THE POTENTIAL FOR COMMERCIAL MILK GOAT PRODUCTION IN THE ARID EASTERN CAPE REGIONS: ECONOMIC ANALYSIS OF THE PERFORMANCE INDICATORS

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Dairy goats appear to be the most suitable milk producing animal species for the arid parts of the Eastern Cape Province. Dairy goats fetch high net returns to a small-scale farmer. A study was carried out to evaluate the long-term economic viability of investments in dairy goats, in the Eastern Cape Province of South Africa. Results of the study show that commercial production of dairy goats, together with a milk processing plant in the region, would be profitable and would have benefits from both economic and social points of view as well as for the environment. With a discount rate of 15%, the Net Present Worth (NPW), Benefit/Cost ratio (B/C) and Internal Rate of Return (IRR) were found to be R4.3 million, 1.44 and 54% respectively. Further, a sensitivity analysis to changes in benefits and costs of inputs was conducted. This found the above proposal to be viable, even when benefits are reduced by 25%. The project proposal was still viable when cost of inputs was inflated by 25%. In both cases, the Benefit/Cost ratio is greater than 1 and IRR is greater than the current market rate of interest. However, the combined effect of reducing the benefit by 25% and inflating costs by 25%, would result in negative NPW. Results from a survey carried out further show the possibility and viability of producing satisfactory levels of milk from dairy goats in the Eastern Cape.

DIE POTENSIAAL VIR KOMMERSIËLE MELKBOKPRODUKSIE IN DIE DROË DELE VAN DIE 00S-KAAP: EKONOMIESE ANALISE VAN DIE PRESTASIE-INDIKATORE

Melkbokke blyk die mees gepaste diere te wees om melk in die droë dele van die Oos-Kaap Provinsie te produseer. Melkbokke behaal hoë netto winste vir die kleinboer. 'n Studie was onderneem om die langtermyn ekonomiese lewensvatbaarheid van beleggings in melkbokke in die Oos-Kaap Provinsie van Suid-Afrika te ontleed. Die resultate van die studie wys dat kommersiële boerdery met melkbokke tesame met 'n melkproseseringsaanleg in die omtrek winsgewend kan wees en sosio-ekonomiese en omgewingsvoordele kan inhou. Met 'n verdiskonteringskoers van 15% was die Netto Huidige Waarde (NHW), voordeel/koste verhouding (v/k) en die interne Obrengskoers (IOK) R4,3 m, 1,44 en 54% respektiewelik. 'n Sensitiwiteitsanaliese van veranderings in voordele en koste van insette is waargeneem. Dit het

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gewys dat bogenoemde voorstel korrek is al is voordele met 25% verminder. Dieselfde is geldig wanneer die insetkoste met 25% verhoog is. In beide gevalle is die v/k groter as 1 en die IOK groter as die heersende markrentekoers. Die gekombineerde effek van verminderde voordele en toenemende kostes sal egter tot 'n negatiewe NHW lei. Resultate van die opname bevestig dat melkbokboerdery 'n goeie boerderyvertakking in die Oos-Kaap kan wees.

1. INTRODUCTION

The semi-arid environment in the interior of the Eastern Cape Province naturally limits arable agricultural practices and but for limited pastoral livestock production (Steyn, 1988). Thus, except for the northern Transkei the predominant activity for rural farmers in this province is livestock production. Within the livestock sub-sector, small ruminants, especially goats, occupy a prominent position (Bembridge, 1989). The Eastern Cape is home to 22 million goats, which represents 78% of the total goat population in South Africa. Currently, most farmers in the province keep goats for meat production and, to a lesser extent, for milk (Milk Goat Project Report, 1996). For a variety of reasons, goat milk is not produced in large quantities. However, the nutritional value and benefits of goats milk have been widely documented (Haenlein 1996, Parkash *et al*., 1968). Goat milk is often used as a substitute for baby formula, particularly for those children allergic to cows' milk (Dozet, 1973 and Haenlein, 1996). Goat milk has a much lower cholesterol content than cows' milk and has other health enhancing factors not present in cow's milk (Gail, 1975 and Martin, 1982). In the Middle East, goat's milk constitutes an important part of most people's diets. In Europe and in some parts of North America, a niche market exists for cheeses which are either wholly or partially made from goat's milk (Haenlein, 1996).

