# Performance of emerging dairy services agri-enterprises: a case study of youth-led service provider enterprises (SPE)

Catherine W. Kilelu; Jessica Koge; Cyrus Kabuga; Jan van der Lee

3R Research report 001 /
WLR report 1094

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March 2018

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The authors

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# Acronyms and abbreviations

| | |
|---|---|
| ADIAS | Assessing and supporting Dairy Input & Advisory service Systems project |
| AI | artificial insemination |
| CBE | collection and bulking enterprise |
| DFCS | dairy farmers cooperative society |
| FGD | focus group discussion |
| GDP | gross domestic product |
| KES | Kenyan Shilling |
| KMDP | Kenya Market-led Dairy Program |
| Ltd | Limited company |
| MDCU | Meru Central Dairy Co-operative Union |
| NGO | non-government organization |
| SNV | SNV Netherlands Development Organisation |
| SPE | Service Provider Enterprise |
| SPEN | Service Provider Enterprise Network |

# Executive summary

The growth of the Kenyan dairy sector has triggered smallholders' demand for various external inputs and services so they can meet the increasing demand for more and better quality milk, delivered at low cost and using sustainable practices. As a result, many business opportunities have emerged along the dairy value chain related to extension and advisory services and inputs delivery, attracting entrepreneurs. Increasingly, youth seeking to venture into various agribusinesses are pursuing these opportunities, either individually or as groups.

The Service Provider Enterprise (SPE) is an innovative youth-led business model in which young men and women form groups to offer commercial support services to entrepreneurial smallholders and medium-scale farmers in the vibrant Kenyan dairy value chain. The model was initiated as a pilot in 2010 with the support of SNV's core subsidy-funded dairy programme. Interested recruits received short-term practical training on technical aspects of silage making and some areas of dairy cow management. There are currently 29 SPEs operating in six counties in high dairy potential regions in Kenya. They are linked to dairy farmer cooperative societies (DFCSs) to provide services to their members and suppliers to help address feed-related challenges.

A study carried out by the 3R Kenya project in collaboration with the Assessing and supporting Dairy Input & Advisory service Systems (ADIAS) project assessed the performance of SPEs to establish the extent to which the model offers business options for youth in agriculture. This assessment addresses technical (i.e. soundness, quality and effectiveness of service delivery) and entrepreneurial (i.e. management, marketing and income generation) performance of the SPEs.

Eight SPEs were purposively selected for the study. Data was collected in June and July 2017. Fifteen SPE representatives were interviewed using an open-ended questionnaire. Key informant interviews were conducted with DFCS representatives and one processor in Meru. Also, focus group discussions for the study were held with a total of 72 farmers across various DFCSs.

**Characteristics of SPEs**

SPE members ranged in age from 18 to older than 35, with the majority (53%) falling in the youth bracket (18–35 years). The majority (59%) had attained a secondary school education, and about 38% had continued with tertiary training. It was also noted that 94% of the active SPE members were male.

**Technical performance of SPEs as service providers**

The main services, which were provided by all SPEs, are silage making and fodder establishment. Silage making was the initial value proposition for establishing SPEs, as most farmers in the study regions were not using silage to feed their dairy cows. The SPEs also offered a range of other services, including fodder establishment, farmer training, input supply (e.g. forage seeds/cuttings and silage-making material) and advisory services (e.g. about feed formulation and rations, calf rearing and record keeping). A few SPEs offered new and more specialized services such as biogas installation, design and construction of zero-grazing units, and soil testing.

*Effects of SPEs at farm and supply chain level:* The study shows that in general SPE services have contributed positively to the dairy supply chain where they are operational. The eight SPEs made an estimated 11,269 tons of silage in 2016, mainly from maize. Farmers who sought SPE services reported some increase in productivity. In Meru, where most silage was made, productivity was up to about 8−9.5 l/cow/day. This is in comparison with the average productivity of 5-6 l/cow/day in the dairy producing regions. Farmers in Meru also generated a higher average daily income from milk sales and experienced reduced fluctuations in their milk volumes during the dry season, noting that silage contributed to this nominal increase. More effort is needed to enable higher productivity increases.

Increased production at farm level resulted in an increase in the volume of milk collected by DFCSs. Where more silage was produced, for example in Meru, DFCS managers indicated that their daily milk collection was stabilizing in all seasons. Furthermore, daily milk collected was within their set target volumes. While many factors may have contributed to more milk intake, including increased membership and supplier loyalty, DFCS representatives said SPE services contributed positively to the increase in their milk collection.

*Challenges limiting SPE technical performance:* Various challenges faced by SPEs affect their performance. These include equipment problems (breakages, limited access and poor suitability, e.g. for compacting), poor quality of silage-making material (e.g. polyethylene), poor quality of and/or access to fodder seeds for forage establishment, poor silage management by farmers, and drought.

**Entrepreneurial performance of SPEs**

SPEs have been able to reach their target market, farmers, although most of the interactions seemed to be for promotional and demonstration purpose. The SPEs provided silage-making services to about 950 farmers in 2016, which is equivalent to only about 7% of total active DFCS suppliers. This shows that SPEs have not yet reached the market potential for their services.

Most SPE members offered services individually rather than as a group, although they use the SPE name to acquire assignments.

*Investment and income generation of SPEs:* A few of the SPEs have made various necessary investments to enhance their business. These include the purchase of new and efficient silage-chopping machinery. Others indicated that the high cost of machinery prevented them from investing. SPE silage-making fees ranged between Kenyan Shilling (KES) 250 and KES 1,000 per ton, depending on whether the SPEs paid for labour and provided choppers. Silage-making services made up the larger portion of SPEs' income. The results show that SPEs with the highest income averaged about KES 46,500/month and those with the lowest income about KES 5,300/month in 2016. Another revenue stream for SPEs was the sale of inputs, mainly fodder seeds.

*Business challenges limiting SPE performance:* The main business challenges for SPEs are the limited financial capacity of farmers to pay for services and the payment delays after services. Other limitations of the business include difficulties in determining appropriate costing of services; slow farmer adoption of promoted technologies and practices; poor planning by farmers when requiring services; costs of promoting and marketing services; limited financing to acquire quality machinery; lack of casual labour, especially during peak (silage-making) season; and limited repeat clients as farmers opt to make their own silage after they learn how.

**Recommendations for various stakeholders in promoting the SPE model**

*Recommendations for policy makers and development agencies*

- **Support broader training:** For this model to work more efficiently, exposure beyond silage making at the initial training and recruitment of SPEs is key. For the SPEs to be able to grow as agribusinesses, there is a need to balance vocational, technical and entrepreneurial skills during recruitment and training.
- **Public investment is needed:** The SPE model has potential not only to engage youth in agriculture but also to support development of the dairy sector. Such a model is worth investing in, including in areas such as skills development and seed enterprise capital.
- **Inclusiveness:** In order to make the model more gender- and youth-inclusive, the different needs of young women and men need to be considered, to reduce the high dropout rate.

*Recommendations for DFCSs*

- **Facilitate SPE creation and strengthen business partnerships:** The DFCSs are in the position to help SPEs form and develop business opportunities for providing their unique services to their members.
- **Inclusiveness:** DFCSs are uniquely positioned to help make the model more gender- and youth-inclusive. Their position as local business enterprises can support the agenda of youth employment in agriculture. This includes factoring in the needs of young women, to enable them to be involved in and benefit from such youth-led enterprises.
- **Business model sustainability:** To increase the sustainability of the SPE model, there is need to consider the pros and cons of having SPEs as independent businesses versus having the SPEs anchored to the support of DFCSs.
- **Business coaching:** A support structure is key to the growth of SPEs. The SPEs are in need of mentorship/coaching, perfecting of technical and entrepreneurial skills, moral support and marketing support.

*Recommendations for SPEs and private service providers*

- **Broadening service offer:** For SPEs to become viable businesses with a stable source of income, they need to complement silage services with a good mix of services that are in demand from farmers.
- **Improving skills:** SPEs need to improve and broaden their skills, in terms of both technical/vocational skills and entrepreneurial skills. This will include the skill to define the need for capital and to apply for it.
- **Seeking out business coaching:** SPEs need to proactively seek business support in developing their businesses.

# 1 Introduction

## 1.1 Kenyan dairy sector development overview

The Kenyan dairy industry is one of the most dynamic sectors in the country and is critical to the economy, contributing to food and nutrition security and to rural livelihoods. The sector is currently valued at about KES 184 billion (USD 2.1 billion) and contributes 4–8% of GDP. The sector's contribution to various socioeconomic dimensions of the country is summarized in ***Table 1*** below. The dairy subsector is estimated to provide employment to approximately two million people either directly or indirectly along the value chain. Actors along the chain include various input and services suppliers, farmers, transporters, traders, dairy farmers' cooperative societies (DFCSs), milk processors, distributors and retailers. The sector's growth is anchored on an estimated increase in domestic milk production (5.3% per year), in processing capacity (7% per year) and in per capita milk consumption (5.8% per year). The average annual consumption per capita is currently 115 litres, and this is projected to grow to 220 litres by 2030 due to envisaged better incomes and better marketing (MoALF, 2010; Rademaker et al., 2016).

***Table 1:*** *Overview of economic contribution of the Kenyan dairy subsector*

| Indicator | |
|---|---|
| Estimated value of dairy contribution to the overall gross domestic product (GDP) | 4–8% |
| Estimated value of dairy contribution to agricultural GDP | 14% |
| Estimated value of dairy contribution to the livestock sector output | 40% |
| Estimated annual growth rate of dairy by product volume | 3.5% |
| Estimated total annual milk production from all livestock (2011) | 5.2 billion litres |
| Estimated total annual milk production (cows) 2014 | 3.9 billion litres |
| Estimated average milk yield (litres) per cow per day | 7–8 litres |
| Estimated amount (litres) of raw milk produced by smallholder dairy farmers | 80–90% |
| Amount of raw milk marketed through informal small business enterprise channel | 84% |
| Estimated processed milk volumes in 2016 (excluding ATM/mini-processing) | 625 million litres |
| Estimated number of jobs at farm level, mostly family farm labour | 1.2 million |
| Estimated direct waged employment | 0.5 million people |
| Estimated jobs created in dairy support services | 0.75 million people |

Sources: Kenya Dairy Board, 2014; Kenya National Bureau of Statistics, 2017; FAO, 2011; MoALF, 2010; 2013; International Dairy Federation, 2016.

As a high value enterprise, dairy farming in Kenya presents profitable opportunities to increase demand for milk and dairy products through sustainable intensification and commercialization of smallholders and medium-scale producers. Enhancing milk production and productivity requires supporting entrepreneurial farmers to improve their dairy farming practices and farm enterprise management. This can be supported by innovative business models that ensure reliable access to inputs, services and finance. Linked to this is support to the robust dairy farmers' organizations system in Kenya, which comprise DFCSs and dairy self-help groups that have played a significant role in the dairy sector development since independence (Wambugu et al., 2011; Rademaker et al., 2016; van der Lee et al., 2016; SNV, 2017). Despite the sector's potential, on-farm milk production has remained low for reasons that include poor animal husbandry, low quality feeds, inadequate feeding, animal diseases, effects of climate change, and diminishing land sizes in high potential areas (MoALF, 2010, 2013).

