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WORKING PAPER

**Smallholder Dairy Production and Marketing in Zimbabwe:  
A Socio-Economic Study of the Gokwe, Rusitu and Marirangwe Dairy  
Development Projects**

By

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## **ABSTRACT**

*Focus on agricultural development in Sub-Saharan Africa has seen a shift towards the smallholder sector, which is home and employment provider to more than 70 percent of the population. However, on-the-ground realities and the viability status of enterprises within this sector remain largely un-probed research areas. This paper, which is based on case studies of three dairy development projects in Zimbabwe, presents results of a socio-economic analysis of the real state, constraints and opportunities vis à vis the performance of the smallholder dairy sector. Through a Gross Margin Analysis at farm level, the study established that smallholder dairying in Zimbabwe is hardly viable. Identified constraints to production include labour bottlenecks, an inadequate feed base, poor breeding practices and production inefficiencies. However, problems arising from limited markets, narrow product bases, recurrent droughts and stringent economic reforms have had more devastating effects on viability in the smallholder dairy sector. Established opportunities for improvement include the production and utilization of home-grown feeds, appropriate mechanisation, use of a controlled and well targeted breeding programme, aiming at economic and efficient production, as well as the re-integration of technical and socio-economic issues in rural development programmes in order to achieve sustained rural development.*

## INTRODUCTION

### *Background*

Due to a historical legacy, the Zimbabwean agricultural sector remains characterised by dualism which is reflected in land quantity and quality, gross income and wealth inequalities between and within agricultural sub-sectors and population groups. The dual agro-industry comprises the large scale commercial farming sector and the smallholder farming community. While production in the large scale commercial sector is under conducive environments, production in the smallholder agricultural sector tends to be done under a completely different context. This sector, which consists mainly of resource-poor farmers comprising over 70 percent of the country's agricultural producers, encompasses the small scale commercial, resettlement and communal farming areas. While the land tenure systems in the three sub-sectors are different, they share common production problems in terms of their location in marginal agro-ecological regions with poor and erratic rainfall, infertile soils, low potential crops and animals and an overall risky production environment. This sector is also characterised by heavy reliance on family labour, a generally poor resource base and technologies used, under-developed infrastructures, weak institutional support and low production levels.

### *Development of Smallholder Dairying*

As one way of addressing these gross inequalities, the Zimbabwean Government established a smallholder targeted Dairy Development Programme (DDP) in 1983. The major objective of the programme was to use smallholder dairying, through enhanced milk production and marketing, as a tool for rural development (Government of Zimbabwe, 1987). This was also designed to involve smallholder farmers in commercial dairying. Prior to this establishment, market-oriented dairying was the sole prerogative of farmers in the large scale commercial sector. Chavunduka (1982) noted that smallholder milk production before independence was basically for subsistence purposes and there were no exotic breeds kept by the smallholder farmers. Thus, in addition to the objective of developing the rural sector, this programme was also seen as a way of fulfilling the government policy of growth with equity. Since the inception of the programme, DDP has established and currently supports (financially, technically or otherwise) 10 smallholder dairy projects in five provinces of the country. However, despite these various efforts, established smallholder dairy enterprises are still characterized by low productivity (Mache, 1994; Jingura and Hanyani-Mlambo, 1995). This has also raised serious concern over overall enterprise viability.

### *Study Focus and Justification*

Livestock production systems are an important component in local economies at both the national and farm household level, where cattle constitute the main livestock species kept by farmers. Specifically, the dairy sub-component has proved to be practically vital, especially in the smallholder sector where it is an important source of protein to young children and supplementary income to often cash-starved farm households. Further to this, due to the large numbers of current and potential producers, the smallholder dairy production system has the greatest potential and thus provides the best basis for increasing national dairy production. However, despite the importance of smallholder dairying in both the macro and micro economies, past and current field research studies and intervention programmes have portrayed biases by favouring crops over livestock systems, and technical over socio-economic issues. There also appears to be very little literature on the economic outlook of smallholder dairy enterprises in Zimbabwe and the entire Sub-Saharan African region. A few earlier attempts, such as studies by Mupunga (1994) and Dube (1995), have focused restrictively on economic analysis of smallholder dairying at project or scheme level with gross detail deficiencies about what happens at farm level. This justified a study that sought to critically assess (from a socio-economic perspective) the viability and the nature of constraints and opportunities at the individual smallholder dairy farm level, with the overall objective of generating information to facilitate the running of current smallholder dairy projects as well as for the planning of future projects.

