TECHNICAL GUIDELINES FOR BROILER PRODUCTION

INTRODUCTION

In Botswana, the poultry industry plays a major role in contributing towards addressing key national development goals and improving the standard of living of people through poverty alleviation and creating employment opportunities.

The Poultry Annual Report of 2005/2006 indicates that the annual consumption of poultry meat per person declined from 37.8 to 23.5kg (62.17%) % during 2004 to 2005 and this was attributed to the outbreak of Newcastle disease in the neighboring countries, Zimbabwe and South Africa. Despite Newcastle disease outbreak, it was estimated that the population of broilers produced in Botswana increased by 69.35% from 21, 500 000 to over 31, 000, 000 during 2000 to 2005. At least over 28 675 000 broilers were slaughtered in 2005 yielding 40 000 tonnes of broiler meat.

There was a sharp decline in the importation of day old chickens from 14, 313, 790 to 5, 988, 595 (41.84%) during 2000 to 2005 implying that local production was significantly increasing in the country.

Prerequisites for establishing a broiler project

Before setting up a project, one should have;

Land: Adequate land to house poultry structures and for carrying out various farm operations.

Water: Adequate clean water is needed for consumption and cleaning within the poultry project. So it is imperative to identify a reliable source of portable water.

Skills and experience: Intensive basic training and relevant experience in poultry management is essential for running the project.

Capital: A source of potential funding for acquiring inputs and equipment needed to run the project. Requirements and policies of financial institutions ought to be known prior to loan acquisition.

MANAGEMENT PRACTICES

Broiler production is the raising or keeping of chickens (broilers) primarily for meat production. The key to successful broiler production depends on a systematic and efficient management program the farmer has adopted. In addition, it is advisable to do proper planning and preparation well on time for the arrival of chicks on site.

Labour

An experienced manager would require poultry attendants for the day to day running of the project. A poultry run which accommodate 1000 chicks will require 1 poultry attendant.

Casual labourers will be needed during the slaughtering period and cleaning/restocking.

Planning and preparation for the arrival of day old chicks

Activities prior arrival of day old chicks include:

- Houses, surrounding areas and all equipments must be cleaned and disinfected before chicks' arrival.

- Litter materials (wood shavings, chopped straw, etc) should be evenly spread throughout the brooding area to a depth of 8 – 10 cm.

- Houses must be pre-heated for a minimum of 24 hours before the arrival of chicks.
  Monitor pre-placement temperatures on a regular basis to ensure uniform temperatures throughout the brooding area.

- Ensure that adequate clean water at room temperature is available. Water is vital in the early stages of the chick's development.

- Provide fresh, dust free starter crumbs in the brooder area. Ensure chicks have easy access to feed (i.e. use flat pans, trays or paper sheeting).

- Do not place feeders or drinkers directly under or near brooders.

The broiler production cycle

Day old chicks are bought locally and raised for 6 weeks after which the chicken houses are cleaned, disinfected and allowed to rest for 2 weeks. At 5 to 6 weeks the broilers reach an average live weight of 2 kg and are selected, slaughtered, packaged and sold to different market outlets. A complete cycle is therefore 8 weeks long, making it 6 to 7 complete cycles annually.

Health and Common Diseases

In Botswana the common poultry diseases are NIwcastle and infectious bursal disease (Gumboro). The problems attributed to these diseases are water and feed consumption patterns, litter conditions, excessive mortality, chicken activity and behaviour. Where Newcastle and Gumboro diseases are reported, broiler chickens should be vaccinated with Lasota or New Castle and H20 or Mild Strain vaccines mixed with drinking water once during the rearing period. Refer to chicken age based vaccination program below

Broiler Vaccination Program

AGE	DISEASE	VACCINE
Day old	Newcastle	Lasota
Day 7	Infectious bursal disease	IBD vaccine
Day 14	Newcastle	Lasota
Day 21	Gumboro	Mildstrain

It is important that farmers request for a vaccination history when purchasing day old chicks from the suppliers because that will assist them to know what was done, not done and where to start.

