

Impact of Small Scale Dairy Farming Projects on Rural Livelihoods: The Case of Mayfield Dairy Settlement Scheme in Chipinge District of Zimbabwe

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Abstract

Rural livelihood diversification and agricultural intensification are key pathways to sustainable rural livelihoods. Most less developed economies have adopted smallholder dairy farming as a double-barreled strategy for achieving both rural livelihood diversification and agricultural intensification. This study sought to assess the impact of dairy farming projects on rural livelihoods. In this study, focus was on Mayfield Small Scale Dairy Settlement Scheme located in Chipinge District of Zimbabwe. In collecting both qualitative and quantitative data, the researchers made use of interviews, questionnaires, observations and project reports. Semi-structured questionnaires were administered to a sample of 75 farmers randomly selected from a total population of 345 family farmers operating on the dairy settlement scheme. In addition, 24 key informants were conveniently sampled for interviews from among the scheme's management, farmer committee leaders and extension workers. The major finding in the study was that while it managed to bring about a number of benefits to the smallholder family farmers, the project, however, failed to provide a solid basis for sustainable rural livelihoods in the project area. Lack of a proper 'fit' between project design, beneficiary needs and the capacities of the assisting organizations was the major reason behind the project's lackluster performance.

Keywords: Impact, Smallholder Dairy Farming Projects, Rural Livelihoods, Zimbabwe

Introduction

Recently, some scholars have advocated for a shift in emphasis away from the study of dairy farming on large-scale farms to the study of small-scale dairy farming operations. In part, this shift in emphasis has come about out of a realisation that smallholder dairy farming is critical in the development of rural areas. Smallholder dairy production has great potential to contribute to agricultural intensification and rural livelihood diversification. According to Ngetha (2000), milk production by smallholder farmers raises rural employment and incomes, and promotes diversification, intensification and stabilisation of agricultural production.

In Zimbabwe, commercial dairy production started as far back as 1912 (Matinhira, 1988:23). However, owing to colonial policies of separate development biased in favour of the white farming sector, dairying was exclusively a prerogative of the large scale white commercial farmers who produced milk to satisfy the 'national needs' (Gittinger, 1997). At independence in 1980, the Government of Zimbabwe embarked on an ambitious programme to de-racialise and expand the dairy industry through the promotion of small scale dairy farming among the, hitherto, neglected communal black farmers. The dairy development programme was coincidentally given impetus by the shortage of fresh milk and other milk products that occurred during the early years of independence. The shortage saw demand for fresh milk rising sharply. In the 1982/83 season, the demand for milk rose by 56 percent to about 240 million litres (Matinhira, 1988: 36). This upsurge in demand resulted in a national milk shortfall of 86 million litres (Hale, 2001:27).

It is against this background that the Mayfield dairy scheme, which is the focus of this study, was established in the Eastern Highlands of Chipinge in 1985 (Mayfield Annual Report, 1986: 2). The project was designed as a fundamental instrument for poverty reduction and sustainable development in the area (ARDA Annual Report, 1989). Using Mayfield Small Scale Dairy Settlement Scheme as a case study, the aim of this study was therefore to assess the impact of dairy farming projects on rural livelihoods and development. Mayfield Dairy Settlement Scheme, a model C resettlement project, covering a total of 6 900 hectares was located in the country's Eastern Highlands, about 35km from Chipinge, a town situated close to Zimbabwe's border with Mozambique.

Nzima (2001:7) observes that in most of East Africa, 75 percent of the milk is produced by smallholder farmers. In Tobago, the smallholder dairy farming industry employs approximately 8,000 people and is a source of both cash and manure for cash crop production (Singh, 2010: 56). In Pakistan the small scale dairy sector contributes almost 50 percent to the value addition in the agriculture sector and almost 11 percent to GDP (Tirvin, 2009: 19). In Guatemala smallholder dairy farming has helped women to actively participate in the processing of milk into traditional winter food products both for domestic consumption and for the market (Boghor, 2010). The Marirangwe smallholder dairy project in Zimbabwe has also succeeded in imparting valuable farming, cooperative management and marketing skills to participating members (Matinhira, 1988). While small scale dairy farming in most less developed countries has contributed significantly to economic growth, employment creation and poverty reduction, some studies, as clearly illustrated below, have, however, also noted some exceptions to this positive development. In Haiti, for example, the smallholder dairy farming did not contribute meaningfully to the welfare of the rural poor (Aneja, 2009). Despite the critical role of smallholder dairy farming to rural development, milk supply in