A major aim of agricultural policy in South Africa is to improve the incomes, employment possibilities and the overall quality of life of the rural poor (White Paper on Agriculture, 1995). Smallholder farmers can have an important role to play in this regard. This can be achieved through intensification and diversification of production (Lasley *et al*., 1993). A principal advantage of production of goat milk on small farms is that goat milk is not in direct competition with cows' milk. Further, cows' milk is mainly produced on large-scale commercial dairy farms that have high technology inputs. Smallholder production in enterprises like goat milk should be supported so that the sector increases its market share on the South African market, especially for items that the sector can produce at a comparative advantage.

Towards the end of 1995 and beginning of 1996 an exploratory survey was conducted to assess the economic viability of goat milk production. The survey was conducted in fourteen districts of the former Ciskei and Transkei regions of

the Eastern Cape Province. These districts were: Alice, Middledrift, Fort Beaufort, Seymour, Jurieshoek, and Balfour from Ciskei and Engcobo, Port St.Johns, Ngqqeleni, Umtata, Qumbu, Xalanga, Tabankulu and Libode from Transkei. A total of 100 farm households that keep goats in one form or another were sampled using purposive sampling techniques. Households were interviewed using a structured questionnaire. Data from the exploratory survey was used to estimate input requirements, output, costs and returns per ewe and per farm for three model management systems (Table 1). Four goat flock-size scenarios (20, 40, 60 and 100) were considered. The main objective of this study was to evaluate the financial and economic viability and technical feasibility of commercial production of dairy goats including the establishment of a goat milk processing plant in the Eastern Cape Province.

2. ANALYTICAL TECHNIQUE

Three criteria commonly employed to evaluate the economic viability of private investment in any business are the Discounted Net Present Worth, the Internal Rate of Return and the Benefit/Cost Ratio (Mishan, 1972; Squire & Van der Tak, 1975; Irwin, 1978; Benjamin, 1981; Gittinger, 1982 and FAO, 1985). Using this information, the standard models for determining the profitability, or otherwise, of commercial production of dairy goats can therefore be written as follows:

(i) Net Present Worth $= \sum_{t=0}^{n} \frac{B_t - C_t}{(1+i)^t}$

(ii) The Internal Rate of Return is obtained by solving the above equation for i

$$\sum_{t=0}^{n} \frac{B_t - C_t}{(1+i)^t} = 0$$

(iii) The Benefit Cost Ratio $= \sum_{t=0}^{n} \frac{B_t / (1+i)^t}{C_t / (1+i)^t} = 0$

whereby:

B_t = benefits in each year t
C_t = costs in each year t
n = number of years to end of project
i = discount rate

A project is considered to be financially viable when (a) the NPW is positive, (b) the IRR is above the current discount rate and (c) the B/C is one and above. However, both NPW and B/C are problematic to employ in project ranking

Table 1: Estimated return per ewe/year and per farm/year in the Eastern Cape province (Rand)

	20 Goats		40 Goats		60 Goats		100 Goats	
	R/ewe/yr	R/farm/yr	R/ewe/yr	R/farm/yr	R/ewe/yr	R/farm/yr	R/ewe/yr	R/farm/yr
Good management system								
Scenario 1	2 344	46 877	1 144	45 760	944	56 640	744	74 400
Scenario 2	3 266	65 327	2 066	82 640	1 866	111 960	1 666	166 600
Av. management system								
Scenario 1	1 539	30 790	339	13 560	139	8 340	-160	-16 000
Scenario 2	2 259	45 190	1 059	42 360	859	51 540	659	65 900
Poor management system								
Scenario 1	1 083	21 661	-117	-4 680	-140	-8 400	-516	-516 000
Scenario2	1 698	33 961	498	19 920	298	17 880	98	9 800

Source: Computed from the survey data.

Note: a) Scenario 1 applies when a litre of milk is sold for R2.85 in supermarkets.
b) Scenario 2 applies when a litre of milk is sold for R3.65 locally.
c) Good management system is the one where the farmer is somewhat progressive in dairy goats production.
d) Average management system is where a farmer has a reasonable knowledge of dairy goats production.
e) Poor management system is where a farmer lacks basic knowledge of dairy goats products.

when the appropriate discount rates are not used in evaluation. Generally speaking, long gestation periods for projects lead to lower profitability for a given discount rate while short gestation periods improve it. It is also known that higher discount rates tend to lower the profitability of projects. The appropriate rate for government is the social discount rate, which is equivalent to the rate government pays to service its long-term loans (Mishan, 1972). On the other hand, the discount rate for the 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 NPW equals zero. The financial evaluation in this study employed the NPW, IRR and B/C with the following assumptions being made in the study:

i) Dairy goat production was considered together with a milk processing plant.