Loan Summary		
Scheduled Payment	P	79,849.58
Scheduled Number of Payments		7
Actual Number of Payments		7
Total Early Payments	P	-
Total Interest	P	136,015.67

Extra Paymer	Total Paymen	Principal	Interest	Ending Balance
- P	79,849.58 P	48,129.72 P	31,719.85 P	374,801.66
-	79,849.58	51,739.45	28,110.12	323,062.20
-	79,849.58	55,619.91	24,229.67	267,442.29
-	79,849.58	59,791.41	20,058.17	207,650.88
-	79,849.58	64,275.76	15,573.82	143,375.12
-	79,849.58	69,096.44	10,753.13	74,278.68
-	74,278.68	68,707.78	5,570.90	0.00

LOAN AMORTISATION SUMMARY

Enter Values		
Loan Amount	P	422,931.38
Annual Interest Rate		7.5%
Loan Period in Years		7
Number of Payments Per Year		1
Start Date of Loan		1/1/08
Optional Extra Payments	P	-

Lender Name: CEDA

PmtNo.	Payment Date		Beginning Balance		Scheduled Payment	
1	1/1/09	P	422,931.38	P	79,849.58	P
2	1/1/10		374,801.66		79,849.58	
3	1/1/11		323,062.20		79,849.58	
4	1/1/12		267,442.29		79,849.58	
5	1/1/13		207,650.88		79,849.58	
6	1/1/14		143,375.12		79,849.58	
7	1/1/15		74,278.68		79,849.58	

Disease control

Disease is one of the factors which contribute to mortality in poultry production. These include bacterial, viral and parasitic diseases. Treatment of these diseases therefore is according to the causative agent.

Mortality

Under good management practices, a mortality rate will range between 5 to 10% per year.

Records management

Relative to records management, each poultry house should have a record book on which information on the number of stocked live birds, slaughtered and deaths are recorded. Record keeping assists the farmer to calculate an accurate gross margin budget and make informed decisions about the project.

The following records should be adequately kept:

- all feeds consumed and purchased
- number of day old chicks purchased
- deaths and causes
- vaccination and other veterinary requisites expenses
- labour and other variable costs
- number of chickens slaughtered
- number of chickens sold and used for home consumption
- number of slaughtered chickens damaged
- water and feed intake daily

MARKETING ISSUES

Market survey

A proper market survey is essential as that will enable the farmer to identify the current and emerging markets where broiler meat can be sold at a better price.

Marketing

Marketing activities include among others value adding, grading, quality, promotions and packaging. A proper utilization of these activities is essential as that will lead to selling large volumes of products as quickly as possible resulting in the farmer making a lot of profit.

Value adding: In broiler production, processes that need to be performed within the business aimed to add value to the product before selling are slaughtering, cutting chicken portions, grading, weighing and packaging. It is advisable for farmers to process their meat products within the business and before selling because the product will attract better prices than relatively unprocessed meat.

Quality: The final performance of broiler meat in the market depends on the quality of the chicks. Therefore, farmers should provide the flock with proper feeding, good ventilated houses and proper handling during the growth stage to ensure good quality meat. It is important for farmers to ensure that chickens are always alert, have uniform weight and no deformities on placement which are the result of good management practices. In addition, chicken meat should be sold when it is still fresh from the farm or after chilling.

Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
988,267.50	1,087,094.25	1,195,803.68	1,315,384.04	1,446,922.45	1,591,614.69	1,750,776.16
3,783,442.50	4,870,536.75	6,066,340.43	7,381,724.47	8,828,646.91	10,420,261.61	12,171,037.77
548,924.41	603,816.85	664,198.54	730,618.39	803,680.23	884,048.26	972,453.08
64,275.76	69,096.44	68,707.78	0.00	0.00	0.00	0.00
375,067.33	414,180.95	462,897.36	584,765.65	643,242.21	707,566.44	778,323.08
810.00	810.00	810.00	810.00	810.00	810.00	810.00
374,257.33	413,370.95	462,087.36	583,955.65	642,432.21	706,756.44	777,513.08
15,573.82	10,753.13	5,570.90	0.00	0.00	0.00	0.00
358,683.51	402,617.82	456,516.46	583,955.65	642,432.21	706,756.44	777,513.08
89,670.88	100,654.45	114,129.11	145,988.91	160,608.05	176,689.11	194,378.27
269,012.63	301,963.36	342,387.34	437,966.74	481,824.16	530,067.33	583,134.81

Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
988,267.50	1,087,094.25	1,195,803.68	1,315,384.04	1,446,922.45	1,591,614.69	1,750,776.16
580,512.69	657,278.79	699,107.40	767,440.54	842,606.99	925,290.09	1,048,922.66
407,754.81	429,815.46	496,696.28	547,943.50	604,315.45	666,324.60	701,853.51
79,849.58	79,849.58	74,278.68	0.00	0.00	0.00	0.00
942,703.47	1,292,669.35	1,715,086.95	2,263,030.46	2,867,345.91	3,533,670.51	4,235,524.02

Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
146.93	163.99	172.04	170.72	187.43	205.80	233.27
36.60	40.26	44.29	48.72	53.59	58.95	64.84
4.01	4.07	3.88	3.50	3.50	3.49	3.60

FINANCIAL PROJECTIONS (CONTINUED)

Capital Investment/Fixed Costs

				Year 0	Year 1	Year 2	Year 3
Returns (Sales)				337,500.00	742,500.00	816,750.00	898,425.00
Cummulative Benefits				337,500.00	1,080,000.00	1,896,750.00	2,795,175.00
Operational (variable costs)				187,461.38	412,415.04	453,656.54	499,022.19
Loan Repayment Principal				48,130.72	51,739.45	55,619.91	59,791.41
Gross Benefits (PBDIT)				101,907.90	278,345.51	307,473.55	339,611.40
Depreciation				0.00	810.00	810.00	810.00
Gross Benefits (PBIT)				101,907.90	277,535.51	306,663.55	338,801.40
Loan Repayment Interest				31,719.85	28,110.12	24,229.67	20,058.17
Gross Benefits (PBT)				70,188.04	249,425.39	282,433.88	318,743.23
Taxation (25% of PBT)				17,547.01	62,356.35	70,608.47	79,685.81
Net Benefit Flow (PADIT)				52,641.03	187,069.04	211,825.41	239,057.42

Summary of Cashflow

				Year 0	Year 1	Year 2	Year 3
Total cash inflow				337,500.00	742,500.00	816,750.00	898,425.00
Total cash outflow				422,931.38	426,372.54	482,500.54	529,172.99
Net cashflow				-85,431.38	316,127.46	334,249.46	369,252.01
Loan repayment				79,850.58	79,849.58	79,849.58	79,849.58
Cummulative cashflow				-165,281.96	70,995.93	325,395.81	614,798.24

Summary of Breakeven

				Year 0	Year 1	Year 2	Year 3
Total cost per batch of chicken				111.73	115.72	125.15	135.52
Average price per chicken				25.00	27.50	30.25	33.28
Number of batches to breakeven				4.47	4.21	4.14	4.07

Average breakeven				3.904	batches/yr	**4**	**batches/ yr**
						3,000	**chickens/ batch**
						18,000	**chickens/ yr**

Promotions: Advertising is essential for the success and growth of any poultry business as it will help farmers to identify and attract potential customers as well as build good relationship with them. Therefore, farmers should to promote broiler products well so that they make them appear to be different to others and that will increase the demand for their broiler products.

Packaging: Packaging is important not necessarily for protecting the product but for the profitability of poultry business. Targeted packaging will increase sales.

