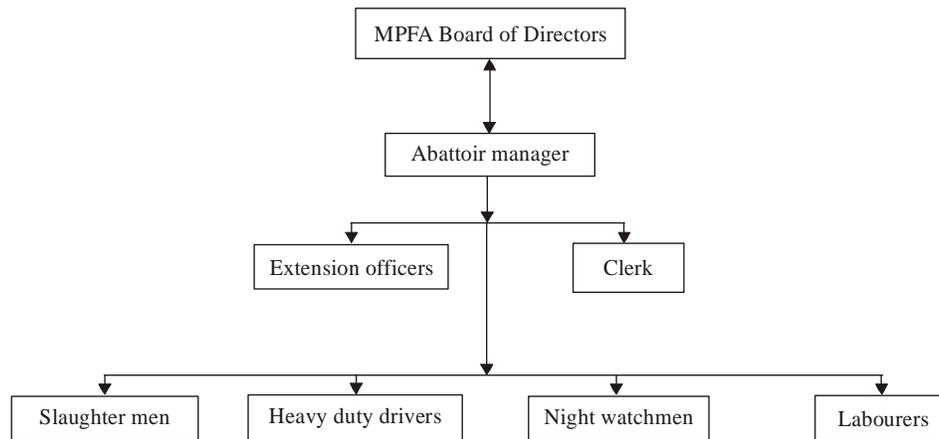


Fig. 2: The organizational structure for MPFA abattoir

Production projection from 2008 to 2022: The pigs would be produced in close supervision by the pig extension officers. This would enable the MPFA abattoir to sell quality pork to its customers. Using resource-providing and market specification contracts, the MPFA abattoir would eliminate major pork marketing problems. The weekly demand of MPFA pork carcasses by primary, secondary and foreign markets is shown in Table 2.

Note: (1) All porkers produced by MPFA members are processed in the MPFA abattoir; (2) Each pig carcass weighs 50 kg; (3) There is an excess demand of pork in MPFA markets; and (4) Given the current status of Mafutseni pig farmers, MPFA would establish a tri-partite model of contract farming. Through this type of contract, the association would supply the major cost of production (feed) to the pig farmers on credit. The feed would be cheaper by 40% compared to when farmers buy direct from suppliers. The feed would be cheaper because the association would buy in bulk.

Supply and procurement of raw material: Porkers, the raw material for the abattoir would be supplied by farmers in the Mafutseni constituency. Currently, farmers in the Mafutseni constituency have over one hundred and forty five (145) sows. The one hundred and forty five sows can bear over 3,625 piglets per year.

Table 3 shows the projected number of sows owned by farmers and the number of porkers to be supplied to the abattoir. Since the association would be using a tri-partite contract, the farmers would be able to access funds for investment in their pig agribusinesses. Thus, supply of pigs to the abattoir will increase as a result of the access to funds to enable them to buy inputs. The results indicate that the pig abattoir would be able to operate in full capacity by 2012.

Technical and organizational feasibility: The following outlines the design and specifications of a pig abattoir for the MPFA. The abattoir would be such that only pigs are processed. The abattoir would operate at a full capacity of 120 pigs per day.

The organizational structure for MPFA abattoir is as shown in Fig. 2. A manager, a pig extension officer, a clerk, slaughter men (4-7) and 2 labourers would be responsible for the smooth operation of the pig abattoir. The abattoir would need four slaughter men in the early stages of operation, rising to 7 when the abattoir is at full operation. An additional extension officer would be added in the fifth year of the project. All the staff would be under the Board of Directors of the association. Personnel costs are reflected in Table 4. The Table shows that the

Table 4: Personnel costs per year for the first four years

Item	Unit cost/year (E)	Total cost/year (E)
Manager	54,000.00	54,000.00
Extension officer	36,000.00	36,000.00
Clerk	26,400.00	26,400.00
Heavy duty drivers (2)	14,400.00	28,800.00
Slaughter men (4-7)	12,000.00	48,000.00
Labourers (2-3)	12,000.00	24,000.00
Night watchmen (2)	9,600.00	19,200.00
Total		217,200.00

Table 5: Summary of capital costs

Item	Cost (E)
Capital expenditure	650,000
Plant and equipment	150,000
Installation	350,000
Building costs	30,000
Borehole	80,000
Feed silos	420,000
Vehicles	5,200
Land and clearing	168,520
Contingencies	1,853,720
Total capital expenditure	1,853,720

total personnel costs would be E217,200.00, and one Lilangeni (E) is equal to US\$6.8.