ii) It was assumed that dairy goat farmers could improve their financial returns if they processed part of the milk into cheese, ghee, yoghurt, ice-cream and powdered milk.

iii) Without the establishment of a milk processing plant, future returns for farmers would not significantly increase.

iv) The project would consist of 50 households, each owning 20 milking dairy goats. This assumption implies that the project would therefore have 1 000 milking goats. A milk processing plant would be established. The project would be co-operatively owned by the 50 households.

v) It was assumed that part of the milk produced would be processed into the various milk products and the remainder sold to supermarkets as raw milk.

vi) A zero land cost was used, as is the case under the traditional land tenure system in the communal areas

vii) It was assumed that the dairy goat project would be financed either through government grants, or through long-term soft loans, at subsidised interest rates. In these circumstances, a discount rate of 15% was used in the analysis.

viii) There would be a market for the milk and milk products and for the culled goats and for the excess male and female kids.

3. RESULTS

As can be seen from Table 1, dairy goat production under good management conditions is a profitable venture, regardless of flock size. Under average management practices, dairy goat production brings a positive return when the flock size is limited to 60. Nevertheless, for a poor management system, the flock size per farm household should not exceed 20, if positive returns are to be achieved. Over and above the production data collected in the survey, the possibility of establishing a milk processing plant, was also assessed by the study team.

Data from results of the exploratory survey suggest that the farmers' return from dairy goat production can be significantly improved if part of the raw milk is processed into ghee, yoghurt, cheese, ice-cream and powdered milk. This would necessitate the setting up of a milk processing plant. Besides improving farmers' returns, a processing plant would bring a number of benefits to the province, including creation of employment in milk processing, packaging and distribution, as well as the possibility of exporting dairy goat products, if sufficient volume of milk is produced and processed.

Table 2 gives a summary of dairy goat flock size projections for 16 years which is assumed to be the average life of the project. Tables 3-8 present the financial analysis of the dairy goat project under a good management system. Data used in this analysis were collected from the farmers during the exploratory survey, and from a small-scale dairy goat milk processing plant near Humansdorp, Eastern Cape Province.

Table 3 summarises the feed requirements based on the two commonly used feeds in milk goat production, milkmaster and lucerne. The cost incurred on these feeds is computed on a yearly basis. Short explanations as to how the feed requirement and the costs are computed are given in the footnotes.

Table 4 shows the income and cost flows from the dairy goat project, calculated after making assumptions as explained in the footnotes of Table 4. Table 5 shows the revenues and operating costs of the dairy goat project and Table 6 shows the on-farm investments for such a project. Table 7 gives the discounted cash flow analysis for the project under normal conditions.

Table 2: Dairy Goat Flock Size Projection

Particulars	Years							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8-16**
Dairy Goats (No)								
Beginning of year[1]	-	1 000	1 000	1 000	1 000	1 000	1 000	1 000
-Deaths[2]	-	-	30	10	20	20	20	20
-Culled[2]	-	-	100	120	127	166	166	166
+Female kids + transfer[3]	-	-	130	130	147	186	186	186
+Purchases of in-kidding goats	1 000	-	-	-	-	-	-	-
End of year	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Kids under 1 yr (No)								
Kids born[2]	-	700	635	800	800	800	800	800
-Deaths	-	49	57	72	64	64	64	64
-Male kids sold[4]	-	326	229	364	368	368	368	368
End of year, female kids	-	325	288	364	368	368	368	368
Female kids 1-2 yrs (No)								
Beginning of year[5]	-	-	325	288	364	368	368	368
- Deaths[6]	-	-	-	-	-	-	-	-
- Sold[7]	-	-	195	158	217	182	182	182
- Transferred	-	-	130	130	147	186	186	186
Technical coefficients (%)								
Kidding rate[2]	-	70	73	80	80	80	80	80
Kid mortality	-	7	9	9	8	8	8	8
Dairy goats mortality[6]	-	-	3	1	2	2	2	2
Dairy goats culling rate	-	-	10	12	13	17	17	17

Sources: Computed from survey data.

