Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

Reducing Milk Wastage in the Milk Value Chain in Kanchomba Area of Pemba District in Southern Zambia

Alfred Sianjase

ABSTRACT

Since June, 2015, Kanchomba farmers in Pemba district of Southern Zambia have been supplying milk to Kanchomba Milk Collection Centre (MCC) which has been supplying to Parmalat Zambia. This survey examines the milk wastage in both quantity and quality along the value chain which reduces farmers' income and nutrition in order to identify the Critical Control Points (CCPs) to reduce the wastage. Data for the study was collected through a semi-structured interview that was conducted to a sample of 36 dairy farmers in Kanchomba area of Pemba District, categorized as 13 from low, 9 from middle and 7 from high producing farmers to give a fair representation. Analysis was done by identifying the key themes that may contribute to wastage, i.e activities of farmers during milking, activities of the MCC from the time they receive milk from farmers to selling and attributes of good quality milk as considered by Parmalat (Z). The analysis revealed that between January, 2017 and January, 2018, farmers lost 12.6% of the milk they supplied to the MCC which was not bought by Parmalat (Z) due to poor quality. Further analysis showed that this is attributed to various causes ranging from poor hygiene at the MCC, poor milking processes by farmers, to irregular timing in milk delivery to the MCC by farmers and collection from the MCC by Parmalat (Z). These results cast doubt on the efficacy of this value chain to reduce poverty and improve household income and food nutrition and security among smallholder farmers. All the chain players may have to implement the recommendations which have been categorised into do it now, do it soon and do it later based on the time required, difficulty and cost implications in implementing the recommendations.

Keywords: *Milk supply, critical control points, quality, milking processes, wastage.*

INTRODUCTION

Smallholder dairy commercialization is frequently considered as a key development strategy in many African countries. There is growing evidence indicating that increasing returns from agricultural production

Alfred Sianjase *is the District Agricultural Coordinator, Ministry of Agriculture, Pemba, Pemba, Zambia. E-mail: alsianjase@gmail.com*

Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

largely depends on the expansion of viable market opportunities (Gabre-Madhin and Haggblade 2004). The commercial transformation of smallholder agriculture is considered as an important pathway for the development of the agricultural sector (World Bank, 2008). Policy-makers, agricultural research institutes, and development organizations in Africa are now shifting attention from enhancing productivity of food crops and livestock to improving profitability and competitiveness of the smallholders by linking them to urban retail markets (Njuki et al. 2011). Therefore, in 2014, a Milk Bulking Centre was built and completed with support from Land-O-Lakes and World Vision in Kanchomba Area in Pemba district of Southern Zambia.

In June, 2015, farmers started supplying milk to this bulking centre (Kanchomba Milk Collection Centre – KMCC) which in turn been supply to Parmalat Zambia – a processor. From January, 2017 to January, 2018, farmers delivered a total of 28,448.50 litres to KMCC managed by the Cooperative (Centre Records, January, 2018). However, in the same period, Parmalat Zambia bought and collected a total of 24,876.50 litres which translates into 87.4% of the supplied milk to KMCC by farmers in nominal terms (KMCC records, January, 2018). This means that KMCC and the households lost about 3,572 litres of milk worth ZMK12,502 at the current price of ZMK3.50.

The introduction of this facility was premised on reducing milk waste and increasing economic and food security benefits to both milk producers (smallholder Dairy Farmers) and consumers along the milk value chain. The important issue, therefore, is that despite that on average farmers are producing and supplying significantly high volumes of milk per annum, less quantities are bought and collected by Parmalat (Z). This high milk production has not commensurately increased income and food security for smallholder milk producers in Kanchomba, thereby leaving these farmers perpetually poor. This study, therefore, examines milk wastage along the milk value chain from the Producers to the Processor through the Milk Collection Centre. Specific objectives are:

i. To investigate the fresh milk wastage in both quality and quantity along the milk value chain.
ii. To draw policy recommendations in order to reduce waste and increase the farmers' income and food and nutrition security along the milk value chain.

Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

METHOD

According to Groves et al. (2004, p.4), the survey is a systematic method for gathering information from (a sample of) entities for the purpose of constructing qualitative descriptors (themes) of the attributes of the larger population of which the entities are members. The study adopted the qualitative survey research design. Data was collected using semi-structured interviews with the respondents who were recruited based on their roles in the value chain. The respondents were drawn from farmers who are milk producers and suppliers to the MCC, MCC Staff responsible for receiving milk from the farmers, and Parmalat Zambia staff who are the milk processors. There are 61 milk producers (farmers) with varying sizes of production levels. Thirty-Eight (38) farmers milk local cows, 12 milk cross-breed cows 11 milk pure Friesian breed cows.