## RESEARCH CONTEXT AND METHODS

### *Research Context*

The research study was carried out within the context of three DDP initiated projects namely: the Gokwe Dairy Development Project in the Midlands Province, Rusitu Dairy Resettlement Scheme in Manicaland and Marirangwe Small Scale Dairy Scheme in Mashonaland East Province. Various characteristics of the three research areas are given in Table 1 below.

Table 1: Characteristics of the Individual Research Areas

<u>Characteristics</u>	<u>Gokwe</u>	<u>Rusitu</u>	<u>Marirangwe</u>
Farming Area Classification	Communal	Resettlement	Small Scale
Agro-ecological Region*	III and IV*	I*	IIa and IIb*
Average Rainfall	450-800mm	1000-1600mm	600-1000mm
Average Temperature	22°C	25°C	29°C
Average Land Holding	7.3 ha	4.0 ha	91.5 ha
Major Agricultural Production Enterprise	Cotton	Dairying	Maize
Smallholder Dairy Project Inception	1994	1986	1985
No. of Active Smallholder Dairy Producers	35	216	9

- \* Agro-ecological Regions are classified according to climate and the potential of production, with Region I having the highest potential and Region V the least.

With the exception of Rusitu, which was established as a special smallholder dairy resettlement scheme, the main agricultural activity in the research areas is dryland crop farming supported by livestock production. This farming system is a product of years of innovation and adaptation to the environment, which experiences unimodal rainfall accompanied by a rather long dry season (stretching from April to October). The dairy herds themselves are composed of pure breeds and crosses of Red Dane, Friesian, Jersey, Holstein and Mashona cattle. However, the different production contexts, establishment periods and experiences, as well as variant marketing environments and management structures in these three projects make the selected projects different, which justify their selection. The three projects are also largely representative of smallholder dairy projects in Zimbabwe.

### *Research Methods*

The target population for the study was defined as consisting primarily of all smallholder dairy farmers in Gokwe, Rusitu and Marirangwe. Farmer selection for the detailed case studies followed a stratified random sampling method to produce a sample of  $\pm 10$  dairy producers from each research area. Stratification criteria included gender, resource endowments, agricultural qualifications and experience, with the aim of making the selected farmers a representative sample of the population under study.

The overall research methodology was constituted by different but complementary research methods. Using secondary data, two questionnaires were developed. The first questionnaire, designed in the format of an informal survey checklist, was used to collect data on the production and marketing contexts, constraints, opportunities and perceptions on the performance of smallholder dairy enterprises. Information on farm-level dairy enterprise costs and revenues, meant to cover the scope of one production season: the 1996/97 season, was collected using a different full structured questionnaire. Both questionnaires were developed, pre-tested and adapted before use in the respective research areas. Specific data collection techniques used included a review of farmer kept records, direct questioning and discussions with members of farm households and DDP personnel. A total of 29 dairy farmers, comprising an average of 10 dairy producers from each research area were interviewed. Of these, 23

(representing 79.3 percent) were men, while the remaining 6 (20.6 %) were women. In all cases, informal discussions and participant observations were employed as techniques of verifying collected data. The study also benefited from information from desk studies of published and grey literature on socio-economic studies done in other project areas and outside countries.

The actual economic analysis was based on the Gross Margin Analysis, in which the gross margin serves as the unit of analysis in evaluating the economic performance of an enterprise. Johnson (1985) defines the gross margin as the difference between the value of an enterprise's gross output and the marginal cost of that production. In the analysis, the value of the gross output (gross revenue) included the value of sales of milk and dairy stock, as well as the value of milk consumed on the farm and products transferred to other farm enterprises. The marginal cost of production are the enterprise variable costs, which vary with the size of the enterprise. Obvious enterprise variable costs such as bought-in feed costs were calculated on the basis of financial prices, while non-priced particulars such as the use of farm produced grain were calculated using economic prices and based on the Opportunity Cost Principle, as adapted from Hill (1990). Throughout the entire research process, poor record keeping at farm level acted as a constraint.

## RESULTS

### SMALLHOLDER DAIRY PRODUCTION

#### *Herd Size and Dynamics*

Dairy herd sizes within individual dairy projects and farm households differ markedly. The table below illustrates this fact.

Table 2: Comparative Dairy Herd Distribution and Composition.

Dairy Cattle Class	Average Numbers Per Dairy Cattle Classes Per Farm Household					
	Gokwe <sup>3</sup>		Rusitu <sup>2</sup>		Marirangwe <sup>1</sup>	
	x	s <sub>n</sub>	x	s <sub>n</sub>	x	s <sub>n</sub>
Bulls	0.3	0.5	0.1	0.3	1.2	0.8
Steers	0.4	1.0	0.5	0.7	4.2	2.2
Cows	1.8	1.5	3.3	3.3	10.7	6.5
Heifers	1.0	1.2	1.2	0.8	5.3	3.6
Calves	1.2	1.4	2.4	1.3	6.7	3.7

Sources: <sup>1</sup> Survey Results; July 1997; <sup>2</sup> Dube (1995); <sup>3</sup> Hanyani-Mlambo (Forthcoming).