1) Transfer end of year number of in-kid dairy goats from preceding year.
2) Apply mortality, culling and kidding rates in beginning of year stock.
3) Transfer residual number of 1-2 yr. old female kid from the same year (after completing the female kid computations).
4) Kids born minus deaths, divided by 2, if odd no, round down.
5) Transfer end of year (1-2 yrs old) female kids from preceding year.
6) For simplicity reasons assume that mortality applies only to dairy goat.
7) Sell as many as are not required to keep number of dairy goats at 1 000.

Table 3: Dairy Goats composition and production

Year	1	2	3	4	5	6	7	8-16
Flock size composition (No)								
Dairy goats	-	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Kids born	-	700	635	800	800	800	800	800
Female kids 1-2 years	-	-	325	288	368	368	368	368
Rams/Billy	1 000	25	25	25	25	25	25	25
Purchases (No)								
Dairy goats (in-kid)	-	-	-	-	-	-	-	-
Rams	25	-	-	-	-	-	-	25
Deaths (No)								
Dairy goats	-	-	30	10	20	20	-	20
Kids	-	49	57	72	64	64	20	64
Sales (No)								
Culled dairy goats	-	-	100	120	127	166	166	166
Male kids	-	326	229	364	368	368	368	368
Female kids	-	-	195	158	217	182	182	182
Milk production (100 lts)								
Per dairy goat[1]	-	11.25	12	12	12	12	12	12
Total	-	7 875	7 620	9 600	9 600	9 600	9 600	9 600
Less: Kid milk[2]	-	650	650	576	576	576	576	576
Home consumption]	-	500	500	500	500	500	500	500
Net production	-	6 725	6 470	8 524	8 524	8 524	8 524	8 524

Source: Computed from survey data
1) per dairy in lactation (equal to number of kids born)
2) 200 lts per female kid reared
3) 1 000 lts per household per year

Table 4: Feed requirements and costs of feed

Years	1	2	3	4	5	6	7	8-16
Milk Master								
Milk produced (100 lts)	-	7 875	7 620	9 600	9 600	9 600	9 600	9 600
Milk master required (100 kg)[1]	-	3 998	3 810	4 800	4 800	4 800	4 800	4 800
Lucerne								
Milk produced (00 lts)	-	7 875	7 620	9 600	9 600	9 600	9 600	9 600
Lucerne required (00 kg)[2]	-	4 500	4 500	4 500	4 500	4 500	4 500	4 500
Costs of Feed								
Cost on milk master (R000)[3]	-	4 568	4 420	5 568	5 568	5 568	5 568	5 568
Cost on lucerne (R000)[4]	-	900	900	900	900	900	900	900
Total Feed cost (R000)	-	5 468	5 320	6 468	6 468	6 468	6 468	6 468

Source: Computed from survey data.
1) A dairy goat is given ½ kg of milk master for every litre of milk produced.
2) A dairy goat is given 1.5 kg of lucerne per day.
3) 100 kg of milk master costs R116.00
4) 100 kg of lucerne costs R20.00

Table 5: Project revenue and operating costs

Year	1	2	3	4	5	6	7	8-16
Revenues[1]								
Culled dairy goats	-	-	9	10.8	11.43	14.94	14.94	14.94
Sale of male kids	-	28.36	19.92	31.67	32.02	32.02	32.02	32.02
Sale of female kids	-		35.1	28.44	39.06	32.76	32.76	32.76
Subtotal		28.36	64.02	70.91	82.51	79.72	79.72	79.72
Sale of milk[2]								
Raw milk sale	-	1 489	1 801	2 386	2 386	2 386	2 386	2 386
Sale of Milk Products[3]								
Yoghurt	-	137.5	137.5	137.5	137.5	137.5	137.3	137.5
Ice cream	-	125	125	125	125	125	125	125
Soft cheese	-	97.5	97.5	97.5	97.5	97.5	97.5	97.5
Gouda cheese	-	50	50	50	50	50	50	50
Powdered milk	-	30	30	30	30	30	30	30
Butter	-	33.25	33.25	33.25	33.25	33.25	33.25	33.25
Subtotal	-	473.25	473.25	473.25	473.25	473.25	473.25	473.25
Total	-	1990.61	2338.27	2930.16	2941.76	2938.97	293.97	2938.97
Operating costs								
Manager [3]	-	30	30	30	30	30	30	30
Other support staff [4]	-	91.8	91.8	91.8	91.8	91.8	91.8	91.8
Feed costs	-	546.8	532	646.8	646.80	646.8	646.8	646.8
Vet. services [5]	-	240	240	240	240	240	240	240
Total	-	908.6	893.8	1008.6	1008.6	1008.6	1008.6	1008.6

Source: Computed from survey data.