The Kenyan dairy sector is transitioning from subsistence to greater commercialization, from low investment into capital-intensive and skilled enterprises, from fragmentation to consolidation towards a sophisticated supply chain involving many actors and offering a wide range of milk and dairy products. This transition is attracting both domestic and international investors, who seek to seize emerging business opportunities.

However, much like the agricultural sector in general, dairy is dominated by an older generation of farmers; with limited youth involvement, this poses a potential demographic crisis. This is especially critical considering the high levels of unemployment in Kenya and the new avenues for employment and business that the dairy sector offers (Rademaker et al., 2016). Although rural youth are ambivalent towards agriculture and the role of a farmer is particularly unpopular, there are many opportunities for engaging youth as agri-entrepreneurs along high value chains such as dairy. According to AGRA (2015), inclusive approaches can tap into the dynamism of Africa's youth and their desire to work in productive and profitable agribusinesses to boost agricultural productivity, ensure sustainable food production systems, create jobs and generate incomes.

## 1.2 Emerging opportunities for engaging youth in agri-entrepreneurship

The emerging opportunities for enlisting youth as service providers in the agricultural sector are linked to the growing drive towards sustainable intensification and commercialization of small- and medium-scale farmers in sub-Saharan Africa (ECA, 2009; African Union, 2014). From a policy perspective, involving youth in high value agricultural sectors such as dairy, in roles other than as producers, is to tap into the potential of a young educated population that can be trained and skilled to meet input and services delivery gaps necessary to develop sustainable agri-value chains and food systems. Such agri-food systems are increasingly knowledge-intensive and technologically dynamic and will require entrepreneurial producers to seek out the requisite technical and managerial support to be sustainable and competitive (FAO et al., 2014; Filmer and Fox, 2014; AGRA, 2015). The dairy sector in Kenya provides a good example of this push for sustainable intensification and market integration, especially of smallholder producers. The growth of the Kenyan dairy sector has triggered smallholders' demand for various external inputs and services in order to meet increasing demand for more and better quality milk delivered at low cost and using sustainable practices (van der Lee et al., 2016). As a result, many business opportunities along the dairy value chain have emerged, such as extension and advisory services and inputs delivery. Among the entrepreneurs attracted to these opportunities are youth seeking to venture into agribusiness, either individually or as groups (Lunguli and Namusonge, 2015; Kilelu et al., 2016; MoALF, 2017). Through this pathway, the agricultural sector can be a driver of sustainable and inclusive economic growth and contribute to employment creation and improved livelihoods for the youth.

Kenya has adopted a pluralistic extension and advisory services approach that includes public, private and non-government organization (NGO) actors who seek to meet the diverse needs of farmers located in different regions and with different farming systems (Muyanga and Jayne, 2008; Kilelu et al., 2011; Bebe et al., 2016). As Kilelu et al. (2016) have shown, support to smallholders with ambitions for sustainable commercialization requires a broad range of advisory services and inputs that can be summarized as 'innovation support'. While privatization of agricultural extension and advisory services in some contexts has not adequately met the needs of small-scale farmers, it is argued that such support needs to be better targeted to address the limiting factors in such contexts (Labarthe and Laurent, 2013). The support ranges from accessing appropriate information, skills and technologies to enhancing entrepreneurial capacity and brokering linkages with other actors for co-innovation and knowledge exchange. Emerging private sector extension and advisory services are geared to provide a range of market-based solutions to business-minded farmers seeking to grow and exploit market opportunities. Private sector extension and advisory services delivery need skilled service providers with entrepreneurial drive, creativity and innovativeness, meaning these business prospects are attractive and interesting for youth. Such service agri-enterprises may require minimal start-up capital. In the dairy sector, liberalization policies of the past 15 years have resulted in the government reducing its role in providing services such as artificial insemination (AI), veterinary and extension services; this change creates space for new business models offering such services (Bebe et al., 2016; Kilelu et al., 2016; van der Lee et al., 2016).

Various efforts have emerged to support youth-led agribusiness models in Kenya (MoALF, 2017). This study focuses on one model: the Service Providers Enterprise (SPE) model that is engaging youth in service provision in the dairy value chain in Kenya.

## 1.3 The SPE model: Background and evolution

The SPE model is characterized as a group-owned enterprise of mainly post-school rural youth who offer agricultural services to producers within their localities. The SPEs target vibrant, high value sectors or value chains such as dairy.

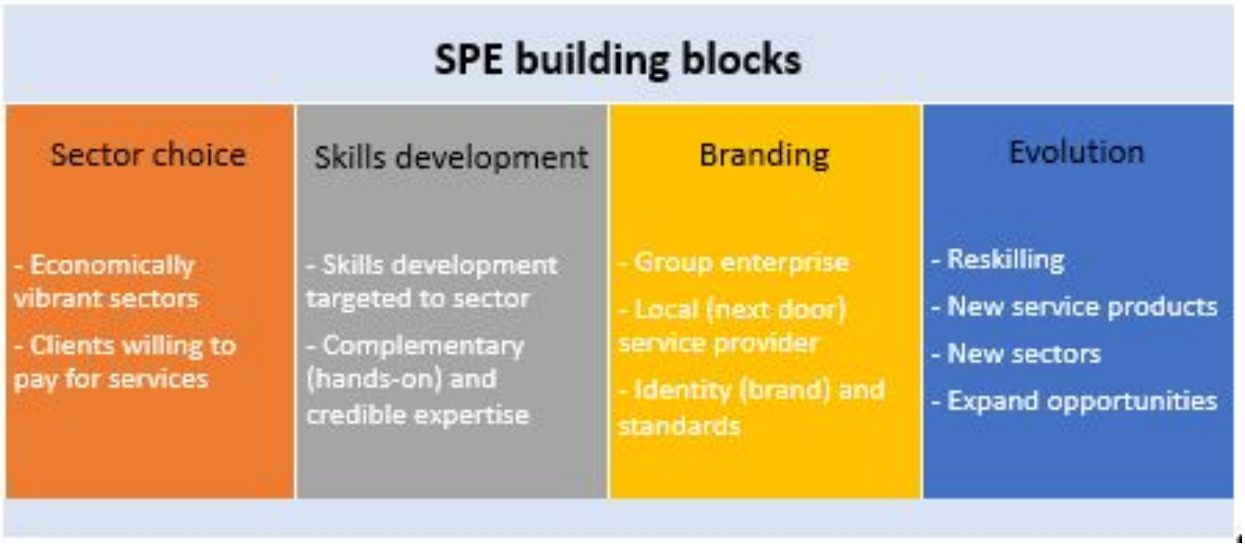


***Figure 1**: Building blocks of SPEs as a dynamic model*

(Source: Maina, 2011)

Underpinning the SPE model are several conceptual building blocks as summarized in ***Figure 1*** (Maina, 2011). These include:

i) The model requires vibrant sectors in which to anchor service delivery. The assumption is that producers in economically vibrant agricultural sectors will be willing to pay for services that support growth of their enterprises.

ii) The service providers are equipped with practical skills that are targeted to needs in the sector, skills that can generate demand.

iii) The enterprise members offer services as a common (shared) brand, as a group-owned enterprise rather than as individuals. They are therefore governed by a common code of conduct.

iv) The service providers need to continually improve their competencies and evolve into new service areas to ensure that they offer competitive services to their (would-be) clientele.

The SPE members received short-term vocational practical training on some technical aspects of silage making and some areas of dairy cow management to enable them to offer quality services commercially. The value proposition of the SPE model in dairy is to improve productivity through promotion of silage and complementary services (such as fodder establishment) and advisory support on dairy management.

The model was initiated as a pilot in 2010 with the support of SNV's core subsidy-funded dairy programme (SNV, 2013). The pilot phase started with four SPEs located in Nyandarua, Nyeri and Embu counties. These four SPEs later merged into a limited company: SPEN Ltd (www.spenkenya.com). The group in Embu suffered leadership challenges and did not survive past the formation phase. However, it is important to note that the present day SPEN groups offer services in Embu, among other areas.

The SPE concept was scaled up through SNV's Kenya Market-led Dairy Program (KMDP-I, 2012–2016) funded by the Embassy of the Kingdom of the Netherlands in Nairobi. Eleven more SPEs were established in 2014 and 2015, spread across Eastern (five in Meru), Central (four in Nyeri and Nyandarua) and Rift Valley (two in Baringo and Uasin Gishu) regions. Meru Dairy Co-operative Union (MDCU) Ltd and its constituent DFCSs[1] and farmer groups were impressed by the successes of the SPEs in the Meru region. MDCU requested KMDP Phase II (2017–2019) to support scaling up of the model. So far, this has resulted in an additional 15

[1] As some dairy farmer organizations (e.g. New Ngorika Milk Producers Ltd) have a legal status other than cooperative societies, SNV KMDP uses the more generic term 'collection and bulking enterprise' (CBE). For ease of understanding, we use the term dairy farmers' cooperative society (DFCS).

SPE groups within Meru County. This is part of an effort by MDCU to increase and stabilize milk supplies to its processing plant.

To date, the SNV program has facilitated recruitment, growth and development of 29 SPEs, as summarized in ***Table 2***. These are anchored in DFCSs existing in the SPEs' local areas of operation. Over time, SPEN have expanded their geographical coverage to other counties as well as abroad. In Eastern Africa, they have worked in Tanzania and Uganda.

***Table 2:*** *Number of SPEs established in various counties*

| County | No. of SPEs | Total active members | Male | Female |
|---|---|---|---|---|
| Meru | 21 | 132 | 123 | 9 |
| Nyeri | 1 | 3 | 2 | 1 |
| Nyandarua | 3 | 9 | 9 | 0 |
| Nakuru | 1 | 4 | 3 | 1 |
| Baringo | 2 | 7 | 6 | 1 |
| Uasin Gishu | 1 | 5 | 4 | 1 |
| **Total** | **29** | **160** | **147** | **13** |

## 1.4 Objective and purpose of study

This study sought firstly to investigate the technical (i.e. service delivery) performance of SPEs and their results in addressing the feeding-related challenges of smallholder dairy farmers in order to enhance productivity and production. We also looked at the influence that SPE services have on other industry actors (DFCSs and processors) along the value chain. Secondly, the study assessed the entrepreneurial performance of the SPEs to understand the extent to which the model offers business options for youth in agriculture. To understand SPEs' entrepreneurial performance, we analysed their entrepreneurial skills, competencies, resources and business outcomes of their services (see ***Figure 2***.)
The specific research questions were:

i. How are SPE members performing as service providers and what factors influence their performance?
ii. How are SPEs performing as agri-enterprises and what factors influence their performance?

The results of this study are expected to shed light on the strengths and weaknesses of the model, as well as on the potential and bottlenecks for scaling of the model. The insights will be used to frame policy and practice recommendations moving forward.