LAND

The farmer should secure land for broiler production. An assessment on the suitability of the land for broiler production should be conducted. The plot should not be located closer to rivers or streams as that may result in the pollution of water by chicken wastes during rainfall periods. Chicken runs located next to rivers and streams may expose broiler chickens to the dangers of floods.

Land specifications

Different specifications on the minimum land size required for broiler production depends on the size of the business

the farmer wants to run. For a broiler production project with 4000 chickens, a land measuring 150m × 150m will be required to accommodate structures and buildings needed. These are 2 poultry houses each measuring 25m × 8m, an 8m x 4m manager's house, 2.5m x 3m toilet and 4m x 4m storeroom. The distance between the poultry and residential houses should be at least 50m to 100m. Where the farmer intends to have an abattoir, an extra land measuring 40m × 40m can be

applied for at any convenient place but not adjacent to the rearing farm. In addition, the abattoir should be a kilometer away from poultry farms.

FIXED ASSETS

Key fixed assets required in broiler production are as per the attached Appendix 1. However, it should be noted that some assets may not be necessary for the project. Some can be hired from other farmers instead of purchasing them. For example, if it is cheaper to hire transport for the project, it will be better off not to purchase a farm vehicle. Materials required for structures and buildings can be sourced from hard-wares and stores specializing in selling agricultural products/inputs. It is advisable to note that prices for the required items vary greatly depending on where and when they are purchased. In this guideline, the average building cost is based on per m².

Average costs per m² are estimated as follows

- Building manager's house, toilet or storeroom = P1100.00/ m²
- Erecting 600m perimeter fence = P15/m
- Construction of a poultry house = P180.00/m²

Please refer to the attached Appendix 1 for other costs.

Equipments and tools

It should be noted that replacement of equipment and tools for poultry projects occurs periodically as and when needed. For example, pipes used for water reticulation are plastic made. Therefore, they may need frequent replacement as they can easily break or eaten by rats anytime. This makes replacement

Annual Depreciation

Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
600.00	600.00	600.00	600.00	600.00	600.00	600.00
3,600.00	3,600.00	3,600.00	3,600.00	3,600.00	3,600.00	3,600.00
144.00	144.00	144.00	144.00	144.00	144.00	144.00
94.50	94.50	94.50	94.50	94.50	94.50	94.50
1760.00	1760.00	1760.00	1760.00	1760.00	1760.00	1760.00
7000.00	7000.00	7000.00	7000.00	7000.00	7000.00	7000.00
500.00	500.00	500.00	500.00	500.00	500.00	500.00
810.00	810.00	810.00	810.00	810.00	810.00	810.00
14,508.50	**14,508.50**	**14,508.50**	**14,508.50**	**14,508.50**	**14,508.50**	**14,508.50**

0	2689.55	0	0	0	0	4331.55
0	2,359.40	0	0	0	0	3799.83
0	10,629.37	0	0	0	0	17118.70
0	4,614.11	0	0	0	0	7431.07
15,812.28	17,393.51	19,132.86	21,046.14	23,150.76	25,465.84	28,012.42
0	0	0	0	0	0	0
2,077.50	2,077.50	2,077.50	2,077.50	2,077.50	2,077.50	2,077.50
0	0	0	0	0	0	0
32,398.28	**54,271.93**	**35,718.86**	**37,632.14**	**39,736.76**	**42,051.84**	**77,279.57**