1) Culled goat @R90; Male kid @ R87; Female kid @ R180.
2) Raw milk @ R2.85/lt; Yoghurt @ R5.50/lt; Ice-cream @ R10/kg; Gouda cheese @ R25/kg; Soft cheese @ R26/kg; butter @ R19/kg and powdered milk @ R48/kg.
3) Manager at R30 000 per year
4) Support staff includes secretary, driver, cleaners, messenger, ordinary workers and security guards.

5) Vet services at R240/dairy goat and follower.

Table 6: On-farm investment and working capital

Item	Unit	Quantity	Unit Cost	Total Cost
On-Farm Investment				
- In-kid dairy goats[1]	No	1 000	1 000	1 000 000
- Billy (Ram)[1]	No	50	800	40 000
- Milk processing plant[1]	-	1	120 000	120 000
- Accessories to the plant	No	-	175 000	175 000
- Processing plant shed	No	1	70 000	70 000
- Store room	No	1	50 000	50 000
- Light vehicle	No	1	120 000	120 000
- Heavy duty vehicle	No	1	170 000	170 000
- Contingency[2]				
- Total investment				1 895 000

Working Capital	Year							
	1	2	3	4	5	6	7	8-16
Operating costs	908.6	893.8	1008.6	1008.6	1008.6	1008.6	1008.6	1008.6
Maintenance cost [3]	-	-	379	379	379	379	379	379
Electricity, water & telephone[4]	140	140	140	140	140	140	140	140
Marketing, handling costs	120	120	120	120	120	120	120	120
Total	1 168.6	1 532.8	1 647.6	1 647.6	1 647.6	1 647.6	1 647.6	1 647.6

Source: Computed from survey data

1) 1 000 dairy goats and 25 Billys all in year 1 and the remaining 25 Billys will be brought in year 8.
2) Contingency cost is an amount included to allow for adverse conditions that will add to the on-farm investments.
3) Maintenance cost is 20% of total on-farm investment and maintenance begins from year 3.

4) It is assumed that the processing plant will get electricity from a nearby electricity line.

Table 7: Calculations of Net Present Value ('000 Rands) and Internal Rate of Return under normal conditions

Year	Total flow of costs	Total flow of benefit	Discount factor 15%	Present worth of cost	Present worth of benefits
1	1 895	0	0.870	1 648.61	0
2	1 168.6	1 990.61	0.756	883.46	1 504.90
3	1 532.8	2 338.27	0.658	1 008.58	1 538.58
4	1 647.6	2 930.16	0.572	942.43	1 676.05
5	1 647.6	2 941.76	0.497	818.86	1 462.05
6	1 647.6	2 938.97	0.432	711.76	1 269.63
7	1 647.6	2 938.97	0.376	619.50	1 105.05
8	1 647.6	2 938.97	0.327	538.76	961.04
9	1 647.6	2 938.97	0.284	467.92	834.67
10	1 647.6	2 938.97	0.247	406.96	725.92
11	1 647.6	2 938.97	0.215	354.23	631.88
12	1 647.6	2 938.97	0.187	308.10	549.59
13	1 647.6	2 938.97	0.162	266.91	476.11
14	1 647.6	2 938.97	0.141	232.32	414.39
15	1 647.6	2 938.97	0.123	202.65	361.49
16	1 647.6	2 938.97	0.107	176.29	314.47
Total				9 587.38	13 825.82
Net present worth (NPW)				+4 238.44	
Benefit cost ratio (B/C)				+1.44	
Internal rate of return (o/b) (IRR)					

Source: Computed from Tables 3-7.

4. DISCUSSION AND SENSITIVITY ANALYSIS

From the results in Table 7, it was estimated that the IRR in the dairy goat project would be 54%. For the same project, the NPW and B/C were R4.2x10^6 and 1.44, respectively. The NPW, B/C and IRR were all financially sound for the dairy goat project. The results show that the project, if implemented in line with the foregoing assumptions, would have a positive NPW based on the social and economic considerations. It can therefore be concluded that the project has social and economic merits which would include empowering rural communities through job creation and employment in milk goat production; increased liquidity of rural communities to improved capital to spend on nutrition, education and other household expenditures and this subsequently will lead to improved demand for goods on the domestic market. If successful, a got milk processing plant will not only produce for niche market in the Eastern Cape Province, but also for national and international markets.