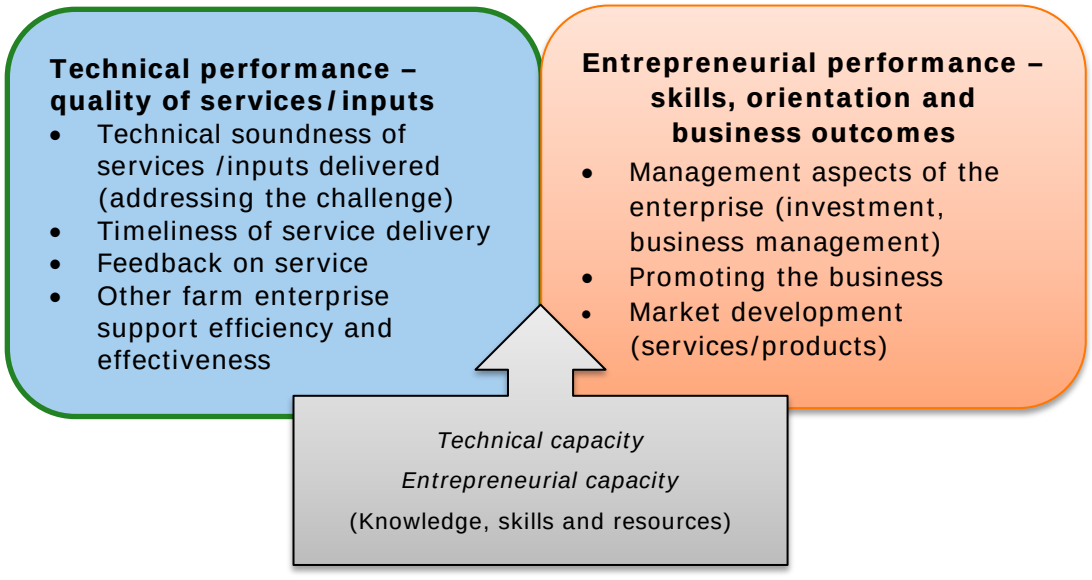


***Figure 2:*** *Analytical framework for analysing SPEs*

# 2 Research method and study design

## 2.1 Study sites

The study was conducted in four of the six counties where the SPE model has been implemented: Meru, Nyeri, Nyandarua and Baringo. Data was collected in June and July 2017. A sample of eight operational SPEs were drawn from groups that were formed between 2010 and 2015. SPEs formed in 2017 (KMDP-II) have been left out as their performance cannot yet be assessed. In Meru, three of the six SPEs were randomly selected. In Baringo two out of five were purposively selected in consideration of the distances between them, in order to reduce travel time. Two SPEN groups were randomly selected, one in Nyandarua County and another in Nyeri County. Details of the SPEs and the DFCSs they are linked to are summarized in ***Table 3***. A map showing their locations is provided in ***Figure 3*****.**

***Table 3:*** *Details of DFCSs and linked SPEs in this study*

| County | Sublocation | Related DFCS | SPE | No. of focus group participants |
|---|---|---|---|---|
| Baringo | Mumberes | Mumberes | Bokimu | 7 |
| | Koibatek | Kiplombe Farmers | IDM | 11 |
| Meru | Mikumbune | Nkuene | DRIP | 8 |
| | Mbwinjeru | Mbwinjeru Ariithi | Bidii | 10 |
| | Buuri | Naari | DASPE | 11 |
| Nyandarua | Ndaragwa | Nyala | Intertech | 9 |
| | Kanjuiri | New Ngorika Milk Producers Ltd | Ngorika | 4 |
| Nyeri | Chorong'i | Kiunyu | Unique | 12 |
| **Total** | | **8** | **8** | **72** |

## 2.2 Data collection

Data was collected from the SPEs, DFCSs and FGDs in June and July 2017 using the following methods (see annexes for the three tools used):

- SPE interviews using an open-ended questionnaire to acquire information about the role of SPEs in the dairy value chain in terms of service delivery and entrepreneurial performance. Two SPE representatives of each of the SPE groups from Meru, Baringo and Nyandarua counties were interviewed. In addition, one representative of Unique SPE from Nyeri was interviewed, bringing the total to 15 interviewed representatives. The representatives selected for the interviews held key leadership roles within their group. They therefore had information about the group's operations in terms of their service delivery and competencies as well as the general performance of their businesses.
- Focus group discussions (FGDs) were held with groups of farmers from each of the sampled DFCSs who were available at the time of the study. A total of 72 farmers participated in the FGDs. The FGD checklist was designed to collect a mix of quantitative individual farming data (e.g. feed preserved and milk collected by the DFCS and outside markets) and qualitative information related to SPEs and their contribution to on-farm changes.
- Key informant interviews were conducted with representatives of the eight DFCSs whose members had received services from the selected SPEs. Moreover, the manager of MDCU, which processes milk from the DFCSs in Meru County, was interviewed. These interviews gathered information about how services provided by SPEs contributed to DFCS businesses and about areas that SPEs could improve on to enhance their performance.

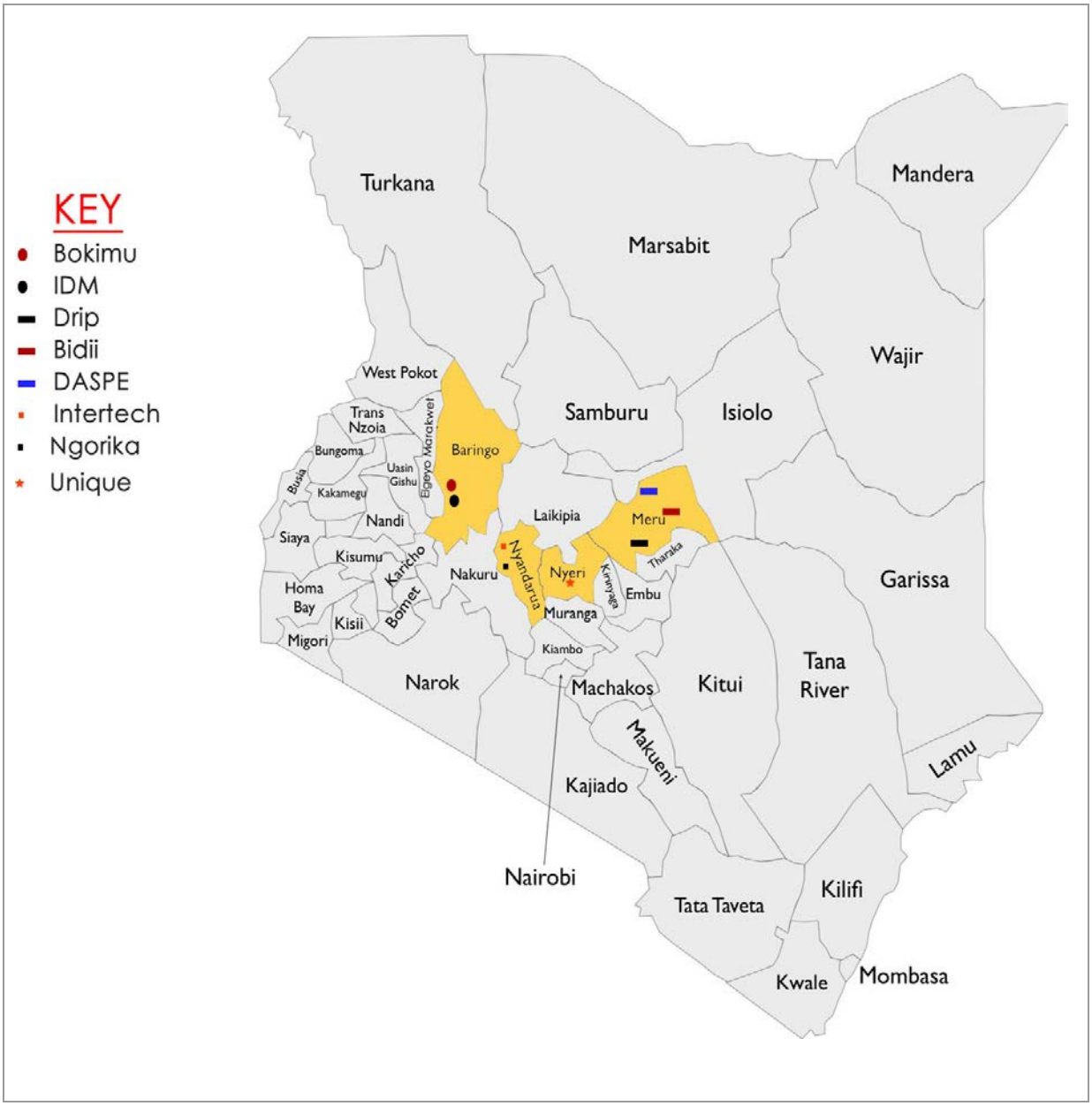


***Figure 3:*** *Map showing SPE locations*

# 3 Results: Performance of SPEs as service providers

## 3.1 Characteristics of SPEs and their services

### 3.1.1 Client base of selected SPEs

The eight SPEs offer services to members of the linked DFCSs. As ***Table 4*** shows, the SPEs have a potential client base of the 14,227 farmers who are actively supplying milk to the DFCSs.[2] But this number is potentially higher, considering that the DFCSs have more registered members who, at any given time and for a number of reasons, are not supplying milk.

***Table 4:*** *Selected SPEs and their target clientele base*

| SPE entity name | DFCS working with the SPE | Registered DFCS members (no.) | Active DFCS members at time of interview |
|---|---|---|---|
| Bokimu | Mumberes | 4,847 | 1,093 |
| IDM | Kiplombe | 2,235 | 1,500 |
| DASPE | Naari | 4,223 | 544 |
| Bidii | Mbwinjeru Ariithi | 600 | 340 |
| DRIP | Nkuene | 4,200 | 1,270 |
| Ngorika | New Ngorika | 2,400 | 900 |
| Intertech | Nyala | 13,000 | 8,500 |
| Unique | Kiunyu | 154 | 80 |
| **Total** | | **31,659** | **14,227** |

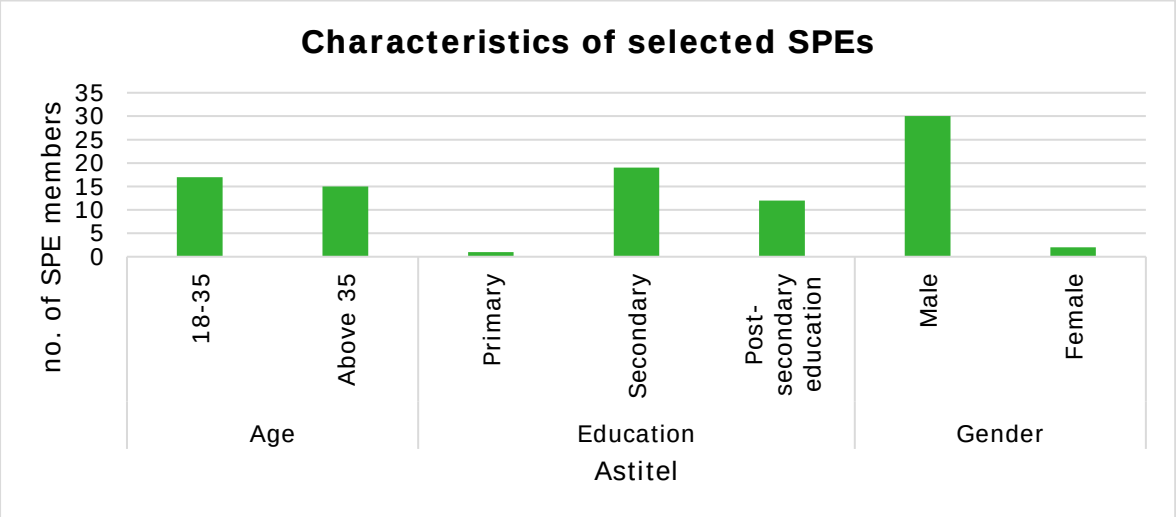


***Figure 4:*** *Membership demographics for SPEs (n=32)*

[2] Active DFCS members are those actually supplying milk to the DFCS at any given moment. This number fluctuates throughout the year due to i) lactation dynamics – all cows belonging to a member may be dry; ii) marketing dynamics –members may sell to other milk buyers instead of to the DFCS.