Facilities: The facilities are divided into a series of units which are combined as required to suit the Mafutseni location. The following units are included; production units with slaughter floor, lairage and chiller; and service units such as effluent disposal, and solid waste and blood disposal.

Financial feasibility analysis:

Capital requirements and investment schedule: Major capital requirements of the project include the plant and equipment, building costs, and vehicles (Table 5). Other important assets include the borehole which would supply water to the abattoir and the feed silos which would be used for keeping the feed for pigs to be given to farmers under the association on credit and at a cheaper price than the current commercial pig feed price. The capital expenditure would be financed by a loan of E1, 855,000.

Sales plan and revenue schedule: Projected annual sales are shown in Table 6. The MPFA abattoir would buy the porkers from its members on live weight basis at E11, E13, E15, E17 and E16 per kg in 2008, 2009, 2010, 2011 and 2012, respectively. MPFA would dress the porkers. The pork carcasses would then be distributed to the MPFA customers. The abattoir would continue to seek contracts with other butcheries selling pork. MPFA average pig carcass would weigh 50 kg and the abattoir

Table 6: Projected annual sales between 2008 and 2017

Sales	Year									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Carcasses (50 kg each)	4,550	7,500	14,325	24,550	30,000	30,000	30,000	30,000	30,000	30,000
Revenue(E)	3,412,500	6,750,000	14,325,000	27,005,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000

Table 7: Operating expenses

Item	Assumptions	Costs (E)
Personnel	Based on personnel requirements.	217,200.00
Maintenance and spares	5% of 1-6.	84,000.00
Training	1 month at E2,000 per person	8,000.00
Interest	14% of E 1,855,000, 10 year loan	259,700.00
Depreciation	10% of 1-6	168,000.00
Bad debt loss	5% of sales	170,625.00
Sewage	One pit a year	5,000.00
Fuel	Based on 60,000km per year	165,000.00
Electricity	Daily consumption is 96 kWh.	11,520.00
Telephone	0.5 % of sales	17,062.50
Water	Annual fee per borehole in SD	900.00
Distribution costs	Estimated	19,200.00
Insurance	1% of rows Capital expenditure	16,800.00
Sundries	Stationery, detergents, solvents, etc.	1,200.00
Sub-total		1,144,207.50

would sell the carcasses at E15 per kg in the first year, E18 in the second year, E20 in the third year, E22 in the fourth and E20 in the fifth year onwards.

Projected operating costs: The operating expenses for the abattoir are shown in Table 7. The major expenses are personnel, bad debt losses and fuel. Maintenance and spares, depreciation, electricity and insurance also contribute as well in the overall amount of operating expenses.

The Net Present Value (NPV): The cash flow for the proposed MPFA abattoir (Appendix 1) is discounted at twelve percent (12%), thirteen percent (13%) and fourteen percent (14%). These are the estimated costs of capital at the time of the project. Using the model for the net present value, the project has the following net present values:

At 12% discount rate:

$$NPV = -1,853,720 - 525,622(1+0.12)^{-1} + \dots + 3414,313(1+0.12)^{-15} = E16,491,417.38$$

At 13% discount rate:

$$NPV = -1,853,720 - 525,622(1+0.13)^{-1} + \dots + 3,414,301(1+0.13)^{-15} = E15,994,625.95$$

At 14% discount rate:

$$NPV = -1,853,720 - 525,622(1+0.14)^{-1} + \dots + 3,414,301(1+0.14)^{-15} = E14,921,546.14$$

The Internal Rate of Return (IRR): The MPFA abattoirs' internal rate of return, also referred to as Internal Financial Return (IFR) is that discount rate which

equates the NPV to zero. The project's internal financial return (r in the model) for the MPFA abattoir is 66.51% (Appendix 1).