Legend: x = mean                      s<sub>n</sub> = standard deviation

Due to their longer establishment histories, Rusitu and Marirangwe tend to have on average more dairy animals than the recently established Gokwe Dairy Project. There also appears to be a marked difference between Rusitu and Marirangwe dairy herd sizes. Social interfaces in Rusitu, as expatiated later, have seen a declining interest in dairy production and a diversification-cum-divergence into activities such as coffee production. 1995 figures show that four percent of the settlers had no dairy cattle despite their continued residence in the dairy resettlement scheme (Dube, 1995). Settlement and production in the scheme is also based on temporary permits which gives settler farmers a sense of insecurity and discouragement to any ideas to increase dairy herds. The other major reasons why the average dairy cattle per farmer figures are still below the targeted levels includes the 1992 and 1994 droughts which resulted in the death of a lot of cattle countrywide, high mortalities due to poor animal health management practices and lack of capital to purchase additional dairy animals. In all smallholder dairy schemes, credit can be sourced from the Agricultural Finance Corporation, commercial banks or local savings

clubs. However, a serious handicap farmers face, and especially a problem with the poorer of emergent farmers, is the lack of collateral by these resource-limited current and aspiring smallholder dairy farmers which excludes them from taking advantage of several credit facilities.

### *Breeding*

The breeding programmes followed in the different project areas also differ markedly. Almost 95 percent of farmers in Rusitu rely on an artificial insemination programme, while smallholder dairy producers in Marirangwe make use of individual bought-in exotic bulls. In Gokwe, the DDP has a full breeding programme where Red Dane bulls are kept and managed by farmer groups. Classical examples of poor breeding practices are cases where dairy cows and heifers run around with both dairy and indigenous bulls resulting in uncontrolled breeding and/or progeny of inferior quality. Recommendations for cross breeding and use of progeny as dairy animals have also been poorly adopted. Most farmers are of the perception that the high producing, but disease prone, fragile and attention demanding, exotic dairy animal is the best.

### *Calf Rearing*

Gokwe and Marirangwe smallholder dairy farmers basically follow calf rearing recommendations based on a modification of the Henderson Calf Rearing System (Oliver, 1987). This is basically a restrictive feeding system where weaning is set at day 35. Calf rearing in Rusitu, on the other hand, is based on a combined product of modifications from the Henderson and Kenya Calf Rearing Systems (Oliver, 1987; Osuji, Khalili, Umunna, Sibanda and Shenkoru, 1995). This modification was developed after observations that most farmers had indigenous animals with small growth rates, making the Henderson system incompatible. It is worth noting, though, that the actual individual farmer calf rearing practices in all the dairy development projects are usually a re-invention of the innovation since most farmers follow practically different feeding schedules in practice. Once weaned, all female calves are kept as replacement heifers, while almost all male calves are culled, exchanged or sold to neighbouring smallholder dairy farmers.

### *Milk Production*

All encountered smallholder dairy production systems are manual operated, where milking is done by hand, and an operation often done twice a day. Production on most smallholder farms heavily relies on family labour. However, where cash is available extra labour is hired from outside. Where cash is a constraint, farmers have been known to employ various labour shortage coping strategies (Hanyani-Mlambo, Forthcoming). Milk production levels vary between different project areas, and within the project areas this varies between different farm households. According to the survey results, the average daily milk production per cow in lactation in Gokwe is 10 litres. This variable is 8 litres per cow per day in Rusitu and 4 - 6 litres per cow per day in Marirangwe. Milk production levels also vary between different dairy breeds. On average, pure breed cows produce 13 litres per cow per day. The respective figures for crossbreds and indigenous cows is 8 and 4 litres, respectively.

A number of production constraints are seriously affecting smallholder dairy production. In addition to the already highlighted problem of lack of capital to acquire more dairy animals, a lot of farmers face difficulties in sourcing suitable breeds and end up using any that come their way. Most bought-in heifers and cows tend to be condemned animals, making smallholder dairy projects dumping grounds. Other factors hampering milk production include an inadequate feed base, high costs of bought-in feeds, shortage of liquid cash and poor on-farm records. Farmers have also been failing to cope and adjust to the heavy labour demands of a dairy enterprise. Labour shortages have been long established as the most limiting factor in smallholder agricultural production (Ruthenberg, 1980). The smallholder dairying scenario in Rusitu has also been marred by a host of socio-political interfaces emanating from power struggles between the project management team and leaders of a faction of the local dairy farmers association.