142,749.75	157,024.73	172,727.20	189,999.92	208,999.91	229,899.90	252,889.89
81,731.92	89,905.11	98,895.62	108,785.18	119,663.70	131,630.07	144,793.08
151,797.89	166,977.68	183,675.44	202,042.99	222,247.29	244,472.02	268,919.22
120,963.94	133,060.34	146,366.37	161,003.01	177,103.31	194,813.64	214,295.00
878.46	966.31	1,062.94	1,169.23	1,286.15	1,414.77	1,556.25
1,563.66	1,720.02	1,892.03	2,081.23	2,289.35	2,518.29	2,770.12
711.55	782.71	860.98	947.08	1,041.78	1,145.96	1,260.56
3,660.25	4,026.28	4,428.90	4,871.79	5,358.97	5,894.87	6,484.36
17,569.20	19,326.12	21,258.73	23,384.61	25,723.07	28,295.37	31,124.91
8,784.60	9,663.06	10,629.37	11,692.30	12,861.53	14,147.69	15,562.45
17,019.81	18,721.79	20,593.97	22,653.37	24,918.71	27,410.58	30,151.63
5,973.53	13,141.76	28,911.88	63,606.13	139,933.48	307,853.65	677,278.03
548,924.41	**603,816.85**	**664,198.54**	**730,618.39**	**803,680.23**	**884,048.26**	**972,453.08**
581,322.69	**658,088.79**	**699,917.40**	**768,250.54**	**843,416.99**	**926,100.09**	**1,049,732.66**

Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
988,267.50	1,087,094.25	1,195,803.68	1,315,384.04	1,446,922.45	1,591,614.69	1,750,776.16
988,267.50	**1,087,094.25**	**1,195,803.68**	**1,315,384.04**	**1,446,922.45**	**1,591,614.69**	**1,750,776.16**

FINANCIAL PROJECTIONS

Capital Investment/Fixed Costs

Item	Unit	Quantity	Unit Price	Year 0	Year 1	Year 2	Year 3
Fence	metre	600	15.00	9,000.00	600.00	600.00	600.00
Poultry houses	m2	400	180.00	72,000.00	3,600.00	3,600.00	3,600.00
Store room	m2	16	180.00	2,880.00	144.00	144.00	144.00
Toilet	m2	10.5	180.00	1,890.00	94.50	94.50	94.50
Farm house	m2	32	1,100.00	35,200.00	1760.00	1760.00	1760.00
Vehicle	van	1	70,000.00	70,000.00	7000.00	7000.00	7000.00
Refrigerator	fridge	1	5,000.00	5,000.00	500.00	500.00	500.00
Generator (back-up)	4.2 KVA 9HP	1	8,100.00	8,100.00	810.00	810.00	810.00
Total depreciation				**0**	**14,508.50**	**14,508.50**	**14,508.50**

Chick founts	fount	100	16.70	1,670.00	0	0	0
Chick feed trays	tray	100	14.65	1,465.00	0	0	0
Tube feeders	feeder	150	44.00	6,600.00	0	0	0
Manual drinkers	10l drinker	75	38.20	2,865.00	0	0	0
Labour (manager)	month	12	900.00	10,800.00	11,880.00	13,068.00	14,374.80
Transport costs (material)		1	3,000.00	3,000.00	0	0	0
Insurance	%	2.5%	83,100.00	0	2,077.50	2,077.50	2,077.50
Electricity (installation)			5,000.00	5,000.00	0	0	0
Total Investment/Fixed costs				**235,470.00**	**28,466.00**	**29,654.00**	**30,960.80**

Operational/Variable Cocts

Day old chicks	chicks	30,000	3.25	48,750.00	107,250.00	117,975.00	129,772.50
Starter mash	50 kg bags	480	116.30	27,912.00	61,406.40	67,547.04	74,301.74
Grower mash	50 kg bags	900	115.20	51,840.00	114,048.00	125,452.80	137,998.08
Finisher mash	50 kg bags	720	114.75	41,310.00	90,882.00	99,970.20	109,967.22
Stress pack	pack	30	20.00	300.00	660.00	726.00	798.60
Gumboro vaccines	doses	30	35.60	534.00	1,174.80	1,292.28	1,421.51
Newcastle vaccine	1000 doses	30	16.20	243.00	534.60	588.06	646.87
Wood shavings	70 kg bags	50.00	50.00	1,250.00	2,750.00	3,025.00	3,327.50
Labourers	month	12	1000	6,000.00	13,200.00	14,520.00	15,972.00
Transportation costs	month	12	500.00	3,000.00	6,600.00	7,260.00	7,986.00
Water	litres	2,075,850	0.01	5,812.38	12,787.24	14,065.96	15,472.56
Electricity	month	12	85.00	510.00	1,122.00	1,234.20	2,715.24
Total				**187,461.38**	**412,415.04**	**453,656.54**	**499,022.19**
Total Costs				**422,931.38**	**440,881.04**	**483,310.54**	**529,982.99**