The MPFA abattoir has net present values of E16,491,417.38; E15,994,625.95 and E14,921,546.14 at 12, 13 and 14% discount rates respectively. Focusing on the highest discount rate (14%) the net present value of the project was positive and reasonably high at E14,921,546.14. This is a satisfactory level since the criterion is based on the difference between benefits and costs, and the difference was discounted at an interest rate. According to Dlamini (1992), if the discount rate truly represents the cost of capital, then any project whose NPV is positive should be considered and implemented. Hence, the MPFA abattoir is an economically viable project and can be put into operation.

The MPFA abattoir has an Internal Financial Return (IFR) of 66.51%. The internal financial return show that capital invested in the MPFA abattoir would earn 66.51% interest. Based on the internal financial return the project is highly profitable and highly attractive.

Looking at the cash inflows of the project, and the total cash outflows, the MPFA need to operate under the tri-partite model for the project to a success. Revenue from the pork carcasses alone can lead to different results, which may not favour the project. However, because of the resource-providing contract, the MPFA would be able

to use cheaper feed and produce cheaper pork. The resource-providing contract also generate revenue shown as feed revenue and transport fees collected in the MPFA abattoir discounted cash flow (Appendix 1).

CONCLUSION

The study has attempted to determine the feasibility of establishing and running an on-farm pig abattoir by the Mafutseni constituency pig farmers. Using the discounted cash flow analysis estimated the net present value and the internal financial return of the on-farm abattoir. Overall, the on-farm pig project was found to be feasible.

The Net Present Value (NPV) of the project at 14% discount rate was positive and convincingly high at E14,921,546.14. The Internal Financial Return (IFR) which measures the project's profitability was high and attractive at 66.51%.

RECOMMENDATION

The findings of the study suggest that in order to realise the viability of the pig abattoir, it would be important for the farmers to engage in contract farming and also honour their contracts. This would not only reduce their exposure to risk, but also enable them to access investment funds.

Appendix 1: Discounted cash flow for Mafutseni pig farmers association abattoir

Details	Before develop	Year					
		2008	2009	2010	2011	2012	2013
Outflow							
Capital Expenditure							
1. Plant and equipment	650,000	0	0	0	0	0	0
2. Installation	150,000	0	0	0	0	0	0
3. Building costs	350,000	0	0	0	0	0	0
4. Borehole	30,000	0	0	0	0	0	0
5. Feed silos	80,000	0	0	0	0	0	0
6. Vehicles	420,000	0	0	0	40,000	0	0
7. Land and clearing	5,200	0	0	0	0	0	0
8. Contingencies	168,520	0	0	0	0	0	0
A. Total fixed capital	1,853,720	0	0	0	40,000	0	0
Operating Expenses							
9. Personnel		217,200	238,920	262,812	314,508	345,959	380,555
10. Maintenance and spares		84,000	53,500	53,500	53,500	53,500	53,500
11. Training		8,000	0	0	6,000	0	0
12. Bad debt loss		170,625	337,500	716,250	1,350,250	1,500,000	1,500,000
13. Sewage		5,000	5,000	5,000	5,000	5,000	5,000
14. Fuel		165,000	165,000	165,000	165,000	165,000	165,000
15. Electricity		11,520	11,520	11,520	11,520	11,520	11,520
16. Telephone		17,063	17,063	17,063	17,063	17,063	17,063
17. Water		900	900	900	900	900	900
18. Distribution fees		19,200	19,200	19,200	19,200	259,200	259,200
19. Insurance		16,800	16,800	16,800	16,800	16,800	16,800
20. Sundries		1,200	1,200	1,200	1,200	1,200	1,200
21. Taxes		0	497,162	1,085,835	1,862,615	2,022,201	2,022,201
Stock purchases							
22. Porker purchases		3,003,000	5,850,000	12,892,500	25,041,000	28,800,000	28,800,000
B. Sub-total	0	3,719,508	7,213,765	15,247,579	28,864,555	33,198,342	33,232,938
Debt Service							
Repayment (Principal)		185,500	185,500	185,500	185,500	185,500	185,500
Interest on loan		259,700	233,730	207,760	181,790	155,820	129,850
C. Sub-total	0	445,200	419,230	393,260	367,290	341,320	315,350