Therefore, 13, 9 and 7 farmers who milk local, cross and pure breeds respectively were randomly sampled for interviews to give a fair representation of each category. In addition, 1 staff from (responsible for receiving milk at Kanchomba MCC) was purposively sampled and interviewed. During the interviews, three main areas were covered. These include activities farmers do during milking processes, milk hygiene practiced by farmers and milk collection centre staff and relevance of milk quality consideration in the milk value chain. Two (2) Parmalat (Z) staff, that is, one responsible for collection of milk from the MCCs and the Depot Manager were interviewed. During this time, investigation was made on the activities of Parmalat (Z) at the time of collecting milk from the MCC and attributes of milk as considered by Parmalat (Z). These Parmalat (Z) staff were recruited by virtual of their roles of ensuring quality milk at the point of collection of milk.

In analysing the data, the farmers' and MCC's activities during milking and receiving and storing milk in chillers respectively were listed and each activity was tagged as to whether it adds value to milk quality (V), creates waste (W) or is just necessary but does not add value or create waste (N). This was done by writing notes in the note book and later analysed as shown in figure 1.

Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

RESULTS AND DISCUSSION

In 2017 (from January, 2017 to first two weeks of January, 2018) the MCC received a total of 28,448.5 litres of milk. However, in the same period, Parmalat Zambia bought and collected a total of 24,876.50 litres which translates into 87.4% of the supplied milk to the MCC. This means that in the same period, 12.6% of the supplied milk was not bought and collected by Parmalat (Z) on grounds of poor quality. Figure 1 provides a schematic representation of the process that maps the physical flow of milk from farmers in the Milk Value Chain.

The value chain map illustrates the stages milk goes through and activities during milking and handling until it reaches the Processor (Parmalat (Z)). Identifying these stages and activities in the value chain is a precondition for identifying Critical Control Points (CCPs) in order to achieve the product as required by the processor. Farmers carry out various activities before, during and after milking as indicated in column 1 in figure 1 above. These activities are either necessary (N) but do not contribute to value adding as considered by Parmalat (Z) while other activities contribute to value in milk demanded by Parmalat (Z), indicated by (V). Some activities create waste and are indicated by (W). The same applies to the activities done by the Milk Collection Centre from the time farmers deliver their milk to the Centre to the time milk is poured into the cooling tanks. Ideally, Parmalat (Z) collects milk from the Centre every second day. Before collecting milk, while at the Centre, Parmalat (Z) does various activities as shown in column 3 in figure 1 above. These activities either create value (V), are necessary (N), or create waste (W). Column 4 lists the attributes Parmalat are looking for in milk and are ready to pay an extra Kwacha for a litre.

The results reveal that most of the waste is occurring at the MCC as hygienic measures are not taken during carrying out several activities as shown in figure 1. However, waste also occurs at farmer level as farmers do not use the standardised milking practices. For example, some famers interviewed confirmed that they do not test for mastitis before milking which may increase the chances of milking a cow that has the disease, thereby affecting milk quality. The inconsistence in collection of milk by Parmalat (Z) also creates waste as milk that stays longer in the chiller gets spoiled.

Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

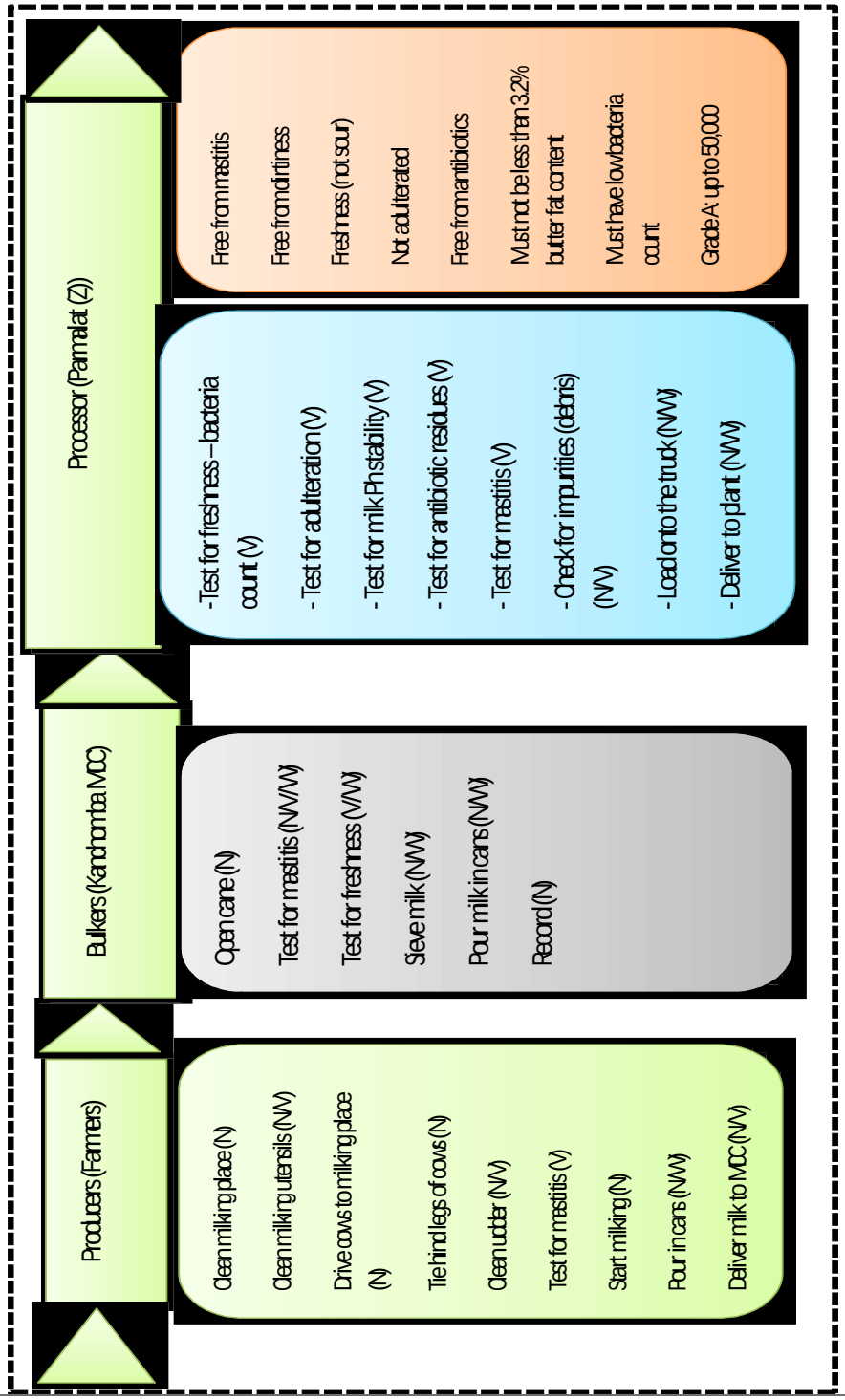
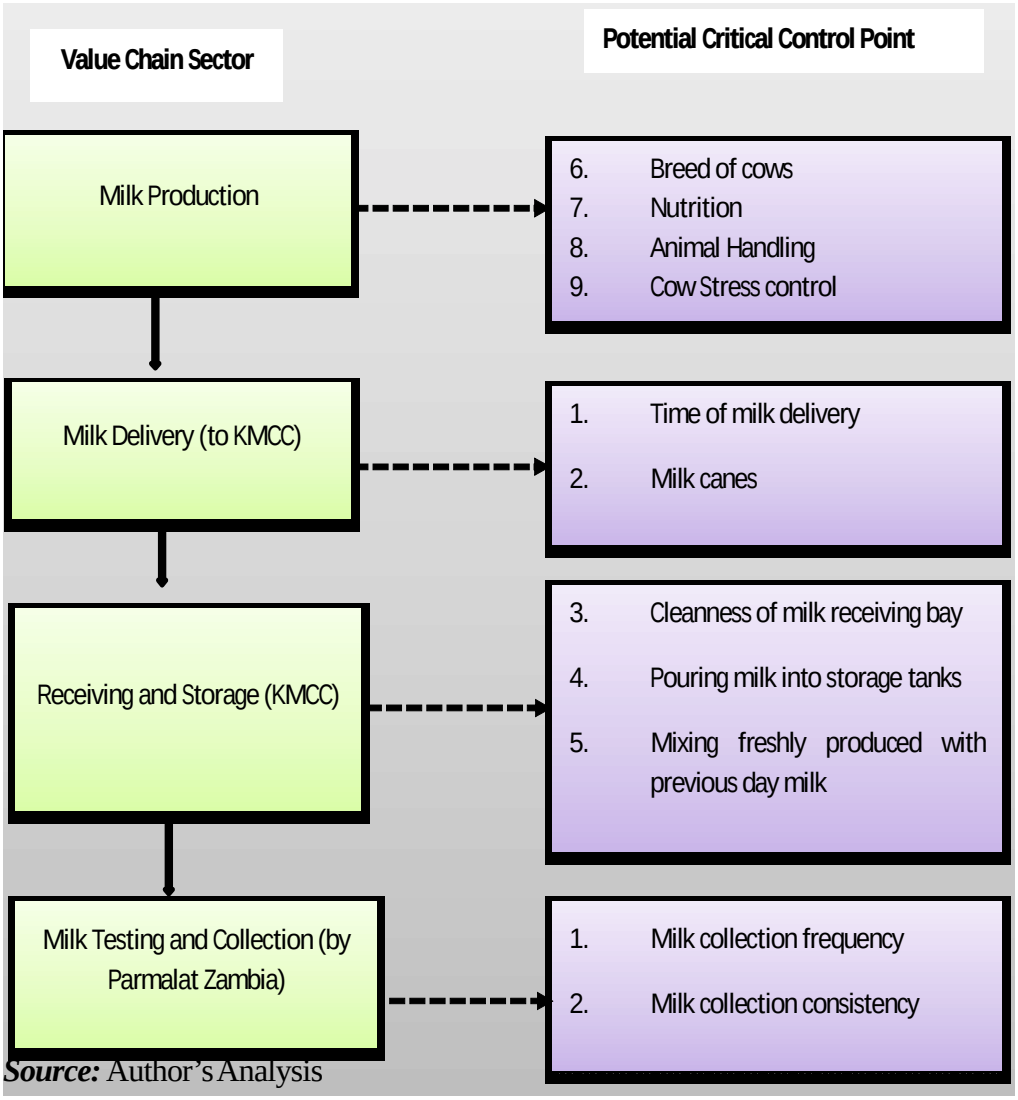