### 3.1.2 Characteristics of selected SPEs

The Majority (53%) of SPE members are characterised as youth, defined as 18–35 years old.[3] All SPE members had acquired at least basic education (primary level), while the majority (59%) had attained a secondary school education. About 38% had attended (at least some) additional post-secondary training. About 94% of the active SPEs members were male (***Figure 4***).

The SPEs had an average of four active members, with Intertech, Unique and Bokimu having the lowest (three members each) and DRIP having the highest number (six members). About 43% of those recruited and trained remained active service providers (***Table 5***).

***Table 5:*** *SPE membership*

| SPEs | Year formed | Recruited members | Active members | Males active | Females active |
|---|---|---|---|---|---|
| Intertech | 2010 | 12 | 3 | 3 | 0 |
| Unique | 2011 | 20 | 3 | 2 | 1 |
| Bidii | 2014 | 7 | 4 | 4 | 0 |
| DASPE | 2014 | 8 | 5 | 5 | 0 |
| DRIP | 2014 | 5 | 6 | 5 | 0 |
| IDM | 2015 | 6 | 4 | 4 | 1 |
| Bokimu | 2015 | 7 | 3 | 3 | 0 |
| Ngorika | 2015 | 5 | 4 | 4 | 1 |
| **Total** | | **70** | **32** | **30** | **3** |

As ***Figure 5*** shows, all SPEs interviewed provided silage-making services – which was the initial value proposition for establishing SPEs – as well as fodder establishment, training and inputs supply (details of inputs are given in section 4). Advisory services were also key services offered by the SPEs. These included feed management, calf rearing, record keeping and breeding. Less frequently supplied services were soil testing and biogas installation.

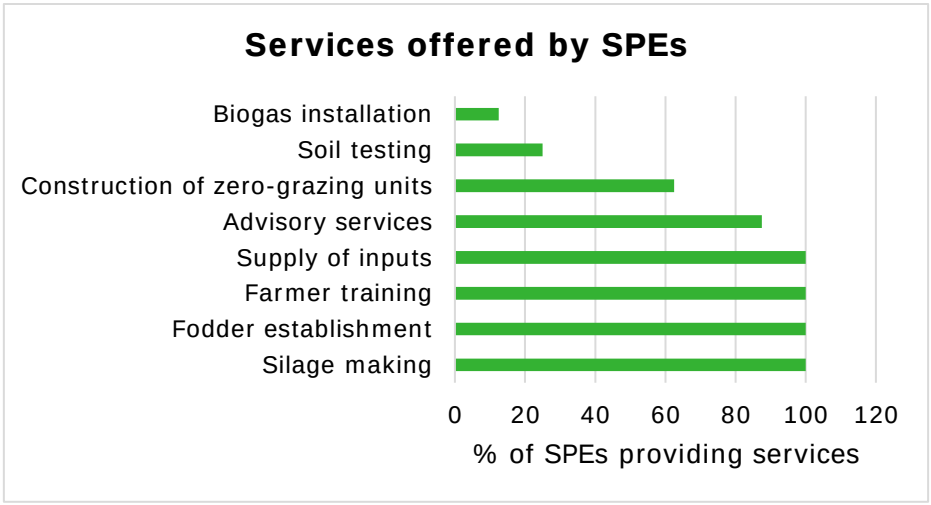


***Figure 5****: Types of services offered by SPEs (n=8)*

### 3.1.3 Type of services provided by SPEs

Farmers noted in the FGDs that silage making and fodder establishment were the main services they sought from SPEs. For fodder establishment, farmers wanted support with planting and advice on good fodder management (e.g. fertilization, weeding and spraying). Farmers also indicated that they had received

[3] At recruitment for the study, the majority were in the youth bracket.

advisory services from SPEs as opposed to from government officers. There was limited demand for other services, such as biogas installation and soil testing.

To integrate silage in their dairy enterprises, farmers noted that they need to make some investments. These were mainly purchase of equipment such as chaff cutters, choppers and other related inputs, including cement and other construction material for the bunkers, polyethylene wrappers and molasses. Some farmers also had to allocate an area from their existing land, while others leased land for planting fodder crops. During silage making and fodder establishment, farmers also had to hire additional labour. Farmers seeking biogas installation services also had to invest in labour and various equipment.

The frequency of the use of silage-making services in 2016 is shown in ***Figure 6*** below. Of the farmers interviewed, 35% had used silage-making services three or more times within the past 12 months, 40% twice and 25% once. Use of SPE silage-making services was most frequent among Mbwinjeru Ariithi farmers, where the majority (75%) of farmers used the services at least four times in 2016. This could partly explain why Bidii SPE, working with the Mbwinjeru Ariithi DFCS, made more silage than any other SPE.

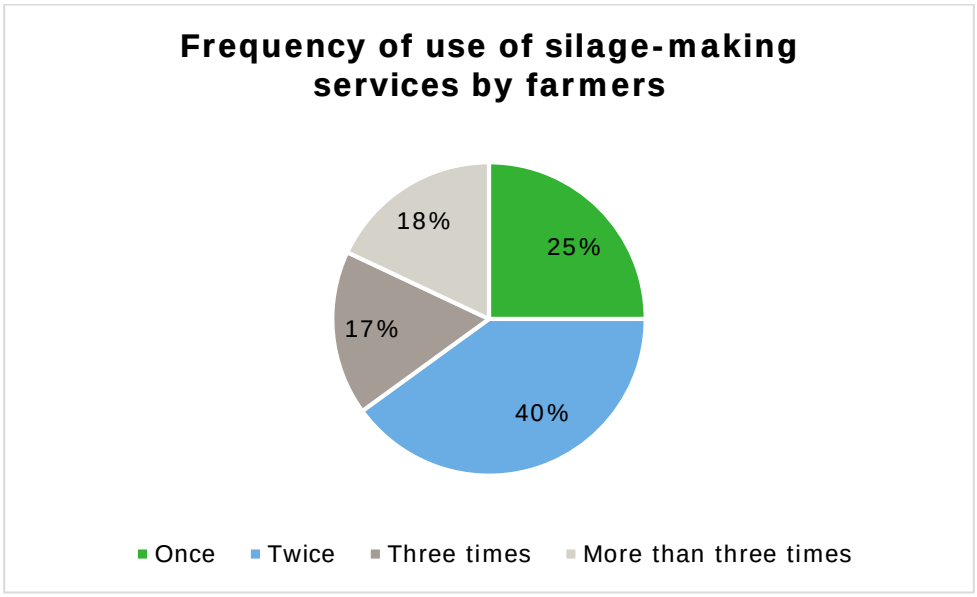


***Figure 6**: Frequency of use of silage-making services by farmers (n=72)*

## 3.2 Farm-level outcomes of using SPE services

This section provides results about farm-level outcomes related to use of SPE services.

### 3.2.1 Integrating silage in dairy farms

According to the FGDs, it took the formation of the SPEs for silage to become a common practice in their regions of operation. Most farmers relied on traditional feeding practices, such as open grazing, tethering and feeding on maize stover, or on improved practices that have been promoted since the 1980s, such as feeding on Napier grass.

As noted earlier, SPEs were formed mainly to support farmers increase silage production and use. Silage-making services include harvesting, chopping, compacting and tubing and, sometimes, provision of the materials required for ensiling. According to the representatives from the eight SPEs, the groups made about 11,269 tons of silage in 2016 (***Figure 7***). The results show that SPEs in Meru County made the highest volumes; these were followed by the Intertech and Unique groups.

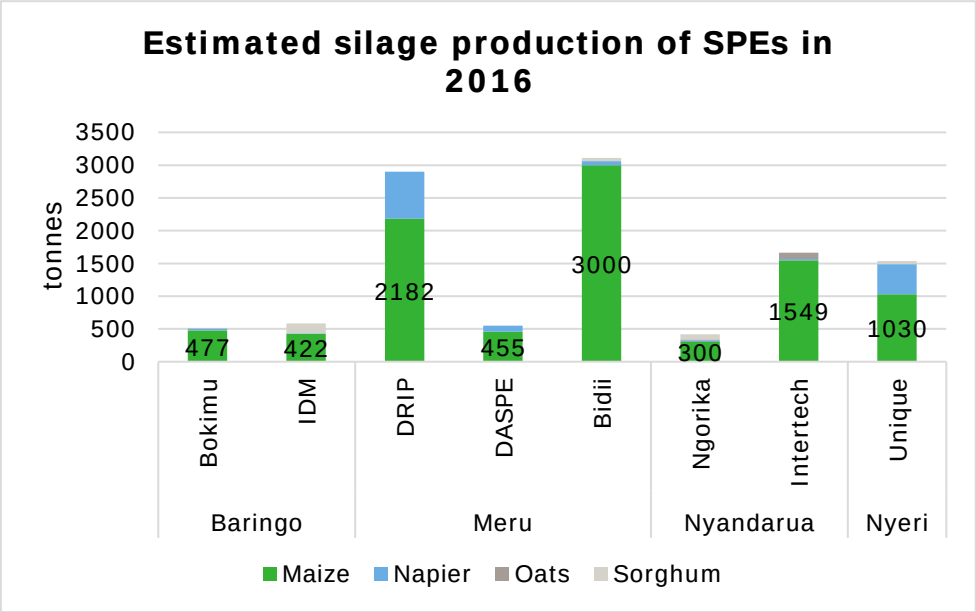


***Figure 7:*** *Volumes of silage made by SPEs (values on bars show quantity of maize silage, not total silage)*

All SPEs made at least two out of four types of silage for farmers, that is, maize, Napier grass, sorghum and oats. Maize silage was the most common silage made by all SPEs, with an estimated 9,415 tons made in 2016 (about 83% of the total silage made). Some farmers, for example from Naari DFCS, made silage from both white and yellow maize.