### *Feeds and Feeding*

Dry season feeding is a problem throughout the tropics and Zimbabwe is no exception. Bought-in concentrates are mainly used as supplements for dairy animals. These are mixed with crushed maize grain as basic or supplementary feed. Feeding is usually twice a day where lactating cows are fed during milking. The actual feeding regimes vary from farm to farm, where feeding can be according to production, season or simply based on a flat rate. Grazing is in private paddocks or on common pastures, usually located in very marginal areas where there is poor sward growth and species composition. Poor grazing resources and the high cost of supplements, problems intensified by recurrent droughts, has led some dairy producers to develop the tendency of following the false economy of restrictive cow feeding in the hope of saving cash on feed purchases. In some cases, low milk producer prices have acted as a disincentive, forcing farmers to restrict their feeding.

### *Fodder Production*

Various fodder crops, including grasses such as napier and bana (*Pennisetum purpureum*) and legumes such as lablab (*Lablab purpureus*) have been established solely for purposes of dairy cattle feeding. These are fed as greens, or conserved and fed as silage or hay. However, not all dairy producers have made the effort to establish pastures. Where fodder production has been attempted or is in progress, the situation is characterized by a great disparity between the herd size and fodder base. In all cases, fodder banks are never enough to feed dairy animals throughout the production season. Shortage of land has been a major constraint to fodder production since dairy competes with other livestock, cash and subsistence crops for this limited resource. In addition, the more widespread constraints of labour bottle-necks and draught power shortages have also set in, greatly hampering fodder production. Once grown, farmers have also faced problems in trying to process or conserve forages due to lack of appropriate machinery.

### *Herd Health*

The major herd health problems are tick-borne diseases. Common tick-borne diseases are gall sickness, red-water and heart-water. These diseases are greatly intensified by infrequent dipping. Other common dairy cattle diseases include mastitis, calf scours, foot rot, orf and ophthalmia. High mortalities have been prevalent in Rusitu, with dairy cattle deaths averaging 50 per month. The mortality rate in Gokwe, which recorded 26 deaths during the 1995/96 production season, is also relatively high. In comparison, the mortality rate for Marirangwe, which is estimated at 2%, is fairly low. The Department of Veterinary Services and extension workers help farmers with cattle treatments and vaccinations. A more common herd health practice among farmers is the deworming of animals which is often done twice a year at the onset of rains and when animals are put on crop residues at the end of the rainy season.

## **SMALLHOLDER DAIRY MARKETING**

### *Milk Collection and Deliveries*

The bulk of farm produced milk is delivered usually twice a day to the local Milk Collection Centre (MCC). Total milk deliveries average around 1700 litres per day in Rusitu, 1200 litres/day for Marirangwe and 280 litres/day for Gokwe. Afternoon milk is normally sold locally as fresh or sour milk, while varying quantities are reserved for home consumption. A constraint to the process of delivering milk has been the steep terrain in mountainous areas and the long distances between the farms and collection centres. This delivery distance averages 12.5 kilometres in Gokwe (on a range of 0.9 km to 35 km). The respective average distances are 2 km (0.8 - 4 km) and 4 km (0.4 - 18 km) for Rusitu and Marirangwe respectively. Because of the relatively long distances, transport costs have also tended to be higher due to higher fuel costs, more wear, and higher maintenance and replacement costs. This situation is aggravated by the existence of a poor milk collection network and poor infrastructural development.

### *Milk Marketing*



The inception of smallholder dairying has seen the introduction of formalised milk marketing, in addition to traditional localised sales and consumption. Built on this historical origin, a dual milk marketing system has developed in the smallholder dairy sector. There is thus in existence basically two major markets for smallholder produced milk namely; the local market which is based on local milk demand and an external market in the form of Dairibord Zimbabwe Limited (DZL). This differs from production in the large scale commercial dairy sector, which is wholly external market oriented, with almost 99 percent of total milk output delivered and sold to DZL. Demand for locally produced milk products is relatively high, with demand outstripping supply throughout a large part of the dry season. This has been a source of much encouragement in the smallholder dairy sector.

#### *Pricing*

Pricing for DZL collected milk is based on a basic price and premiums or penalties depending on the quality of delivered milk. Premiums are paid for quality in excess of the set standard and penalties apply to milk of a lesser quality. For dairy projects which do not market through DZL, prices are simply set by members of the marketing committee. In general, locally marketed milk enjoys much higher prices compared to prices offered by DZL or local MCCs. See table 3. The MCC producer price is the price offered to farmers after deductions of MCC running costs, while the local price is that charged by individual farmers during informal marketing.