Malawi remained as low as 3.3 kg to 6 kg per capita per year (Banda, 2012: 56). Thus, although useful as a tool for empowering rural communities and securing sustainable rural livelihoods, due to a number of technical and management problems, smallholder dairy farming has had a limited positive impact on rural livelihoods.

This study is largely informed by a framework for sustainable rural livelihoods analysis developed by Ian Scoones. Drawing on the works of a number of rural development scholars, Scoones (1998) came up with a comprehensive framework for analyzing sustainable livelihoods. The framework shows how, in different contexts, sustainable livelihoods are achieved through access to a range of resources which are then combined in pursuit of different livelihood strategies such as agricultural intensification or intensification, livelihood diversification and migration. Central to the framework is an analysis of a range of formal and informal organizational and institutional factors that influence sustainable livelihood outcomes. Major expected livelihood outcomes in any rural development intervention from the perspective of this framework include employment, poverty reduction, wellbeing and improved capabilities. Sustainability, in this framework, entails livelihood adaptation and enhanced resilience as well as avoiding undermining the natural resource base. The framework is useful to developing countries in that it provides an analyst with a checklist of key issues to explore and consider when assessing a livelihood. However, just like all frameworks, this particular framework tends to oversimplify reality.

Underpinning this study is also the Rural Fit Model developed by David Korten in 1980. The model posits that rural development projects can be assessed in terms of the degree of fit between three elements: programme design, beneficiary needs and the capacities of the assisting organisations. According to Korten (1980), where good fit exists, the intended beneficiaries will be empowered and a rural development project would bring positive changes to the lives of the concerned rural people. On the other hand, poor fit results in underdevelopment and poverty, and is also often associated with tension between management and the intended beneficiaries.

Research Methodology

Qualitative and quantitative data were collected during the study. Data were collected through the instrumentation of a structured and semi-structured questionnaires as well as through interviews and observations. The data were collected over a period of three (3) months from January 2013 to March 2013. The target population for this study consisted of all the 345 households registered on the dairy scheme. A list of the farm households was supplied by the scheme's management. From this list, a sample of 75 farm household units was randomly targeted with questionnaires. The 75 household units represented a sample size of more than 20%.

For most of the qualitative data, a total of 24 key informants were conveniently selected on the basis of accessibility and willingness to participate. The key informants were selected from among members of the management, scheme development committee and extension staff. Observations were also made during the field visits that took place after interviews with the farmers. These field visits included visits to breeding pens, dairying points, processing facilities and milk collection centers (MCCs).

Results and Discussion

This section on results and discussion looks at the impact on rural livelihoods of the dairy projects implemented at the Mayfield Small Scale Dairy Settlement Scheme. In this particular section focus is specifically on such livelihood outcomes like employment, incomes, food security, nutrition and education, among others. The section also captures some of the major challenges to the delivery of the aforementioned livelihood outcomes at the scheme.

Project livelihood outcomes

Mayfield Dairy Farming Project managed to deliver a number of livelihood outcomes or positive changes at both household and scheme levels. The dairy project succeeded in improving the lives of the dairy farmers through employment creation, income generation, cash savings, improvement in the asset position of the dairy farming households, capacity building, and education, adoption of new technology, improved nutrition and food security for the family farm households, among other benefits. Below is a detailed discussion of some of the livelihood outcomes generated by the project.