Revenue				**Year 0**	**Year 1**	**Year 2**	**Year 3**
Broilers	chickens	27,000.00	25.00	337,500.00	742,500.00	816,750.00	898,425.00
Total				**337,500.00**	**742,500.00**	**816,750.00**	**898,425.00**

costs difficult to project due to variability from one farmer to the other and differences in ages of facilities.

Poultry house

In Botswana, a house with open sides is recommended for poultry production as it controls climate and allows air movement inside the house. It also promotes improved heat loss by evaporation and convection. In addition, curtains are recommended for use as it allows for air renewal and supply of oxygen.

The house should be easy to clean and provide of uniform conditions with temperature and gaseous environment controlled to optimum level. In addition, the house should be built such that it will guarantee protection for chickens from predators and good health for both human and chickens. Poor housing can lead to the collapse of the project regardless of how well it is managed.

The design and size of poultry house should be built based on the size of the flock purchased, the climatic conditions of the locality and the cost.

It is advisable to put up the building across prevailing winds, which is always from south to north position. This allows air to circulate into and out of the building. In Botswana, poultry house orientation should be from east to west position.

Concrete floor and spacing

A concrete floor is highly recommended because it assists in controlling parasites like mites, which hide in the soil and sore into chicken legs. The concrete floor should be easy to clean. In addition, adequate floor space should be provided for each

chick as that is essential to its growth, health, quality and general well being.

Stocking density and spacing

The recommended stocking density for broiler chickens follows

- 20 to 25 chicks/m² for day old chicks and
- 10 to 12 chicks/m² for 21 to 25 day old chicks.

Improper stocking density or overstocking will restrict chicken movement and this will negatively affect broiler performance as well as feed space availability and access to water. In addition, overstocking will cause leg problems, scratching; bruising and high mortality.

Sidewalls

Sidewalls should consist of a 25 to 70 cm brick wall with a 25cm wire mesh to the eaves. It may be made of bricks or congregated iron. Sidewalls should also incorporate an adjustable roll-down reinforced plastic curtain for use during brooding, cold weather and at night.

Shape of roof

Practically poultry houses built should have gable roof, with pitch varying from one quarter to one third. An overhang of 1m helps to protect the inside from windy rains and affords interior shade.

Length

There is no limit in the length of the house as it depends on the number of chickens to be accommodated.

SUMMARY OF KEY ASSUMPTIONS OF PRODUCTION (CONTINUED)

Operational costs (P)

Day old chick 3.25
Starter mash . . . . . .116.30 / 50kg bag
Grower mash . . . . . .115.2 / 50kg bag
Finisher mash . . . . . .114.75 / 50kg bag
Stress pack . . . . . .20.00 / 100 g
Gumboro vaccine . . . . . .35.60 /1000 vaccines
Newcastle vaccine . . . . . .16.20 /1000 vaccines
Protective clothing . . . . . .500.00 / person/ yr
Wood shavings . . . . . .50.00 / 70kg bag
Transportation costs . . . . . .500.00 / month
Water . . . . . .5.60 */ 10000 l*
Electricity . . . . . .85.00 / month
Packaging material . . . . . .5.00 / 100 chickens
Labour wages / P/ month 500.00
Manager/ P/ month 900