Table 3: Comparative Milk Producer Prices

Outlet Channel	Milk Producer Price [ \$/litre ]		
	June 95	June 96	June 97
DZL Basic Producer Price	1.86	2.50	2.90
MCC Producer Price			
Gokwe	1.55	2.60	2.30
Rusitu	-	2.07	-
Marirangwe	1.75	2.15	1.92
Local Prices			
Gokwe Average	3.33	3.63	4.00
Rusitu Average	2.67	3.33	3.67
Marirangwe Average	2.50	3.00	4.00

Source: Survey Results, July 1997.

Gokwe, whose production is primarily targeted towards the local market, also enjoys relatively higher milk producer prices compared to Rusitu and Marirangwe. This can be attributed to the fact that the project's marketing strategy evades the traditional middleman: DZL, which not only shortens the marketing chain but also reduces overall marketing costs. Local prices, which are determined by market forces of supply and demand, also appear to be more competitive prices. Some farmers, however, maintain that local prices are affected by "affection forces" where exchange values are influenced by social ties within the community.

#### *General Marketing Constraints*

The smallholder dairying context presents several marketing constraints. The major constraint is of a dispersed producer community and an equally dispersed rural market. The large distances between individual farms and local MCCs have created serious milk delivery problems, high marketing costs and general marketing difficulties. Transport for milk deliveries or local milk marketing has always been a problem. For dairy projects where production is mainly targeted towards the local community, such as in Gokwe, an unreliable rural market is also a cause of concern. Rural markets are by nature seasonal. In rural settings most indigenous cows drop their calves

during the rainy season which provides most of the projects' clientele a source of milk, thereby reducing the demand for project produced milk. The rainy season also coincides with a glut in projects produced milk. In other circumstances, the problem is one of trying to re-establish lost markets due to the large variability in milk production and subsequent quantities delivered. Subsequent gluts and droughts have led to the perception of the local milk production base as an inconsistent milk supplier resulting in the loss of lucrative markets. Smallholder dairy marketing is also restricted to a limited product line, where only two products: fresh and sour milk, are marketed. Milk quantities delivered per day are also very low. This entails that the farmer associations and individual farmers cannot benefit from economies of scale where dealing in large quantities reduces unit costs. The other major marketing constraints include processing losses and relatively low producer prices.

## ENTERPRISE VIABILITY

### *Prelude*

Maximising production levels and efficiency is a goal cherished by most farmers and absolutely all technical interventionists in the local production context. The important question here is: have production levels reached their full potential, and, if not, how can this be best achieved? However, from a strict economic point of view and for the discerning farmer, of paramount importance is not production alone but production in relation to costs, that is, enterprise viability. The important question then becomes: is it worthwhile to engage and to invest in a particular enterprise? This later question forms the pinnacle of dairy enterprise viability analysis.

### *Enterprise Viability*

The Gross Margin Analysis of enterprise viability was based on five indicators. The Gross Margin (GM) was used as the basic unit of analysis in evaluating enterprise viability. Given the additional need to evaluate production and economic efficiency, viability assessments were also based on the gross margin per unit of production. Under consideration was the gross margin per cow (GM/cow) and the gross margin per hectare (GM/ha). The gross margin per enterprise costs (GM/EC) and the gross margin per variable costs (GM/VC), both representing the returns per each invested dollar, were also considered.

Despite the great potential economic benefits at both the farm and national levels, smallholder dairying has failed to match expectations with accomplishments. Though most GMs were positive, some GMA results were somewhat disappointing. See Table 4.

In general GM results put in doubt the viability of smallholder dairy production in the newly established Gokwe project. In all, 4 of the 10 case study farmers failed to break-even, with some recording substantial losses. Real economic viability in Rusitu remains questionable, while Marirangwe was the only project with overall positive results. GMA results for the three research areas also showed that the more viable projects tend to be more economically efficient. Marirangwe, which boasts the highest gross margins per cow and per ha, also recorded the highest returns to investment.

Table 4: Comparative Dairy Enterprise Gross Margin Table for Gokwe, Rusitu and Marirangwe for the 1996/97 production season.

Viability Indicators	Gokwe	Rusitu	Marirangwe
Average GM (\$)	- 202.32	3 414.99	10 560.65
Average GM/cow (\$)	249.39	26.54	1 308.46
Average GM/ha (\$)	- 50.70	853.70	2 640.78
GM/EC	0.06	0.12	0.42

Source: Survey Results, July 1997.

A number of patterns also emerged *vis à vis* production and economic efficiency. Only the major one was considered (see Table 5).