Employment

Owing to its labour intensive nature, the project generated significant employment opportunities for the Mayfield rural community of Chipinge district in Zimbabwe. Both temporary and permanent workers were engaged in the project since 1985 when the scheme commenced. Most temporary workers were employed in infrastructural development. Eighty percent (80%) of the registered farm owners worked fulltime on the farms while seventy three percent (73%) of the farmers employed a total of sixty-four (64) fulltime workers.

The average monthly payment for labour was US \$55.00 per month excluding the food and accommodation that were supplied to workers free of payment. Thirty five percent (35%) of households at the scheme indicated that they sometimes hired temporary or casual workers during the cropping season to perform tasks such as ploughing, planting, weeding and harvesting. These casual workers were hired during the peak agricultural period of around between October and June. Payment of temporary workers was either in cash or in kind. For weeding, the average payment

was US\$5 per acre or a 20litre bucket (about 15kgs) of maize grain. All the farmers reached during the study indicated that family labour was their major source of labour.

The project also managed to create a number of employment opportunities downstream. For example, most management and extension staff at the scheme employed members of the Mayfield local community as full time domestic workers. In addition, two primary schools, one secondary school and one clinic had been set up in the area by the time of carrying out this study and, together, these institutes employed a total of 283 people, of which a significant number were from the local community. Some of these non-agricultural professionals, in turn, employed fulltime domestic workers mostly from among members of the local community. By the end of 2012, the scheme had also managed to induce the establishment of a service centre at which one bottlestore, one beerhall, five grinding mills and three general dealer shops were operating, thereby creating additional jobs for the local community. Employment growth opportunities in this service sector were also expected to further grow as quite a number of business stands were still to be developed at the centre by the time of conducting the study.

Income Generation and livelihood use of income

The income generated by the project included both cash and non-cash earnings. The cash earnings for the dairy farming enterprises were derived mainly from the sale of milk, male calves, surplus female calves and culled cows. The study found out that farmers were on average getting US \$ 235.00 per month from the sale of milk to Dairiboard Zimbabwe Limited, a partially government-owned milk marketing company in the country. The income generated from dairy farming enabled farmers at Mayfield Dairy Scheme to finance various livelihood needs. Below is a table summarizing the various uses to which income generated from milk sales were put:
Table 1: Uses of income from dairy sales

Use of income	Percentage use of income for each use
Purchase of staple food	49.8
Purchase of non-staple food	11.4
Payment of educational / school fees	10.2
Purchase of Agricultural inputs	12.2
Purchase of Clothing	1.5
Others	14.9

Source: Field Data, March 2013

Enhanced asset position of dairy farm households

Dairy farming has improved the asset position of dairy farm households at Mayfield Settlement Scheme. Table 2 below shows the state of asset possession at the dairy scheme.

Table 2: Household asset ownership at the dairy project

Type of asset owned by households	Percentage of farmers owning the asset (N=75)
Dairy housing	69
Separate milking parlour	72
Hay shade	84
Cattle shade	80
Feed shade	84
Car	12
Mobile Phone	85
Radio	79

Source: Field Data, March 2013

Table 2 above shows that the majority of farmers accrued assets as a result of their participation in smallholder dairy farming. An overwhelming majority of the farmers owned a mobile phone (85%), hay shade (84%), feed shade (84%), cattle shade (80%), separate milking parlour (72%), dairy housing (69%) and radio (79%). Car ownership was at 12%.

Food security and nutritional benefits

Milk provided a cheap and reliable source of protein to the farmers. The majority of farmers (66.7%) at the scheme reported that they had experienced a positive net incremental change in milk consumption. Only 24.5% of the farmers indicated that their milk consumption level had not changed with the dairy project, with only 8.8% of the farmers indicating a negative incremental change or decrease in milk consumption. The annual per capita milk consumption or intake for the scheme stood at 68 litres, an amount more than double Zimbabwe's annual per capita milk consumption country average of 32 litres (Gillespie, 2012:59).

Data on malnutrition-related diseases in children obtained from Chipita Clinic, a Rural Health Centre serving Mayfield Small Scale Dairy scheme, showed that the incidence of malnutrition among children below 5 years at the scheme was far below the national average. The national level of malnutrition for children below 5 years in Zimbabwe at the time of carrying out the study was 30 percent (Gillespie, 2012). The graph for Mayfield below shows a significant drop in malnutrition among children below 5 years particularly from the year 2010.