Appendix 1: (Continued)

D.	Total Outflow (A+B+C)	1,853,720	4,164,708	7,632,995	15,640,839	29,271,845	33,539,662	33,548,288		
Inflow										
	Sales									
	Porker carcasses		3,412,500	6,750,000	14,325,000	27,005,000	30,000,000	30,000,000		
	Other revenue									
	Feed revenue		113,293	984,970	1,881,292	3,224,134	3,939,879	3,939,879		
	Transport fees collected		113,293	984,970	1,881,292	3,224,134	3,224,134	3,224,134		
E.	Sub-total	0	3,639,085	8,719,939	18,087,584	33,453,268	37,164,013	37,164,013		
F.	Loan funds									
G.	Total Inflow (E+F)	0	3,639,085	8,719,939	18,087,584	33,453,268	37,164,013	37,164,013		
H.	Net Benefit(= cash flow) (G-D)	-1,853,720	-525,622	1,086,945	2,446,745	4,181,423	3,624,351	3,615,725		
	Project present worth									
	at 12% discount rate	-1,853,720	-469,306	866,506	1,741,545	2,657,370	2,056,554	1,831,839		
	at 13% discount rate	-1,178,100	-465,152	851,237	1,695,717	2,564,545	1,967,152	1,736,700		
	at 14% discount rate	-1,178,100	-461,072	836,369	1,651,483	2,475,738	1,882,374	1,647,276		
	Net present worth									
	at 12% discount rate	16,491,417								
	at 13% discount rate	15,994,626								
	at 14% discount rate	14,921,546								
	Internal Financial Return	0.6651446								
Source of Investment Funds	Total Capital Expenditure (Line A)									
	Borrowed funds (approx. 70%)									
	Farmer's own funds (approx. 30%)									
		Year								

	Details	2014	2015	2016	2017	2018	2019	2020	2021	2022
Outflow										
	Capital Expenditure									
	1. Plant and equipment	0	0	0	0	0	0	0	0	0
	2. Installation	0	0	0	0	0	0	0	0	0
	3. Building costs	0	0	0	0	0	0	0	0	0
	4. Borehole	0	0	0	0	0	0	0	0	0
	5. Feed silos	0	0	0	0	0	0	0	0	0
	6. Vehicles	0	0	0	0	0	0	0	0	0
	7. Land and clearing	0	0	0	0	0	0	0	0	0
	8. Contingencies	0	0	0	0	0	0	0	0	0
A.	Total fixed capital	0	0	0	0	0	0	0	0	0
	Operating Expenses									
	9. Personnel	418,610	460,471	506,519	557,170	612,888	674,176	741,594	815,753	897,329
	10. Maintenance and spares	53,500	53,500	53,500	53,500	53,500	53,500	53,500	53,500	53,500
	11. Training	0	0	0	0	0	0	0	0	0
	12. Bad debt loss	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
	13. Sewage	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
	14. Fuel	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
	15. Electricity	11,520	11,520	11,520	11,520	11,520	11,520	11,520	11,520	11,520
	16. Telephone	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063
	17. Water	900	900	900	900	900	900	900	900	900
	18. Distribution fees	259,200	259,200	259,200	259,200	259,200	259,200	259,200	259,200	259,200
	19. Insurance	16,800	16,800	16,800	16,800	16,800	16,800	16,800	16,800	16,800
	20. Sundries	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
	21. Taxes	2,022,201	2,022,201	2,022,201	2,022,201	2,022,201	2,022,201	2,022,201	2,022,201	2,022,201
	Stock purchases									
	22. Porker purchases	28,800,000	28,800,000	28,800,000	28,800,000	28,800,000	28,800,000	28,800,000	28,800,000	28,800,000
B.	Sub-total	33,270,994	33,312,855	33,358,902	33,409,554	33,465,271	33,526,560	33,593,977	33,668,137	33,749,712
	Debt Service									
	Repayment (Principal)	185,500	185,500	185,500	185,500	0	0	0	0	0
	Interest on loan	103,880	77,910	51,940	25,970	0	0	0	0	0
C.	Sub-total	289,380	263,410	237,440	211,470	0	0	0	0	0
D.	Total Outflow (A+B+C)	33,560,374	33,576,265	33,596,342	33,621,024	33,465,271	33,526,560	33,593,977	33,668,137	33,749,712
Inflow										
	Sales									
	Porker carcasses	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000
	Other revenue									
	Feed revenue	3,939,879	3,939,879	3,939,879	3,939,879	3,939,879	3,939,879	3,939,879	3,939,879	3,939,879
	Transport fees collected	3,224,134	3,224,134	3,224,134	3,224,134	3,224,134	3,224,134	3,224,134	3,224,134	3,224,134
E.	Sub-total	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013
F.	Loan funds									
G.	Total Inflow (E+F)	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013	37,164,013
H.	Net Benefit(=cash flow) (G-D)	3,603,639	3,587,748	3,567,671	3,542,989	3,698,742	3,637,453	3,570,036	3,495,876	3,414,301
	Project present worth									
	at 12% discount rate	1,630,103	1,449,031	1,286,538	1,140,748	1,063,300	933,644	818,160	715,326	623,780
	at 13% discount rate	1,531,765	1,349,567	1,187,624	1,043,723	964,253	839,182	728,875	631,623	545,915
	at 14% discount rate	1,440,149	1,257,718	1,097,087	955,699	875,187	754,987	649,994	558,326	478,332