Table 5: Emerging GMA Patterns

Herd Size (No. of Cows)	Average GM/cow [\$]	Average GM/ha [\$]	Average GM/EC
0 - 5	170.03	388.43	0.15
6 - 10	157.82	504.30	0.31
11 - 15	124.75	190.50	0.13
> 15	77.79	554.00	0.01

Source: Survey Results, July 1997.

An analysis of the gross margins per unit of production and returns to investment with regard to the number of producing dairy cows indicated a situation where a specific range emerged as the "ideal" number for smallholder dairying. Gross margins and returns to investment were relatively low for the 0 to 5 range. These indicators increased in value and reached their ceiling in the 6 - 10 range. Values for these indicators declined to their previous low for the 11 - 15 range and drastically fell once the number of producing cows was further increased. Dairy producers utilizing the local market more also posted better results than those marketing only through DZL, which could be a result of the fact that these producers tend to have relatively lower milk marketing costs.

In comparison with other competitive on-farm enterprises, smallholder dairying does not fair better either. Only the major smallholder on-farm production enterprises were considered. See Table 6.

Table 6: Comparative Enterprise Gross Margins and Gross Returns

Enterprise	Average GM/ha (\$)	Average GM/VC
Dairy Production (survey average)	1 096.45*	0.20*
White Maize Production	1 754.17	0.95
Cotton Production	5 496.75	1.12
Sunflower Production	81.47	0.05
Groundnut Production	1 732.41	0.86
Sorghum Production	183.34	0.08

\* Gross margins and returns to investment for the dairy enterprise are based on actual farmer costs and revenues, while figures for the rest of the enterprises are based on estimates.

Smallholder dairying, with a return of 20 cents per each invested dollar, turned out to be one of the enterprises with the lowest GM/ha and GM/VC viability index. The perception on smallholder dairy viability is, however, still tainted by mixed views. Almost 55 percent of interviewed farmers said that they were worse off now compared with their original economic state, a situation farmers blamed on the sub-economic prices offered by DZL and local MCCs. The remaining 45 % felt that the inception of smallholder dairy projects have set them off to greater economic heights.

## DISCUSSION

### *Smallholder Dairy Viability and Implications of Non-Viability*

The study established that smallholder dairying in Zimbabwe is overall hardly viable. The relatively poor GMA results for Gokwe can be attributed to the short establishment history and related high establishment costs, the use of expensive modes of transport for milk deliveries such as motor-cars and lack of dairy management experience. Marirangwe's success story is also exceptional since production is only limited to a few remaining committed farmers and producers who can be classified as real entrepreneurs. Traditionally, smallholder farming is a way of life rather than a thriving business enterprise.

Another disturbing finding was that the average return and most of the individual returns in smallholder dairying were lower than those for competitive enterprises such as maize and cotton production where government and donor funding is virtually absent. Due to the dairy enterprise's higher intensity, the gross margin and returns to investment in dairy production are expected to be higher in comparison with other on-farm enterprises. A possible explanation for this gloomy outcome could be the effects of the Economic Structural Adjustment Programme and the lingering effects of the 1994/95 drought. These have resulted in a price squeeze for most dairy producers due to escalating production costs in the face of relatively static producer prices. Much of this price squeeze emanates from ever increasing feed costs given the fact that feed costs account for about 70 percent of total production costs for each produced litre of milk. The total absence and lack of proper record keeping by individual farmers also aggravates this crisis. With no records farmers cannot continuously monitor progress and assess past economic performances, which are essential management practices and the basis of future improvements. Poor record keeping then becomes both a production and viability constraint.

The study also established that viability in the smallholder dairy sector can be maximised with a herd size of 6 - 10 cows. In addition to more extra labour, higher feed costs, etc., bigger dairy units have higher costs due to what is assumed to be a loss of care and attention at the margin, particularly at milking (DANIDA, 1995). However, this result also proves that there are viability problems for the poor or smaller farmers, who comprise the majority of smallholder dairy producers, who cannot afford more than five producing cows.

The basic implication of a non-viable smallholder dairy venture is that the largely expected higher incomes for poor rural households won't be forthcoming. Also to go down the drain are dreams of rural development and more equitable distribution of national wealth. DZL, a former parastatal, was privatised through a floatation of shares in line with recent World Bank initiated economic reforms. However, given the low viability status of smallholder dairying, the real feasibility of participation of smallholder farmers in the DZL company is very small. Low viability also negatively affects re-investment, improvements of individual dairy units, and ultimately development in the larger smallholder dairy sector.