Fig. 1 Level of malnutrition among children under the age of 5 years at Mayfield and its environs (Quarterly for the years 2009 to 2012)

Source: Chipita Rural Health Centre

Capacity Building

Through the project, the farmers gained a lot of valuable knowledge on intensive smallholder dairying. A comprehensive training programme on all aspects of dairy production was offered to farmers by the extension staff. Through the training, farmers were equipped with the necessary knowledge and skills required for them to farm successfully. Table 3 below shows the percentage of farmers who had done various courses offered by the extension workers.

Table 3: Courses Offered and Percentage of Participating Farmers in each course

COURSE NAME	PERCENTAGE FARMERS (N=75)
Cow Management	50.7
Dairy Hygiene	37.3
Calf Management	41.3
Farm Management	30.7
Farm Records	13.3
Crop Budgets	14.7
Veterinary services	20.0
Napier Production	14.7
Subsistence and life skills	13.3
Leadership	13.3

Source: Field Data, March 2013

A total of 123 farmers also indicated that they had been trained several times in

the use of new improved technologies. The trainings covered such knowledge areas as artificial insemination and nutrition management. In addition, the extension staff also ran a demonstration plot where various trials on new technology were conducted.

Education

From income generated by the project and with a bit of support from the government, the scheme managed to build three schools: two (2) primary schools and one (1) secondary school. By the end of 2012, the total enrolment at the 3 schools stood at approximately 2200 pupils, of which 900 were in secondary school and the remainder in primary schools (See Table 3 below).

Table 4: Approximate Number of Pupils in the Schools as at November 2012

Name of school	Number of pupils
Chipita Primary	700
Mabheka Primary	600
Foroma Secondary	900

Source: Scheme Management Progress Report, November 2012.

Thirty percent (30%) of the farmers reached during the study also indicated that their children had managed to proceed to tertiary institutions after having graduated from the local secondary school at the scheme. Thus, the project has contributed fairly well to the education of children in the country.

Limits to livelihood outcomes and livelihood sustainability

Access to livelihood resources

The above benefits notwithstanding, lack of access to adequate livelihood resources has been a major limiting factor to the attainment of sustainable livelihoods at the scheme. For effective dairy farming activities to take place farmers require adequate resources in the form of different forms of capital. Financial capital for purposes of meeting dairy investment and working capital requirements is one such vital form of capital. A sizeable number of farmers at the Mayfield Dairy Settlement Scheme had limited access to financial capital leading to low milk output. Twenty

eight percent (28%) of the farmers contacted during the study indicated that, due to lack of credit and coupled with the prohibitively high cost of acquiring the bought-in crossbred and in-calf heifers required to build the dairy cow herd size, they had inadequate cows for their dairy operations. Most farmers blamed management for the non-provision of cows and credit which some settlers claimed had been promised to them at project inception.

Low milk production at the scheme affected milk sales and, consequently, incomes. Analysed in relation to the World Bank (2011) poverty measure of US\$ 1.25 per day per person, the US\$235.00 average income from milk sales referred to above meant that each household was entitled to only US\$7.8 per day on average. Given the project area's relatively high mean household size found in the study to be 8 people per household, it means each household member was living on US\$ 0, 98 per day on average. In terms of the World Bank income poverty threshold of US\$ 1.25, the income earned from milk sales was therefore way below the poverty datum line and this, thus, suggests the prevalence of poverty in the area. As indicated in Table 1 above, a disproportionately high percentage (61.2%) of income from milk sales went towards the purchase of food. It is universally agreed in development scholarship that spending more than half of one's income on food is one key indicator of poverty, and poverty reduction being one of the key livelihood outcomes in Ian Scoones' framework for analyzing sustainable rural livelihoods, it could, thus, be concluded that the project had a very limited positive impact on rural livelihoods in the project area. Besides, the mere fact that most farmers heavily relied on family labour shows the limited employment potential of the project. In any case, the US\$ 55-00 average payment for hired labour was way below the country's poverty datum line which stood at around US\$500-00 per month during the time of conducting the study.