***Table 6:*** *Fodders currently conserved by farmers in sampled SPEs*

| | FGD | Types of fodder conserved | | % of farmers interviewed conserving fodder | Avg. tons of silage conserved per farmer interviewed | Avg. no. of cows per farmer in DFCS |
|---|---|---|---|---|---|---|
| Meru | Naari | Silage | Maize | 100 | 17.3 | 8 |
| | Nkuene | Silage | Maize | 90 | 29.2 | 3 |
| | | Crop residues | Maize, cowpea, groundnut and bean | 60 | 2.2 | |
| | | Hay | Rhodes grass and wheat straw | 25 | 6.9 | |
| | Mbwinjeru Ariithi | Silage | Maize, Napier grass and sorghum | 70 | 26.2 | 2 |
| Baringo | Mumberes | Silage | Maize and oats | 100 | 6.8 | 9 |
| | | Crop residues | Maize | 40 | 1.5 | |
| | | Hay | Rhodes grass | 10 | 0.5 | |
| | Kiplombe | Silage | Maize, sorghum and Napier grass | 100 | 66.2 | 25 |
| | | Grasses/hay | Lucerne, Rhodes and Sudan grass | 50 | 0.3 | |
| Nyandarua | Ngorika | Silage | Sorghum and maize | 100 | 4.1 | 5 |
| | Nyala | Silage | Maize, Napier grass and oats | 10 | 60 | 8 |
| | | Hay | Rhodes grass | 20 | 1.4 | |
| Nyeri | Kiunyu | Hay | Rhodes grass | 40 | 0.5 | 1 |

### 3.2.2 Fodder conservation at farm level

Interviewed farmers noted that they were now conserving feed to enhance feed availability for the dry season ***Table 6.*** Most farmers indicated that they had conserved some silage, except in Nyala, where only about 10% of farmers had, and Kiunyu, where none had. In Kiunyu, farmers said they had conserved silage in the past, but current drought conditions affected maize production. Farmers interviewed from Kiplombe reported the highest volumes of conserved silage per farm, averaging 66.2 tons in 2016. They also had larger herds (average of 25 cows per farmer).

Some farmers noted that the silage they made was not sufficient for the dry season. This indicates that SPEs need to competences to guide farmers on assessing how much silage is needed for their cows (feed planning). To do this, they need to take the specific circumstances of individual farms into consideration, such as length of dry season, dry matter content, type of cow and cost–benefit ratio.

### 3.2.3 Benefits of SPEs' silage-making services at farm level

Farmers interviewed mentioned increased milk production as a primary benefit of silage-making services. As the graph below **(*Figure 8*)** shows, farmers in Meru – where most silage was made – reported higher productivity compared to those from other counties. The interviewed farmers from Naari and Nkuene DFCSs indicated that they had achieved an average of 9.5 l/cow/day, and those from Mbwinjeru Ariithi DFCS got 8 l/cow/day.

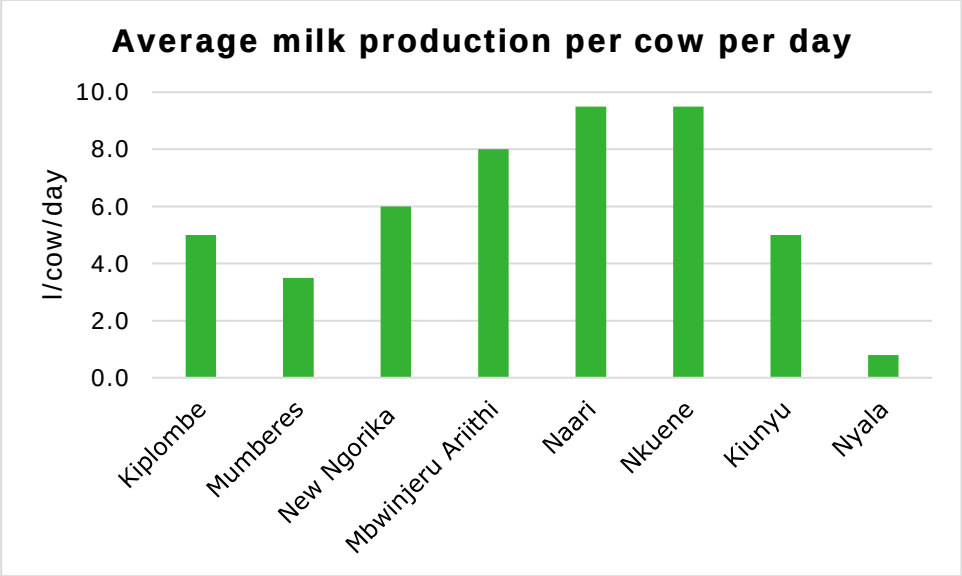


***Figure 8**: Average milk production per cow per day for DFCS farmers*

Considering the average productivity of 5 l/cow/day in Kenya, and with access to feed and feeding management being key limiting factors to productivity (MoALF, 2010), the productivity increases can be linked to the work of the SPEs, especially to the silage making.

During the FGDs, farmers also reported other benefits of fodder establishment and use of silage as summarized in the list below**.** They also identified reduced wastage of manure as a benefit associated with the construction of zero-grazing units.

- Increased milk production
- Reduced fluctuations in milk volumes between wet and dry season
- Better animal health and increased weight gain
- Increase in herd size (calves)
- Fodder during the dry season and lower production costs
- Less post-harvest losses
- Reduced energy and time for collecting grasses outside the home

### 3.2.4 Boosting milk production for more income

Farmers in all of the DFCSs[4] indicated that they rely on milk as their primary source of income ***Figure 9***. It was only in Mumberes that farmers mentioned a variety of primary on-farm (including milk) and off-farm income sources. The importance of milk as a source of income is illustrated ***Figure 9*** which shows the estimated daily income of farmers from milk delivered to the DFCS.

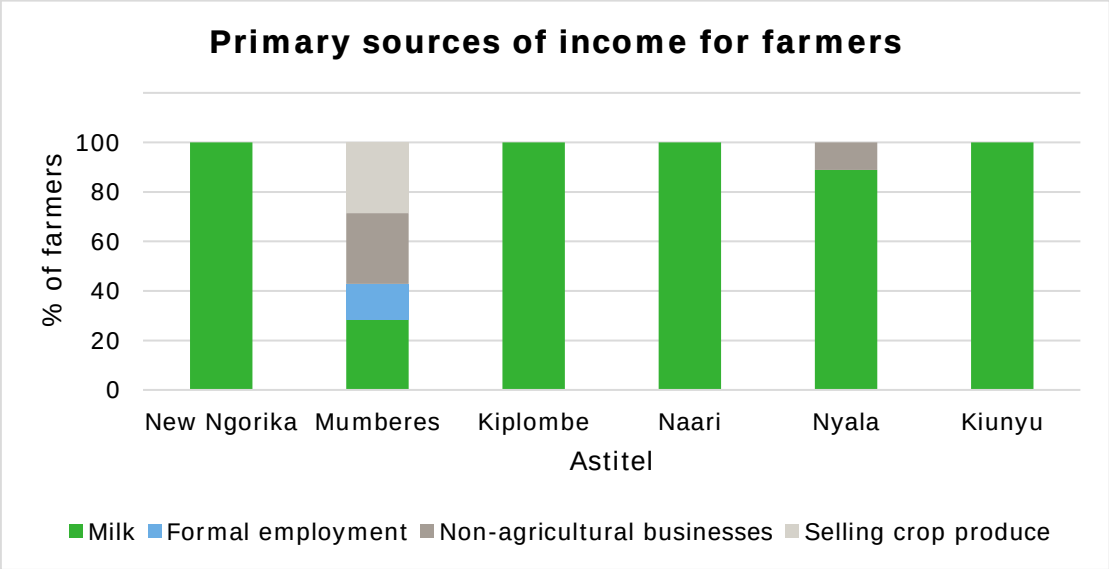


***Figure 9:*** *Milk as a primary source of income compared to other sources*

Farmers from Nkuene generated the highest gross revenue from milk of about KES 1,779 (USD 17.79) a day, while farmers in Mumberes had the lowest gross revenue of about KES 263.50 per day (USD 2.64) as summarized in **Figure 10**

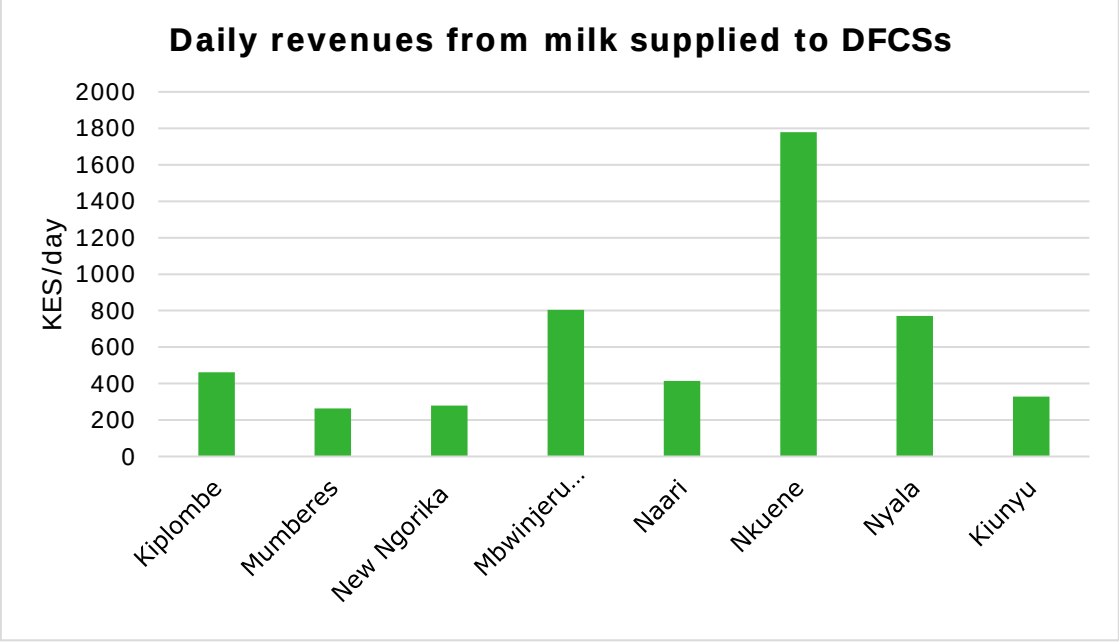


***Figure 10:*** *Farmers' proceeds from milk according to FGDs*

The revenue from milk does not take into account milk sold to other markets, such as the local market, and costs of production have not been factored in. All in all, in general increased milk production can provide farmers with a decent revenue.

[4] This question was not originally asked in Nkuene and Mbwinjeru Ariithi DFCSs, but was added after a pretest on the tool was carried out in the two DFCSs.

## 3.3 Impacts of SPE services on other value chain actors

### 3.3.1 Increased milk collection by DFCSs and processors

The increased milk productivity at farm level is partly contributed to increased volumes of milk collected at DFCSs. This is an indication that SPE services have a positive effect along the dairy value chain. Panel data on the DFCS milk intake from 2012 to 2016 showed an overall increase in volumes across most DFCSs, as summarized in ***Figure 11***.