### *Endurance, Equity and Potential*

Over 30 large-scale commercial dairy producers quit the industry during the 1995/96 production season (The Herald, 30/07/97). Smallholder dairy enterprises are also not viable and face a host of production and marketing problems. One would then wonder why smallholder dairy farmers are not quitting and why other emergent smallholder farmers are joining the band-wagon, adding to the numbers of farmers involved in a non-viable and sometimes loss making enterprise. In the study, it was established that the only reason why farmers continue to be involved in the enterprise is because of the pull of relatively regular and reliable incomes in the sector, which has been a welcome departure for most farmers compared to the traditional once-a-year return in crop production enterprises.

By involving smallholder farmers in dairying, one of the major assumptions was that such a move will achieve both economic efficiency and a high degree of equity in the process. However, the achievement of downright

equity is far from achievable. This is because only the bigger and better farmers, comprising a small rural bourgeoisie class (elites), tend to be dairy farmers because they can afford the risk of a new venture. Either way, to begin dairying requires relatively huge capital outlays and the running of a dairy enterprise involves large financial outflows. Though such amounts are proportionally lower than in the more intensive large scale commercial sector, most poorer rural farmers (including female-headed households) will not be in a position to participate in smallholder dairying, even at the most modest level. In other words, benefits from the Dairy Development Programme are circumventing the most vulnerable social groups.

Despite this gloomy outlook, smallholder dairy projects have managed to raise the amount of milk produced and marketed in smallholder areas, increase per capita milk consumption (and hence nutrition), generate employment, as well as improving rural living standards by raising and ensuring regular incomes in rural areas. Viability in the sector is also expected to change for the better given the recent privatisation of DZL and an expected stabilization of stockfeed prices. There are also in existence several other factors which are expected to facilitate continuance and further development of smallholder dairying in Zimbabwe. According to Dube (1995) Zimbabwe's smallholder dairy projects have great potential because traditionally, smallholder farmers have always kept cattle, demand for milk in the rural communities is quite high, overhead costs for setting up smallholder dairies are lower compared to sophisticated commercial dairy set ups and donor support in the development of this sub-sector is still forthcoming.

#### *Recommendations and Issues for Further Research*

A number of improvements need to be effected in order to raise the general productivity and viability in the smallholder dairy sector. First, is the need to strengthen the production base through the introduction of home-grown feeds to ensure adequate supplementary feed for the dairy animals throughout the production season. This can include the production of more dairy complementary crops such as maize and sunflower, formulation of rations and forage conservation; supported by context specific on-farm research. The use of improved feeds will increase productivity, while self sufficiency in animal feeds is expected to reduce feed costs to the individual farmer by almost 40 percent. In Brazil, farmers use whole sugarcane crops as dry season feed after discovering that the crop, unlike grass, retains moisture under rainfed conditions in the dry season. Ongoing research in Vietnam has also shown that the unit cost of producing 1 kg of sugarcane dry matter is lower than for grasses (Preston, 1993). On-farm research in Mauritius, involving about 100 cows maintained by small farmers, showed 305 day lactation yields of 2 800 kg milk could be obtained from basal diets of sugarcane tops, adequately supplemented with protein and minerals (Boodoo, *et al*, 1989). Constraining draught power shortages and labour bottlenecks can be reduced by mechanising some of the dairy production processes. An example is the acquisition of a few multi-versatile assets such as tractors, since these can be used for draught purposes, silage making, transport for milk deliveries and in maintenance of local roads.

A recommendable herd size is that which includes 6 - 10 dairy cows. The actual individual herd size will, however, depend on an individual farmer's financial resources and his/her management capabilities. For the poorer and emergent dairy producers, optimum dairy herd sizes can be attained through cross-breeding, based on a well-planned breeding strategy which is also useful in controlling calving and seasonal milk production. Where breeding is not controlled a controlled breeding programme can be introduced by creating separate paddocks for bulls. Use of a controlled breeding programme can actually indirectly solve the problem of production and delivery inconsistencies thereby reducing the risk of losing lucrative markets.

More integrated and economic milk collection systems can be put in place in all project areas. These include the use of group transportation and deliveries by use of beasts of burden such as donkeys, which is not only cheaper in the long run but also much more efficient in terms of farmers' working and involvement time. In either way, the larger quantities involved enable farmers to benefit from economies of scale through the reduction of unit delivery

and marketing costs.

The smallholder dairy industry can also benefit by widening its product base, through the introduction of more value-added products and processing of milk into dairy products with a longer shelf life. At the policy level, local market and effective demand for milk products can also be improved through an integrated rural development approach, in a context where smallholder dairying is perceived as an integral component of rural development, whose other benefits include an increase in the purchasing power of rural populations. Government and donor support in smallholder dairying should also be extended to the smaller and poorer farmers to achieve a wider spread of benefits. There is also need for the re-integration of technical and socio-economic issues in rural development programmes if sustained rural development is to be achieved. Though largely critical, the authors believe that this study is essential for development of the smallholder dairy sector since a critical approach to evaluation of development projects can serve as a basis for improvement.