Figure 1: Illustration of Material Flow Analysis

Source: Author's Analysis

Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

Figure 2: Value Based Critical Control Points (VBCCP)



Source: Author's Analysis

Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

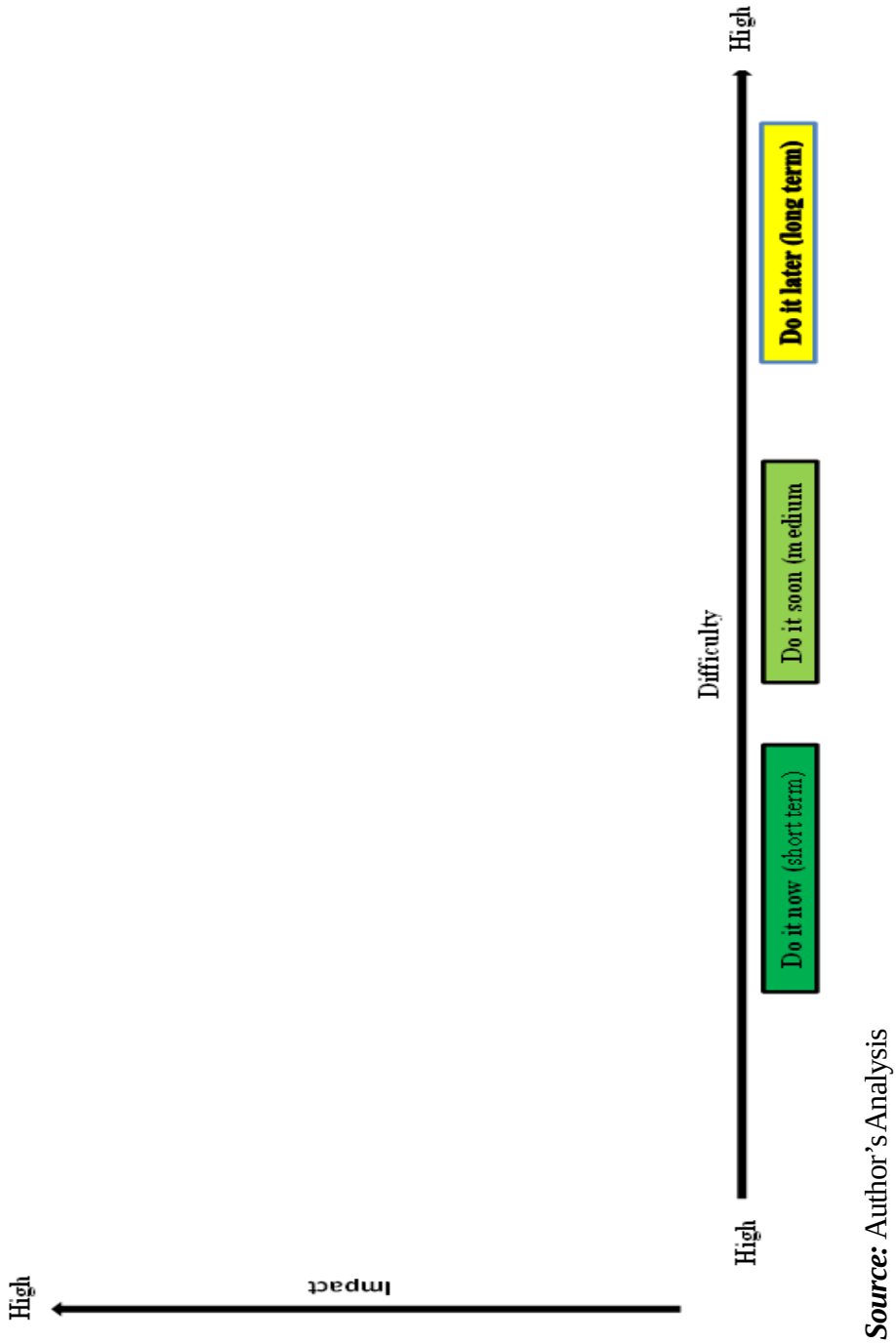


Figure 3: Recommendation Matrix

Source: Author's Analysis

Journal of Environmental Issues and Agriculture in Developing Countries
Volume 11, Numbers 1-3, December 2019
ISSN: 2141-2731
Published By:
International Centre for Integrated Development Research, Nigeria
In collaboration with:
Copperstone University, Zambia.

CONCLUSION AND RECOMMENDATIONS

From the results obtained in this study, it is seen that milk waste mainly occurs at the MCC in quality and in quantity too. Milk waste that occurs in quality at the MCC is as a result of it being rejected by Parmalat due to high bacteria count. For example, from January, 2017 to January, 2018, 12.6% of the supplied milk to the MCC by the farmers was rejected by Parmalat (Z) due to poor quality which largely was due to high bacteria count. In addition, at the MCC, some milk is lost during the process of transferring milk from the can into the cooling tank. However, at farmer level, some milk is lost due to spillage during milking and transferring into the milk cans. In addition, farmers are also losing in terms of milk quantity and quality by not investing in improved dairy cows and feeding regimes i.e more roughage leading to higher butterfat; more protein and carbohydrate (concentrate), higher solids nonfat (SNF).

Based on the results and discussions above, the value based critical control points identified and highlighted in figure 2. The recommendations are categorised into ***do it now*** (short term), ***do it soon*** (medium term) and ***do it later*** (long term) based on how much time is required, how difficult it is and cost implications in implementing the recommendations as shown in the matrix in figure 3

REFERENCES

Gabre-Madhin, E. Z. and Haggblade, S. (2004). Successes in African Agriculture: Results of an Expert Survey. World Development 32(5): *745–766.10.1016/j.worlddev.2003.11.004*

Groves R. M., Fowler F. J., Couper, M. P., Lepkowski J. M., Singer E. and Tourangeau, R. (2004). *Survey methodology*. Hoboken, NJ: John Wiley & Sons.

Njuki J., Kaaria S., Chamunorwa A. and Chiuri W. (2011). Linking Smallholder Farmers to Markets, Gender and Intra-Household Dynamics: Does the Choice of Commodity Matter? *European Journal of Development Research* 23(3): 426–443.*10.1057/ejdr.2011.8*

World Bank (2008). *Agriculture for Development*. *World Bank World Development Report 2008*. Washington, DC: The World Bank.