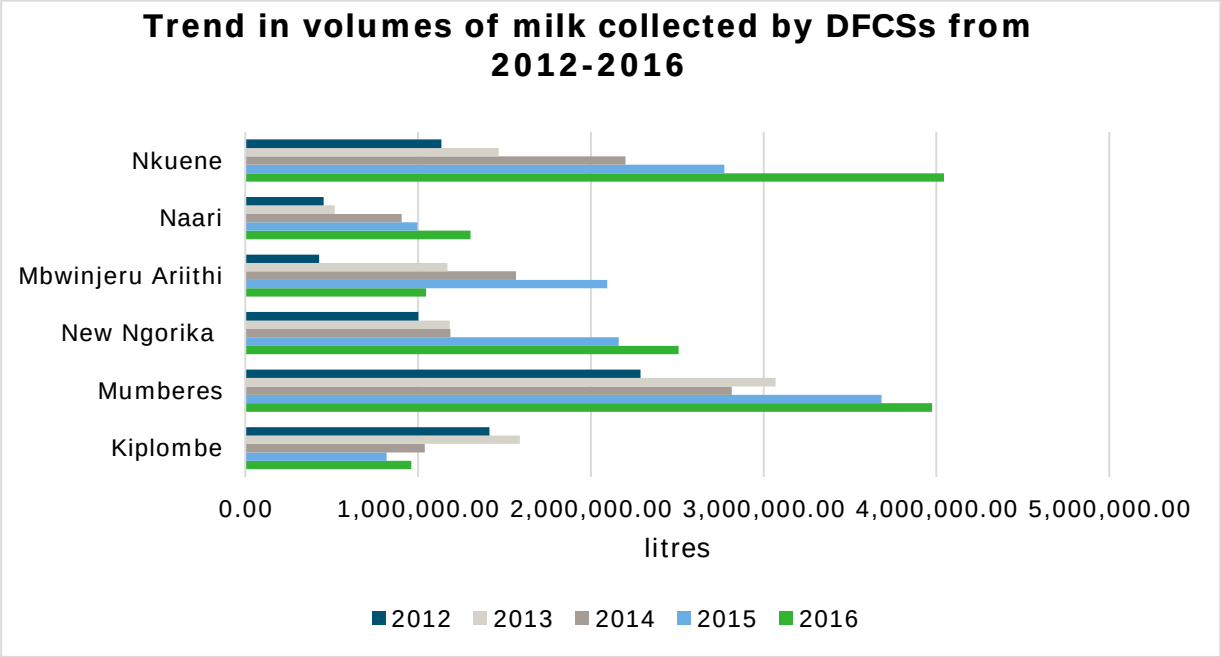


***Figure 11***: *Trend in milk volumes collected by the DFCSs*

While many potential factors may have contributed, including increased membership and supplier loyalty, DFCS representatives said that SPE services noticeably increased their milk collection. A trend analysis of six of the sampled DFCSs where data was available indicated a greater percentage increase in milk volumes in locations where SPEs made the highest volumes of silage. Nkuene, Naari and Mbwinjeru Ariithi, for example, saw 256%, 187% and 145% increase in milk collection respectively over five years, while active suppliers increased by only 134%, 100% and 90% respectively.

According to the MDCU manager, there was a difference in the volume of milk collected from DFCSs that worked well with their SPEs and those that did not, with the former collecting more milk. It was noted that MDCU extension teams collaborated with SPE groups to link with farmers and jointly facilitate silage-making demonstrations. MDCU paid SPEs an allowance to carry out such training and demonstrations.

The DFCSs set specific targets for milk collection in order to grow business. In addition, they aimed to reduce seasonal fluctuations in the volumes they collected. There were interesting observations from initial snapshot data from the selected DFCSs on the maximum and minimum daily milk collection in 2016 ***Figure 12***, with the difference in volumes between these values indicating that seasonal fluctuations were still a challenge for most of the DFCSs. However, it appeared that in areas where increased silage making was bolstered through SPE support, that is, in Meru, the DFCSs had lower fluctuation rates. Nkuene DFCS had about 12.8% difference between minimum and maximum daily volumes, Naari 8.7% and Mbwinjeru 14.3%. The other DFCSs had higher fluctuation rates, with Nyala having the largest difference in maximum and minimum volumes (220% difference). Many factors could contribute to the large differences observed. But the results suggest that enhanced use of silage and improving feeding management helped stabilize milk production. However, more conclusive understanding of these effects requires longitudinal data that was not available for this study.

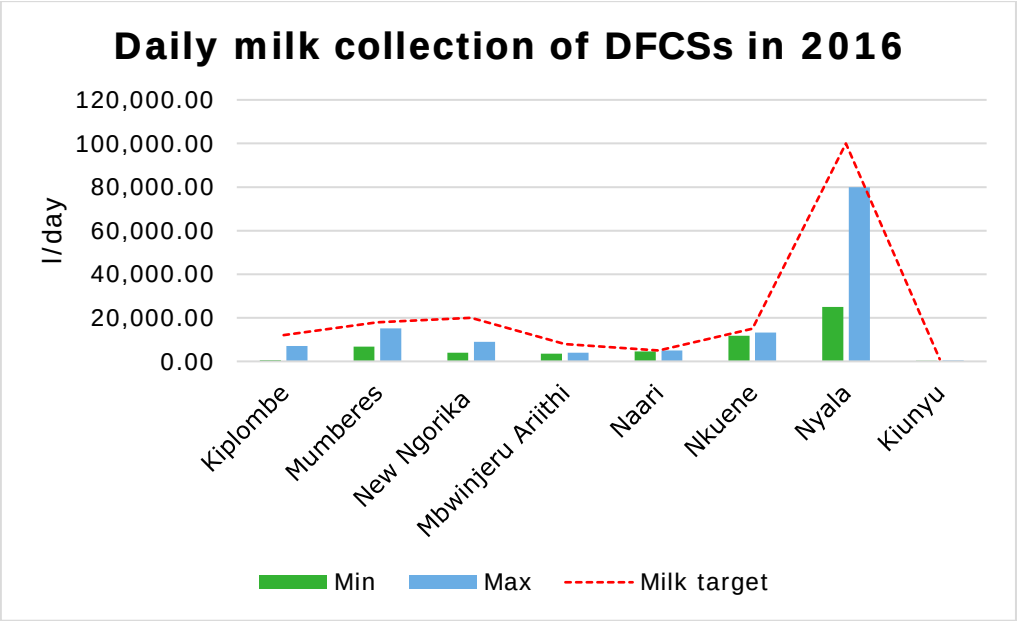


***Figure 12:*** *Range of milk volumes collected by the DFCSs compared to their collection targets*

## 3.4 Challenges in service delivery facing SPEs

The results show that SPE services had positive effects at farm level and, by extension, on other actors along the value chain. However, the SPEs faced a number of challenges that limit their operations and their ability to achieve more impact and at a larger scale. These limitations were intertwined with the challenges that constrained farmers from demanding SPE services. **Table 7** summarizes the challenges that we characterize as technical. Lack of appropriate and quality machinery is the factor that most constrains SPEs from delivering services. Other challenges that affect most SPEs include poor quality of ensiling material, limited access to quality seed and limited farmer adoption of new practices.

***Table 7:*** *Technical challenges faced by SPEs that limit operations*

| Technical challenge | % of SPEs that identified the challenge |
|---|---|
| Lack of machinery (choppers, chaff cutters, pulverizers) for silage making | 87.5 |
| Poor quality of ensiling material (polyethylene) | 62.5 |
| Poor quality of and/or limited access to fodder seed | 62.5 |
| Slow farmer adoption of new practices (not following advice) | 62.5 |
| Farmland area too small for construction of proper zero-grazing units | 37.5 |
| High workload during peak silage-making season affecting timely delivery of services | 25.0 |
| Skills gap in providing other demanded services (e.g. AI, animal health) | 25.0 |
| Rains lowering the quality of silage harvested in that period | 25.0 |
| Rodent attacks in silage bunkers (moles) | 12.5 |
| Farmers uncovering silage before it is ready | 12.5 |
| Drought, hence fewer silage-making job opportunities | 12.5 |

Addressing the above challenges, faced both by farmers as users and by SPEs as providers of services, would ensure that the service offer would be better adapted to demand, which would benefit both parties. SPEs grow as a business, so improving performance to offer timely and better quality services will generate more business opportunities.

Another challenge facing SPEs as group enterprises is the dropout of SPE members after recruitment, attributed to either internal or external factors. The attrition rate was 20–85%, as summarized in ***Table* 8** below. Internal factors generally relate to leadership skills and group dynamics. External factors include climatic conditions, farm sizes and access to markets. Analysis of the SPE members' growth trend showed that some members left the enterprise to work on their own, including making silage; moved to a different enterprise; or were employed elsewhere.

***Table 8:*** *SPE membership status*

| SPE entity name | Year formed | Recruited members | Active members | Dropout members | Dropout rate % |
|---|---|---|---|---|---|
| Intertech | 2010 | 12 | 3 | 9 | 75% |
| Unique | 2011 | 20 | 3 | 17 | 85% |
| Bidii | 2014 | 7 | 4 | 2 | 43% |
| DASPE | 2014 | 8 | 5 | 2 | 37% |
| DRIP | 2014 | 5 | 4 | 1 | 20% |
| IDM | 2015 | 6 | 4 | 2 | 33% |
| Bokimu | 2015 | 7 | 3 | 4 | 47% |
| Ngorika | 2015 | 5 | 4 | 1 | 20% |
| **Total** | | **70** | **30** | **38** | **57%** |

# 4 Performance of SPEs as agri-enterprises

This section analyses the business performance of SPEs operating as agri-enterprises. It explores how viable SPE ventures contribute to income generation for youth.

## 4.1 Establishment, operation and capacities of SPEs

During establishment of the SPE groups all of the recruited members received practical training, facilitated by SNV, on silage making, fodder establishment, basic dairy cow management and business skills. However, in order for the SPEs to remain competitive in service provision, they have to progressively acquire and enhance relevant skills, knowledge and technology. SPE members interviewed sought information in various forms and from various sources such as training materials that were provided by various trainers during initial and other subsequent training sessions. Other sources of new information and knowledge were the internet, farm visits and dairy exhibitions. SPE interactions with DFCS staff, dairy experts and private service providers (e.g. animal feed suppliers, Perfometer) provided additional learning opportunities. The results indicate that SPEs focused on improving the technical aspects of their services and less on the business aspects of the enterprise.

## 4.2 Scope of clients served by SPEs

As shown in **Figure 5**, the SPEs offer a diverse bundle of services. As ***Table 9*** below shows, farmer training was offered to the most farmers, followed by silage making. SPEs preferred demonstrations as a method of training and extension. The training sessions were either fee-based, facilitated (i.e. paid for by a third party such as an NGO, processor or DFCS) or provided for free as a marketing strategy.

***Table 9:*** *Summary of services delivered in 2016*

| Number of farmers served by SPEs in 2016 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Activity** | **Bidii** | **Bokimu** | **DASPE** | **DRIP** | **IDM** | **Ngorika** | **Intertech** | **Unique** | **Total** |
| Silage making | 231 | 147 | 125 | 321 | 38 | 34 | 21 | 32 | 949 |
| Fodder establishment | | 352 | 15 | 0 | 4 | 11 | 3 | 5 | 390 |
| Farmer training | 760 | 1,445 | 140 | 145 | 112 | 275 | 350 | 530 | 3,757 |
| Soil testing | 60 | | | | | | | 2 | 62 |
| zero-grazing unit design | 2 | 15 | 15 | | | 2 | | 2 | 34 |
| Advisory services | | 15 | | | | 2 | 3 | 0 | 20 |
| Hay making (baling) | | 2 | | | | | | | 2 |
| Biogas installation | 1 | | | | | | | | 1 |

Some of the SPEs' members have invested in their farms to leverage SPE activities. That was the case for the Bidii SPE Chair, who has developed his farm into a training centre and breeding farm (***Figure 13***). The owner invested in the reconstruction of the zero-grazing units, established a training room, purchased additional cows and increased fodder acreage and fodder preservation.