Appendix 1: (Continued)

	Net present worth	
	at 12% discount rate	16,491,417
	at 13% discount rate	15994626
	at 14% discount rate	14921546
	Internal Financial Return	0.6651446
Source of Investment Funds	Total Capital Expenditure (Line A)	
	Borrowed funds (approx. 70%)	
	Farmer's own funds (approx. 30%)	

REFERENCES

- Anonymous, 2006. Swaziland Smallholder Agricultural Development Project: Interim Evaluation Report. International Fund for Agricultural Development. Mbabane, Swaziland.
- Audrey, L., J. McKissick and S. Kane, 2007. Developing Feasibility Studies and Business Plans. Center for Agribusiness and Economic Development, Ontario.
- Baxter, B., 2003. Adding Value to Farm Produce by on-Farm Processing. Ontario Ministry of Agriculture, Food and Rural Affairs, Ontario.
- Brown, M.L., 1979. Farm Budgets: From Farm Income Analysis to Agricultural Project Analysis. The Johns Hopkins University Press, Baltimore.
- Dlamini, P.M., 1992. Economic analysis of the Ngculwini oilseeds production, processing and marketing project. *Uniswa Res. J. Agric.*, 1: 22-44.
- Dreweatt, N., 2000. Abattoir Provision in the South East Region of England. Staple Chambers, Hampshire. Retrieved from: <http://www.dreweatt-neate.co.uk>, (Accessed on: 16 November, 2006).
- Edwards, D., D.A. Hector, G.A. Norman and D. Silverside, 1979. Slaughter facilities for tropical conditions: A guide to the selection and costing of appropriate systems. Tropical Products Institute, London.
- Gittinger, J.P., 1982. Economic Analysis of Agricultural Projects. The Johns Hopkins University Press, Baltimore.
- Gue, D.E., 1998. Guidelines for Livestock Marketing and Processing Components in Bank Funded Projects. The World Bank, Torquay, England.
- Maseko, I., 2000. Pig marketing by the manzini ingulube cooperative society. Unpublished B.Sc. Research Project, Faculty of Agriculture, University of Swaziland, Luyengo.
- Nkwanyana, P., 1998. Commercialising Smallholder Pig Production. *Farming in Swaziland*. June/August issue, Mbabane, pp: 5-6.
- Nkwanyana, P., 2003a. Commercialization of Smallholder Pig Production. *Farming in Swaziland*. June/August issue, Mbabane, pp: 12.
- Nkwanyana, P., 2003b. New Pig Breeding Centre. *Farming in Swaziland*, Mbabane, 27(1): 10.
- Ortmann, G.F., 1981. The economics of establishing an intensive pig unit II: The use of discounted cash flow techniques. *Agrekon*, 20(3): 5-8.