Loan

Institution . . . . . .CEDA
Interest 7.5%
Repayment period . . . . . .7 years
Amount (Yr 0 total cost) 422,931

SUMMARY OF KEY ASSUMPTIONS OF PRODUCTION (CONTINUED)

Farm assets and development costs (P)

Material transportation	3,000.00
Houses	1,100.00 m^2
Poultry structures	180.00 m^2
Fencing	15.00 m
Electricity (installation)	7,000.00
Vehicle	70,000.00
Generator (back -up)	8,100.00
Chich feed trays	14.65
Chick founts	16.70
Tube feeders	44.00
Manual drinkers	38.20
Refrigerator	5,000.00
Insurance	0 %
Price inflation	1.1 %

Depreciation (straight line method)

Houses	20 years
Poultry structures	20 years
Fencing	15 years
Vehicle	10 years
Generator (back -up)	10 years
Refrigerator	10 years

Width

The width of an open side house should not exceed 9 meters. A house wider than this will not provide ample ventilation during hot weather.

Height

The distance from the concrete floor to the roofline should be 2.5m - 3m to allow in fresh air. A house with wall height above this will prevent fresh air in resulting in chickens dying from suffocation.

Feed requirements

In Botswana, a three phase feeding program comprised of broiler starters' mash, grower's mash and finishers mash are the most widely practiced. Feeds represent over 70% of the cost of producing chicken meat. Therefore, only high quality feeds are recommended for various uses. That is to

1) ensure good performance of the broiler chicken
2) optimize feed efficiency and
3) generate profit on the farm.

Feed intake

In this guide, average feed intake for broilers from day old to slaughtering (6 - 7 weeks) is estimated to be 4 kg/chicken. During this period a range of feeds are given according to the age of the chickens. Refer to the table below.

Feed duration table

Type of feed	Broiler's age (days)	Duration of feeding (weeks)
Starter's mash	1 – 21	3 weeks
Grower's mash	22 – 35	2 weeks
Finisher's mash	36 – 42	1 week

Nutrition

Correct nutritional diet is the key to successful broiler growing as it provides chickens with energy and nutrients that are essential for health and efficient production. In addition, basic nutritional requirements like water, crude protein, energy, vitamins and minerals act to assure proper skeletal growth and muscle deposition of a chicken. Feeding chickens with incorrect diet can influence a chick's'

1) Final weight
2) Feed efficiency
3) Abdominal and carcass fat levels and
4) Breast yield

Water requirements

Broilers drink clean water about thrice the amount of feed they eat per day. However, it should be noted that water intake will increase in hot weather and when high protein ration is fed. Limiting water intake especially during hot weather conditions and after eating high protein ration will subsequently reduce feed intake and ultimately leads to growth retardation. In addition, drinking water that is too hot (>30°C) or cold (<10°C) should be avoided otherwise chickens will not drink it. Therefore, this guide recommends that water should be

Production

Average slaughter age . . . . . .6 weeks/ chicken
Resting period . . . . . .2 weeks/ batch
Production cycle . . . . . .8 weeks/ batch
Total batches . . . . . .6 per year
Mortality per flock 10%
Chickens sold . . . . . .4,500 / batch
Chickens sold . . . . . .27,000 chickens/ year
Chickens sold @ P 25
Starter mash/ chicken . . . . . .0.8 kg for 21 days
Grower mash/ chicken . . . . . .1.5 kg for 14 days
Finisher mash/ chicken . . . . . .1.2 kg for 7 days
Water/ chicken/ day . . . . . .1.648 l
Stress pack . . . . . .200 l for 1000 chicks
Gumboro vaccine . . . . . .100 g for 1000 chicks
Newcastle vaccine . . . . . .1000 ml for 1000 chicks
Labour months/ yr 12
Labourer/ house 1