### 4.2.1 SPE modes of service delivery

SPEs have adopted a hybrid business approach, offering services either as a group or as individual members, with the latter being the most common mode of service provision. The SPE representatives interviewed said they preferred offering services individually, although they use the SPE name to acquire assignments. Reasons for working as an individual included efficiency (saving time on decision-making processes and budgeting) and reduced costs for clients in terms of SPE member transportation costs to and from the farm and in labour charges; this was especially true for cases of small silage quantities.


***Figure 13**: Bidii SPE member dairy training*

### 4.2.2 Marketing approach of SPEs

As emerging entrepreneurs, SPEs promoted their services through various channels, such as dairy field days (exhibitions) organized by various actors and county and national agricultural fairs. DFCS-facilitated forums were identified as a good marketing option. Word-of-mouth marketing by early adopters connected SPEs to new clients. Such referrals from clients and related social networks were the most common means of acquiring job opportunities for SPEs. While national trade fairs such as Nairobi, Nakuru and Eldoret annual agricultural shows were noted to provide opportunities to expand business entry, exhibition fees were considered high and constrained SPEs from attending regularly.

### 4.2.3 Product development

While SPEs started with silage making and fodder establishment services, the expanded services portfolio shows that part of the business task is to identify new services and products of use to clients. The summary in **Table 10** shows how different SPEs introduced new products.

***Table 10:** Summary of new services integrated by various SPEs*

| Services added to SPE portfolio in 2016 | SPE that have integrated the service | Remarks |
|---|---|---|
| Biogas installation | Bidii | Skills were acquired in 2016 and served few farmers |
| Zero-grazing unit design | Unique and Ngorika | Supervised construction of four zero-grazing units |
| CowSignal training | Unique and Intertech | Offered services on cow comfort / farm planning introduced through PUM and other Dutch experts |
| Hoof trimming | Unique and Intertech | Trained on hoof trimming; it's yet to be commercialized |
| Soil testing | Bidii and Unique | Over 60 soil samples collected and analysed |
| Feeds formulation | DRIP, Bokimu, Unique, Intertech | Advised farmers on rations |
| Hay baling | Bokimu | Provided baling services |

Ngorika SPE members designed and constructed two zero-grazing units in 2016, earning KES 21,000, and Unique SPE supervised construction of two zero-grazing units in 2016, earning KES 10,000. Other groups (i.e. Bidii, Bokimu, and Daspe) indicated that they provided zero-grazing unit construction advice as a free service. Bidii SPE members provided soil testing services to 60 farmers whereas Unique SPE did soil testing for 2 farmers only in 2016. Bokimu SPE member provided hay-baling services and traded in fodder tree shrubs. Silage inoculates were traded mostly in Meru region (DRIP SPE member). While SPEs diversified services to expand their business, the results show that their delivery of such additional services remained relatively low.

## 4.3 SPE income generation

### 4.3.1 Product pricing

SPEs generate income mainly from silage making, specific advisory services and sale of inputs. The pricing of different services is summarized in ***Table 11.*** Silage was charged per ton. The fees ranged between KES 250 and KES 1,000. Low fees were paid where the SPE mainly provided supervision services, and the farmer sourced the various materials and equipment and paid the casual labourers. SPEs charged higher fees where they operated on a full contract that involved sourcing and paying the casual labourers and providing the chopping machine. Some DFCSs set silage-making prices; for example, Naari DFCS set silage-making fees at KES 2,000 per day irrespective of the amount of silage made. Naari DFCS also provided two choppers for hire and passed a by-law where their milk suppliers were to allocate at least 0.25 acres for fodder production, increasing service opportunities for SPEs.

***Table 11:*** *SPE product pricing*

| SPE | Bokimu | IDM | DRIP | Ngorika | DASPE | Bidii | Unique | Intertech |
|---|---|---|---|---|---|---|---|---|
| Silaging (KES/ton) | 450 | 500 | 650 | 500 | 2,000/day | 500 | 1,000 | 500 |
| Establishment/baling (KES/acre) | 1,500 | - | - | 1,600 | - | 1,000 | 2,000 | 4,000 |
| Training organized farmer groups (KES/head) | - | - | - | - | - | - | 100 | - |
| Zero-grazing unit (KES/unit) | | - | - | 10,500 | - | | 5,000 | |
| Soil testing (KES/service) | | | | | | 1,500 | 1,000 | |

These results indicate that most of the training conducted by SPEs was initially promotional and for marketing the services. Free training included silage-making demonstrations. The variations in SPE product pricing indicate the need to establish the basis of costing.

### 4.3.2 Monthly gross income

Based on services and products offered in 2016, the results show that SPEs varied in their business performance. Silage-making services made the highest contribution to SPE earnings. The average incomes varied for different groups as summarized in ***Table 12.*** Unique and Intertech made the highest average monthly incomes, although there was seasonal variance based on the peak months for silage making. Other SPEs, such as DRIP and IDM, made much lower average incomes of about USD 53 and USD 73 per month respectively. SPE incomes are clearly linked to the volumes of silage made.

To explain the low incomes, some SPEs indicated that they had limited market penetration and faced seasonal gaps in silage-making activities. Further, it was noted that some trained farmers and their managers were now making silage on their own, once they had acquired the skills from SPEs. SPEs observed that growing their customer base through new clients took time.

Another key revenue stream for SPEs was the sale of farm inputs, fodder seeds being the main product. Of all groups, Intertech made the highest annual income (KES 176,500) from sales of about 552 kilograms of various types of fodder seeds in 2016, as summarized in ***Table 13.*** Intertech has been trading in fodder inputs since 2010, so it has more than seven years of experience in this business. It has established strategic networks with multiple fodder seeds suppliers and multipliers as well as a sizeable customer base of repeat customers.

***Table 12:*** *Average gross monthly income – goods and services traded in 2016*

| SPE | KES (monthly average per member) | Remarks |
|---|---|---|
| Bidii | 12,054 | Received almost a constant income in 2016. Some of their clients have invested in an irrigation system, while their anchor DFCS had a milk supply contract that assured farmers of a constant pay for 12 months. They work as group and contribute KES 600/person to a group savings scheme on monthly basis. |
| Bokimu | 11,060 | Jan–April and July (five months) are low season months, while October to December (three months) are high season months. Most income is earned while working as a group. |
| DASPE | 15,052 | Rain-fed farming. The DFCS that works with Naari (DASPE) has two choppers for hire and has a set silage-making charge for SPEs of KES 2,000 per day. |
| DRIP | 5,395 | Had their anchor DFCS extension officer trained alongside the SPEs on fodder management and thus supports farmers on preservation. Some farmers have invested in irrigation and were quick to adopt silage making. Had limited income from the sale of fodder inputs. |
| IDM | 7,314 | Located in region that experiences prolonged dry periods. Had the lowest income of all SPEs from sale of fodder inputs. Due to limited fodder business, the SPE has ventured into milk transportation. They charge the least per ton for silage (mean of KES 250). |
| Ngorika | 8,050 | This SPE indicated slow adoption of modern dairy practices by their farmers. |
| Intertech | 36,896 | Has six peak business months (July–December). Trades fodder inputs during low silage months. Targets medium and large-scale farmers. Plans to participate in dairy exhibitions regularly. Shareholder of SPEN Ltd and can expect to reap from their investments. |
| Unique | 46,467 | Has four peak business months (June–September) and three medium business months (January–March), and has little income from SPE activities for the rest of the year. Shareholder of SPEN Ltd. Shareholder of SPEN Ltd and can expect to reap from their investments. |

***Table 13:*** *Summary of inputs sold by SPEs in 2016*

| Input | Unit | Bidii | Bokimu | DASPE | DRIP | IDM | Ngorika | Intertech | Unique | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Seeds sold in 2016** | | | | | | | | | | |
| Maize seeds | kg | 10 | | | 10 | | 30 | 330 | 300 | 680 |
| Lucerne | kg | 15 | 0.5 | 6 | | | 5 | 10 | | 36.5 |
| Desmodium | kg | | 0.5 | 1 | | | | 3 | | 4.5 |
| Vetch | kg | | | 1 | | | 2 | | | 3 |
| Sorghum | kg | 3 | | | | 50 | 5 | 100 | | 158 |
| Lupin | kg | | | | | | | 100 | | 100 |
| Calliandra | kg | 4 | | | | | | 3 | | 7 |
| Tree Lucerne | kg | | | | | | | 3 | | 3 |
| Sesbania | kg | | | 2 | | | | 3 | | 5 |
| Rhode grass | kg | | | | 10 | | | | | 10 |
| Total seeds | kg | 32 | 1 | 10 | 20 | 50 | 42 | 552 | 300 | 1,007 |
| **Other products traded in 2016** | | | | | | | | | | |
| Grass hay | bales | | | | | | | 1,000 | | 1,000 |
| Molasses | 20 l | 6 | | | | | | | | 6 |
| Plastic polyethylene | roll | | | | | | | 20 | | 20 |
| Lactic acid | gm | | | | 3 | | | | | 3 |
| Weighing band | pcs | | | | | | | | 20 | 20 |
| Dairy manual | pcs | | | | | | | | 100 | 100 |

### 4.3.3 SPE investments

In order for the SPEs to remain competitive as service providers, they made various investments related to their core business, as summarized in ***Table 14***. The main investments highlighted were the purchase of new and efficient silage-chopping machinery by Bidii, Unique and Intertech SPEs. Despite unfavourable weather conditions in 2016, Bidii indicated it had acquired more assignments in silage making after investing in efficient choppers that cost KES 165,000 (approx. USD 1,650). Intertech and Unique acquired new choppers individually costing KES 150,000 (USD 1,500) and KES 100,000 (USD 1,000). Intertech acquired a motor vehicle for ease of chopper transportation and doing other business. There were also individual investments at farm level for those SPE members that had farms.

SPEs financed their investments mainly from their own savings and bank loans (five out of eight SPEs). SNV supported Bidii through a cost-sharing arrangement to acquire their first chopper: SNV provided 50% and Bidii got a bank loan for the remaining 50%.

***Table 14:*** *SPE investments – as a group and by individual members*

| | Intertech | Bidii | Bokimu | DASPE | DRIP | IDM | Ngorika | Unique | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Group investments 2016** | | | | | | | | | |
| Chopper/chaff cutter | | 182,000 | | | | | | | 182,000 |
| Equipment and branding | 53,000 | | | | | | | 53,000 | 106,000 |
| **Individual investments 2016** | | | | | | | | | |
| Chopper | 150,000 | | | | | | | 100,000 | 250,000 |
| Motorcycle | | | | | | 50,000 | 110,000 | | 160,000 |
| Motor vehicle | 400,000 | | | | | | | | 400,000 |
| Herd purchases | | 600,000 | 20,000 | 70,000 | | | | 500,000 | 1,190,000 |
| Silage roller | | | | | 1,200 | | | | 1,200 |
| Zero-grazing unit reconstruction | | 200,000 | | | | | 2,000 | | 202,000 |
| Total (KES) | **550,000** | **800,000** | **20,000** | **70,000** | **1,200** | **50,000** | **112,000** | **500,000** | **2,203,200** |

Results indicated that low investment either individually or as a group for DRIP, Bokimu and IDM and SPEs partly contributed to their low business, and this can result in low ability to grow or access capital. Gaining access to finance was noted as an issue where SPEs would like support.