The most critical variables that can affect the project are the prices of milk, dairy products and the overall increase of costs of inputs. A sensitivity analysis was carried out to determine the effect marginal changes in the price of milk, milk products, the goats themselves and input cost variables would have on the project. The following arbitrary scenarios were considered:

i) Benefits reduced by 25%

ii) Costs inflated by 25%

iii) Combined effects where benefits are reduced by 25% and costs are inflated by 25%

In scenario (i), the project would be sensitive to the reduction of benefits which is likely to result from changes in prices as production increases, assuming all other things remain constant. As can be seen from Table 8, a reduction of benefits by 25% could cause the IRR to fall from 54% to 24%. The project is therefore fairly sensitive to changes in prices of goats, goat milk and milk products. In scenario (ii), a similar assessment was made by assuming that the costs are inflated during the life of the project. As shown in Table 8, a 25% increase in costs results in a drop of the IRR from 54% to 30%. This generally indicates that the project is less sensitive to increase in costs than to a reduction in benefits. In scenario (iii), the combined effects include reduction of benefits by 25% and increase of cost by 25%. As can be seen from Table 8, the effects of the two variables combined will result in a negative NPW and a C/B ratio of less than one. This simply indicates that the project is very sensitive to the combined effects, to the extent that it becomes non viable.

Table 8: Summary of Discounted Cash Flow Analysis of the Dairy Goat Project ('000 Rand)

Measure	Normal conditions	Benefits reduced by 25%	Costs inflated by 25%	Combined effect-costs inflated by 25% and benefits reduced by 25%
Present value of costs	9 587.38	9 587.38	1 1984.24	11 984.24
Present value of benefits	13 825.82	10 369.49	13 825.82	10 369.49
Net present worth (NPW)	4 138.44	782.11	1 841.58	-1 614.75
Benefit cost ratio (B/C)	1.44	1.08	1.15	0.86
Internal rate of return (1/0) (IRR)	54	23.95	30.38	-

Source: Computed from Tables 3-7.

5. CONCLUSIONS

From the data presented in this study, it appears that smallholder participation in commercial production of dairy goats could play a significant role in creating jobs and improving the financial well-being of small-scale farmers. The project was found to be economically sound and financially viable. The sensitivity analysis shows that milk production with dairy goats in smallholder farming systems in the Eastern Cape Province of South Africa can be a viable proposition, even when production costs increase by 25% or when the benefits are reduced by 25%. The evidence from this study is strongly supportive of the idea of promoting this enterprise in this part of the country where employment opportunities are very limited and household incomes generally low and income from farm-based activities is, in most cases, less than 20% of total household income (Bembridge, 1987).

An important added advantage is that this would not be a new cultural practice being introduced. The people in this area have reared goats for many decades and goats form a natural part of the agricultural economy of the area, even under traditional practices. The fact that there is not much of a tradition of consuming goat milk amongst the local population could also be an advantage, in the sense that milk production for profit is not likely to come into conflict with any possible need to satisfy household requirements first. It would also be an activity that is consonant with the natural resource base of relatively low rainfall and the adapted vegetation species, mainly scrub acacia, a perennial high protein browse which is a favourite with goats. It would thus also be an environmentally sensitive and appropriate land-use. Further, goats are already a readily available resource in the Eastern Cape Province which, from a milk production perspective, is currently underutilised. A viable milk goat project would assist towards employment creation and income generation, especially if production levels can be brought to a level where they can support a processing factory to add value to the milk. Also, in those cases where it may be considered prudent to start it off as a cottage industry, the capital outlay required to set up a processing unit for making cheeses and yoghurt, for example, is relatively low and would be within the means of most small-holder farmers. If it could only be supported by a loan scheme, there is evidence that the financial commitments can be sustained even by a production system based on a herd of 20 goats per household. A co-operative approach, if acceptable to the farmers, would no doubt help them to quickly garner the level of resources needed to support a larger production system and achieve reasonable economies of scale.

Even in the face of these positive indications of viability it would be wise to start the project as a pilot project involving a limited number of participants before

introducing it province-wide. A vigorous training and support programme for farmers would also need to be put in place, supported by appropriate extension services.

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