Potential for increased income generation at the scheme was also adversely affected by limited diversification opportunities. Unavailability of water due to lack of adequate dam infrastructure meant that farmers could not diversify into high value cash generating enterprises like horticulture to augment income from the dairy enterprise. Cooperative fish farming was also another livelihood option the farmers suggested during the study. However, like with horticulture, lack of adequate water supply was an obvious constraint. Some farmers also complained that the Agricultural and Rural Development Authority (ARDA), a semi-governmental organisation mandated by government to provide overall management services to the project, did not allow them to diversify into other income earning enterprises on the ground that such a move would divert the farmers' attention from the project's core business of dairying.

Organisation and management

Neo-patrimonial norms and practices of familism and nepotism seemed to have had a negative effect on dairy project management at Mayfield. The study found out that farmers mainly employed their relatives at the MCCs. These farmers were also generally accused of overpaying their relatives while, at the other end, underpaying non-relatives. Similarly, ethnic-based farmer conflicts were viewed by most farmers as one of the major problems affecting effective management and leadership by most farmer committees at the scheme. Farmer committees were also reportedly incapacitated by power struggles with most of these power struggles apparently bordering on ethnic differences. During the study the scheme management and extension staff managed to identify a total of eight ethnic groups in the project.

There was also near-consensus among key informants that the farmers elected to office ended up pursuing their own individual selfish interests and were frequently accused of adopting dictatorial styles of leadership while at the same time dividing the rest of the farming community along ethnic lines instead of fostering good community relations. The farmers also appeared poorly organized with the farmer's committees clearly failing to adhere to basic principles of good corporate governance.

The farmers were also divided on ARDA's continued direct management support to the project. 33.3 percent of the farmers felt that it was high time ARDA withdrew its personnel from the scheme. These farmers argued that extension support, and not management services, was what the project only now needed since they felt that they were by then experienced enough to run their own affairs without close supervision from, or control by, ARDA. The farmers noted that the bulk of donor and government funding earmarked for the project was not benefitting them but instead went towards meeting the salary needs of ARDA scheme management and extension staff. These farmers therefore wanted the ARDA staff removed from the helm to allow them to benefit fully from any funds given to the project by either the government or donors.

The other 66.7 percent of the farmers wanted ARDA to continue offering both management and extension support. These farmers argued that ARDA's withdrawal from the scheme would lead to the collapse of the project particularly in light of the power wrangles and sharp ethnic-inspired divisions characterising relations at the dairy scheme. To these farmers, ARDA was the glue holding the project together and without which project sustainability could not be guaranteed. In addition, these farmers also felt that ARDA was providing a valuable link between the project and other service providers like donors and other government service providers.

Land tenure system

Land tenure regimes have played a central role in any analysis of rural livelihoods, particularly the analyses of livelihoods of those rural inhabitants whose broad pathway is agriculture. The nature of the users' rights and obligations over a piece of land has been one of the major factors militating against land use productivity, not only at Mayfield and Zimbabwe at large, but the world over. The permit system of land ownership and control in Zimbabwe's resettlement areas has generally been found to be highly insecure. Apart from being of a temporary nature, the permits granted to farmers under this permit land tenure system did not clearly address issues pertaining to land inheritance, transfer and disposal. The permit system in Zimbabwe gave broad rights to the state and few rights to the settlers, thereby rendering it the most insecure form of land tenure in the country (Rukuni, 1994).

The sense of insecurity at Mayfield Dairy Settlement Scheme was not made any better by ARDA officials' constant threats of eviction issued to farmers for the slightest violation of any of the provisions of the land tenure permit. 13% of the farmers interviewed during the study expressed concern over the insecure nature of this tenure system which they said served as a dis-incentive to long term agricultural investment and proper land resource management by settlers at the scheme. Indeed, one disturbing phenomenon observed during the study was the problem of massive land degradation and river siltation. Overgrazing and, resultantly, soil erosion threatened to put the ecosystem in the project area off-balance, a situation that was worsened by the absence, in the country, of a clear policy on the management and utilization of open lands.