In conclusion, this study, in addition to establishing a number of interesting facts has also raised several questions needing further research and analysis. To begin with, even if viability in the smallholder dairy sector was to change for the better, the big question will still remain: is it worthwhile to engage or invest in smallholder dairy production? Currently farmers benefit from the Dairy Development Programme while the state, with the help of various donors, meet the development costs of the projects. The government also offers free extension advice and veterinary services. An area of major interest will be an analysis of how viable individual farmers' involvement in the enterprise would be if farmers had to meet these development and service costs. A study designed to establish these true economic returns is set to be very enlightening. Given more ample funding, further research can also be focused on studying trends in smallholder dairy viability over a long period.

In both industrialized and developing nations, increased milk production is associated with increased herd size (DANIDA, 1995). Phenomenal increases in national and local herd sizes has adverse implications for land use and the general environment. This is cause for great concern, given that most smallholder dairying involves the keeping of potentially large numbers of cows in small communities where the land is short and the population dense. It then becomes essential to understand the likely impact on local farming systems, the pressures on pastures and forest vegetation, as well as coming up with appropriate and sustainable solutions to the problem.

## REFERENCES

- Boodoo, A.A., Ramjee, R., Hulman, B., Dolberg, F. and Rowe, J.B. 1989. "The Response of Creole, Friesian and Friesian Cross Cows to Concentrate Supplementation on Village Small Holdings in Mauritius". British Society of Animal Production, Winter Meeting, March 13-15, Paper No. 143.
- Chavunduka, G.L. (Chairman) 1982. Report on the Commission of Inquiry into the Agricultural Industry. Harare: Government Printers.
- DANIDA, 1995. "Evaluation of Danida's Support to the Dairy Industry in Thailand". DANIDA Evaluation Report. 71 pp.
- Dube, L. 1995. "An Economic Analysis of Smallholder Dairy Farming in Zimbabwe: A Case Study of Rusitu Small Scale Dairy Settlement Scheme". Unpublished MSc. Thesis, University of Zimbabwe.
- Government of Zimbabwe, 1987. Review of Dairy Development in Zimbabwe.
- Hanyani-Mlambo, B.T. (Forthcoming). "Farming Systems in Zimbabwe's Smallholder Agricultural Sector: The Case of Gokwe South District". Department of Agricultural Economics and Extension; University of Zimbabwe.
- Hill, B. 1990. *An Introduction to Economics for Students of Agriculture*. 2nd Edition. Oxford: Pergamon Press. pp. ix + 381.
- Jingura, R.M. and Hanyani-Mlambo, B.T. 1995. Diagnostic Report on the Informal Survey on Gokwe South District's Farming Systems.
- Johnson, D.T. 1985. *The Business of Farming: A Guide to Farm Business Management in the Tropics*. London and Basingstoke: Macmillan Publishers Ltd.
- Mache, B. 1994. "State of Affairs and Issues for Livestock Research in the Communal Areas: Experiences from AGRITEX". pp. 47-50 in a Pre-implementation Planning Workshop Report of the "Improvement of Research-Extension-User Linkages" Project, held at UZ, Harare, 2-4 August.
- Mupunga, E.G. 1994. "Impact of the Dairy Development Programme on the Living Standards of Smallholder Farmers in Zimbabwe: A Case Study of Nharira Smallholder Dairy Development Project". Unpublished MBA Thesis.
- Oliver, J. (ed) 1987. *NADFZ (National Association of Dairy Farmers of Zimbabwe) Dairy Farmers' Handbook*. NADFZ. Commercial Farmers' Union, Harare, Zimbabwe.
- Osuji, P.O., Khalili, H., Umunna, N.N., Sibanda, S. and Shenkoru, T. 1995. "Effect of Level of Milk Feeding and Type of Housing on the Performance of Crossbred Calves (*Bos taurus* x *Bos indicus*) and Zebu Calves (*Bos indicus*). *Tropical Agriculture*. 72 (3): 1 - 8.
- Preston, T.R. 1993. "Increasing Livestock Production by Making Better Use of Available Feed Resources". A Report to SAREC.
- Ruthenberg, H. 1980. *Farming Systems in the Tropics*. 3rd Edition. Oxford: Oxford University Press. pp.
- The Herald, 1997. "Conolly Seeks Ways to Boost Dairy Industry". The Herald (30/07/97).



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