SUMMARY OF KEY ASSUMPTIONS OF PRODUCTION

Project size

Initial flock . . . . . .5,000 chickens
Poultry farm length . . . . . .150 m
Poultry farm width . . . . . .150 m
Poultry houses 2
Poultry house length . . . . . .25 m
Poultry house width . . . . . .8 m
Store room length . . . . . .4 m
Store room width . . . . . .4 m
Toilet length . . . . . .3.5 m
Toilet width . . . . . .3 m
Manager's house length . . . . . .8 m
Manager's house width . . . . . .4 m
Chich feed tray . . . . . .1 tray for 50 chicks
Chick fount . . . . . .1 fount/ 50 chicks
Tube feeders . . . . . .3 feeders/ 100 chickens
10l Manual drinkers . . . . . .15 drinker/ 1,000 chickens
Flock size/ house 2,500

delivered to broilers at 10 - 12°C. In this guide, on average water intake from day old to slaughtering (6 - 7 weeks) is 12L/chicken/day. Therefore, farmers should ensure that there is a reliable source of clean and fresh water. Refer to the table below for daily and weekly water requirements per chicken per day.

Daily and weekly water requirements per chicken per day

Age (week)	Liters/ day	Liters /week
1	0.54	3.8
2	0.82	5.8
3	1.08	7.6
4	1.40	10.0
5	1.86	13.0
6	2.28	16.0
7	2.40	17.0
8	2.80	21.0

INFRASTRUCTURE

Electricity/Gas: It is essential to establish a poultry project where electricity or gas is available. Electricity or gas is needed for providing light and heat to broilers especially during brooding and cold periods throughout the rearing period. This will increase chickens' feed consumption rate as well as maximizing growth in the shortest possible time.

Telephone: Telephone is vital means for marketing the product to the current or potential consumers wherever they are located.

Roads: It is advisable that a poultry farm should have good and easy access to tarred or graveled roads to minimize

breakages. In addition, it will enable the farmer to transport inputs and outputs to and from the farm.

Market outlets: Accessibility and availability of market outlets within the vicinity of the project is very crucial for the success of the project.

Variable inputs

Variable inputs needed in broiler production are day old chicks, feeds, medication, water transportation, protective clothing, disinfectants, casual labour and wood shavings. Some of these variable inputs can be sourced from the Ministry of Agriculture and stores specializing in selling agricultural products.

Capital required

Establishing and running a project requires finance from the owners and/or various financial institutions and government programs. This guideline has assumed acquisition of a loan from Citizen Entrepreneurial Development Agency (CEDA). The loan amount applied for plus an interest of 7.5% would be payable over a 7 year period. The principal loan amount covers the entire project establishment and running costs for 12 months only. This guideline assumes availability of land as owner's contribution. Borehole drilling and equipment are not included, instead a ten thousand liter (10,000L) tank capacity is used to fetch water. (see Appendix 1 attached).

The broiler production financial projections attached in Appendix 1, are an outline of the project key assumptions, a budget of the entire project's requirement, summary of profit & loss, cash-flow and breakeven.

It should be noted that production details could vary from project to project and location to location. The key assumptions in this guideline include the project size, production level, costs, prices and loan. The budget of the entire project's requirement assumes that project establishment and all the necessary pre-production obligations will be met in 6 months. Stocking of day old chicks would start at the beginning of the seventh month. The production cycle is 8 weeks long. Therefore, the first batch of broiler chickens will be slaughtered and marketed at the end of the eighth month of year 0.

The summary of Profit and Loss statement and cash-flow assumes that loan amount required for the project would be P422,931.38. However, the cash-flow analysis shows that the project will be able to repay the loan from year 1 and subsequent years.

The financial analysis of the project is based on a 5000 broiler chickens' capacity of 6 batches annually making it a total of 30000 slaughter chickens a year. Breakeven is after 4 batches producing a total of 18,000 chickens for slaughter a year (see Summary of Breakeven Analysis attached).