Capacities of assisting organisations

Lack of capacity on the part of critical support organisations also limited the delivery potential of the dairy project. Roads at the scheme were in a very poor state due to lack of funds and limited engineering expertise on the part of local and central government authorities responsible for road maintenance. The poor road network greatly affected both extension service coverage on the scheme as well as milk delivery to the Milk Collection Centres (MCCs). The water supply infrastructure at the scheme also left a lot to be desired. For example sixty four percent (64%) of the farmers interviewed complained of poor water supplies during the dry season. This water supply problem was found to negatively affect fodder production leading to significantly reduced milk output during the dry season.

Failure by the government's veterinary department to regularly supply acaricides, a dipping chemical, reportedly resulted in an erratic dipping programme. This

situation often resulted in dairy cattle suffering from tick borne diseases, a situation which, in turn, led to an increase in livestock mortality at the scheme. Sixteen percent (16%) of the farmers interviewed indicated that cattle diseases had greatly affected their dairy operations. The situation was made worse by the farmers' lack of knowledge in the area of preventive animal health due to lack of training from the government's veterinary department. For example, fifty six percent (56%) of the farmers interviewed indicated that they needed basic veterinary skills in areas such as vaccination, heat detection and pregnancy diagnosis. Apart from technical skills the same percentage of farmers pointed out that they also needed to be equipped with skills in community and cooperative leadership with more emphasis being put on aspects relating to financial management and accounting. As evidence of this dearth in management skills, fifty-seven point three percent (57.3%) of the farmers interviewed complained of poor management of the MCCs by the management committees with most allegations bordering specifically on mismanagement of farmers' milk incomes. All the above deficiencies, thus, point to limited capacity on the part of organizations mandated to provide technical and management support to the dairy farmers.

Conclusion

In conclusion, it could be noted that the Mayfield Dairy Farming project managed to modestly deliver on rural livelihood outcomes. Notable benefits derived from the project by the community in the project area include employment, incomes, education and training for the rural poor. All these immediate project outcomes positively impacted on asset position, food security and nutrition among the Mayfield smallholder family farmers. These achievements notwithstanding, the project still had a long way to go in eliminating absolute rural poverty in the community under study. The project's ability to foster sustainable rural livelihoods in the long run was negatively affected by, among other factors, limited access to credit to meet investment and working capital requirements. This situation led farmers to largely depend on, inherently unsustainable, donor grants. Lack of capacity on the part of supporting agencies, poor project corporate governance and lack of group cohesion were some of the major problems affecting the project. Insecure land tenure also limited prospects for long term agricultural improvements and effective management of natural resources at the scheme.

Thus, clearly evident in this project intervention was relative lack of 'fit' between project design, beneficiary needs and the capacities of the assisting organisations. In terms of design, the project lacked an institutional and organizational framework capable of effectively delivering credit, engendering security of tenure and fostering self-management among the farmers. Coupled with a poorly mixed state-market policy regime and lack of capacity on the part of assisting organizations, optimum

and sustainable delivery of beneficiary livelihood needs could therefore not be guaranteed at the Mayfield Dairy Settlement Scheme.

In light of the above observations, it is recommended that the powers-that-be address, as a matter of urgency, the long outstanding issue of land tenure insecurity adversely affecting agricultural land owners in the country. This initiative would go a long way in encouraging long term investments at resettlement farms. Further to that there is also need to strengthen extension and social intermediation efforts among the relevant farmer-assisting organisations in order to cultivate a culture of self-reliance, good corporate governance, group cohesion and self-management among project participants at the dairy scheme. Equally important is the need to strengthen financial intermediation efforts so as to usher in a comprehensive and effective credit delivery system for the benefit of all farmers in need of financial support not only at Mayfield Small Scale Dairy scheme but throughout the country.

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