## 4.4 Business challenges affecting SPEs

As a new model in dairy service provision, SPEs face a number of business challenges, some internal and others external. As summarized in ***Table 15*****,** three quarters of SPEs interviewed indicated that receiving payment for services is the main challenge. This is partly because some of the farmers take an informal approach to the SPE service provision model, viewing the skilled local youth as promoting community welfare.

***Table 15:*** *Summary of business challenges facing SPEs*

| Business challenges | % of SPEs that identified the challenge (n=8) |
|---|---|
| Payment issues (delayed, credit defaults) | 75 |
| Costing of services (basis of pricing various services, tonnage estimation, promotional costs recovery) | 50 |
| Slow farmer adoption of new technologies and practices promoted | 50 |
| Poor planning (unprepared farmer, unavailability of necessary materials) | 50 |
| Difficulty in managing labourers (especially farmer-hired workers) | 25 |
| Low investment by clients (viewed as expensive, hence fewer work assignments) | 25 |
| Transport to clients (sometimes SPEs travel long distances by public means) | 12.5 |
| Skill transfer (knowledgeable farmers /manager make silage themselves) resulting in fewer repeat customers | 12.5 |

## 4.5 External factors influencing SPE performance

The results show variation in the technical and business performance of SPEs. Several factors were identified from the interviews and discussions that contribute to these different performances; some of these are outlined below.

*Agro-ecological zones*

The SPE model predominantly depends on silage making as the primary income-generating venture. It was established that variations in agro-ecological zones (e.g. in soils, temperature, rainfall patterns) of the various counties affect SPE business operations.

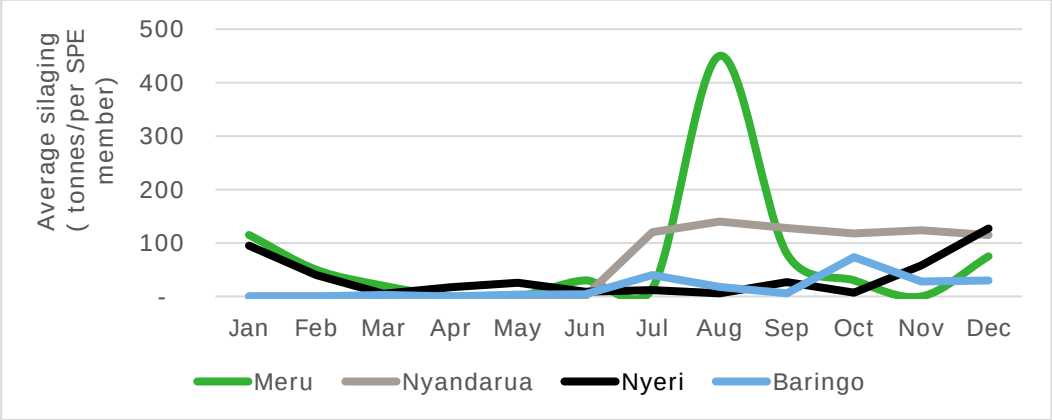


***Figure 14:*** *Agro-ecological zones and silage seasonality*

SPEs operating in the highlands (Nyeri and part of Meru), 2,000–3,000 metres above sea level, have less business because of limitations in the cropping cycle and fewer choices in fodder crop varieties, due to frost and the longer maturation of crops. SPEs based in arid and semi-arid regions of Nyandarua and Baringo County are constrained by a long duration (between January and June) with limited fodder crops for preservation (***Figure 14***). In Baringo County, the SPEs indicated that most of the silage-making business was between August and December, coincided with the single maize harvesting season. These agro-ecological zones offer limited business opportunities.

For the SPEs located in warm and wet regions, it is plausible to achieve 2–4 cropping cycles of maize silage per year under intensive cultivation. These localities include parts of Meru (Bidii and Mbwinjeru operational locations), and the SPEs there have assured business for more months each year.

*Socioeconomic status of target farming households*

Counties with a higher percentage of their population living below the poverty line have a more limited market for SPE services. IDM and Bokimu are located in Baringo County, which has the highest poverty level among the counties studied, at 58%, followed by Ngorika in Nyandarua County, where the percentage of people in poverty is 46.6% (KNBS, 2017) compared to the national average of 45.2%. These counties are unable to support as much SPE business as Meru County can, which has a poverty rate of 28.3% and is a smallholder-dominated county (about 98.6% of the rural population is smallholder-based farming (KNBS, 2017). The poverty levels of the target market therefore may affect the willingness and ability of farmers to pay for SPE services.

*Access to machinery/equipment*

Difficulty in accessing choppers limited the silage-making opportunities that SPEs could take up. SPEs mostly rely on DFCSs to hire out their choppers, which are also often inadequate. SPEs also use chaff cutters that can only chop small amounts of maize in each go and are therefore inefficient. Breakdown of machinery poses an additional challenge for SPEs. Having enough well-maintained equipment is therefore crucial to efficiency of service delivery, acquiring new business opportunities and reaching a larger client base.

## 4.6 Building an SPE support network

SPEN Ltd, as the original SPE, put some effort into branding and marketing that contributed to their growth. They served a wide range of clients: smallholder, medium and large-scale dairy farmers in Kenya and other countries in Eastern Africa. As part of the plan to scale the SPE model, SPEN Ltd was linked to nascent SPEs to support them to become established. This was done in Meru County in 2014 (Bidii, DRIP and DASPE) and Nyandarua and Baringo counties in 2015 (Bokimu and IDM).

The SPEN members traded in different fodder inputs from different source locations, and worked with the SPEs in distribution and marketing. For example, SPEN from Nyandarua sourced vetch and Lupin seeds from KALRO Oljororok and send them to Meru SPEs, while former members of Embu SPE source Calliandra seeds from KALRO Embu to send to Nyeri SPEs. Intertech played a key role in distribution of over 10 tons of fodder maize seed from Nakuru to Meru in 2015 and 2016.

Regarding post-recruitment training, SPEs interviewed indicated that SPEN Ltd's support during fodder campaign demonstrations was crucial, as it helped build their confidence at initial stages of their engagement in silage making, fodder establishment and establishing of linkages with other value chain actors. SPEN Ltd provided the young SPEs with mainly technical support and some aspects of business development and management. Strengthening the SPE networks is therefore an important aspect of further development of the model.

# 5 Discussion and conclusion

## 5.1 Enabling entry of youth in agribusiness

The study shows that the SPE model offers a good opportunity for engaging youth as service providers in dairy, which is a high potential sector with growing demand for services and inputs. The SPE model has enabled entry of post-school youth into business and income-generation activities in the agriculture sector. The majority of youths engaged in SPEs had completed high school, and a minority had attained tertiary training. SNV support to the SPEs focused on vocational and practical training, which is critical so that SPEs can offer the services that are of interest to farmers. Such vocational training has been shown to be important to enable easy entry for youth into agribusiness (FAO et al., 2014). In a context of limited opportunities for employment, the SPE model shows that the agriculture sector can absorb youth who will be self-employed by establishing agro-enterprises. The SPE model can therefore be seen as part of an inclusive development approach for sub-Saharan African countries (Filmer and Fox, 2014; Lunguli and Namusonge, 2015). An important finding is that the SPEs attracted mainly male youth and few women. This reveals the importance of gender analysis in understanding how opportunities for engaging youth in agri-enterprises are differentiated by gender, in order to enhance inclusiveness.

## 5.2 Performance of the SPEs as service agri-enterprises

The analysis of the technical performance points to SPEs contributing positive outcomes at farm and supply chain level in some regions. At farm level, the contribution of SPEs is in increasing farmers' knowledge and skills, as well as improving feeding and general dairy cow management through contracting (silage making/fodder establishment) and knowledge (advisory) services. These resulted in positive outcomes, including some improvement in productivity and in closing the seasonal fluctuation gap, which cascades to other supply chain actors. SPEs have provided services to a sizeable number of farmers, showing that the model is responding to demand. Other studies on private service delivery models in the dairy sector show similar results, where more farmers access services when new service providers emerge (Bebe et al., 2016; Kilelu et al., 2016). But the effects are mixed for different farms owing to various factors highlighted in the findings. These include agro-ecological differences and socioeconomic status of the target clients.

The entrepreneurial performance for most SPEs shows that most have not reached full potential. This is due to seasonality of the business and low market penetration. While SPEs work with the DFCSs as a way to reach farmers, this did not stimulate higher business opportunities, as they only served about 7% of the potential client base. Private service delivery has potential to enable access to demand-led extension and advisory services for sustainable intensification and commercial orientation in smallholder-dominated agriculture. However, low demand makes it unsustainable for private sector actors to provide such services (Birner et al., 2009; Poulton et al., 2010; Bebe et al., 2016; Kilelu et al., 2016). There is therefore the need to understand how best to stimulate and sustain this demand, and this might require identifying the public and private dimensions of these services.

## 5.3 Complementarity and viability of the SPE model

The SPE model creates opportunities for post-school rural youth to be accessible, next-door competent service providers who are able demonstrate application of new technologies and provide some advisory support into understandable local language where there is demand for such services. Since most of the SPE members reside within the community they serve, follow-up activities are more frequent, informal and at

minimum or no cost. This approach confirms Anderson and Feder's (2003) argument about the potential for efficiency gains in agricultural extension and advisory services that comes from locally decentralized delivery systems with an incentive structure that is largely based on private provision. This is in line with policy support by the Kenyan government for a pluralistic extension and advisory system (Muyanga and Jayne, 2008; Kilelu et al., 2011; Bebe et al., 2016) and the newly devolved governance system that has decentralized the agriculture sector development functions to county governments.

SPEs offer complementary services to farmers that are filling in gaps in the extension support by public and other actors operational in the same locality, including the dairy cooperatives and non-governmental organizations. The SPEs specialize in services and products with apparent demand and that are hands-on in nature. Thus, as complementary service providers, SPEs require a strong value proposition to remain in business. This is what determines the viability of the model. An important contributor to viability relates to their ability to bundle various services offered to farmers. But what remains to be seen is whether these services stimulate a sizeable market demand that will enable the SPEs to generate decent incomes over time (Poulton et al. 2010).

## 5.4 SPE propagation and dynamics of entrepreneurship

SPEs see training and recruiting new members as a pathway to expand their businesses and reach more clients. This would help address the challenge that sometimes there is a lack of SPE members when they are needed, especially during peak season when there is high demand for their services. As the results show, the potential client base is largely untapped and the current numbers of SPEs are not able to cover even the small percentage of this base they currently service. This raises the issue of how to propagate and scale the model. Attracting more service providers into the business can be a first step. But rather than focusing on growing the numbers of service providers, there is need first to understand the "scaling readiness" (Sartas et al., 2017) of this innovative service delivery model in light of the challenges that are limiting SPE performance.

The results suggest that SPEs lack adequate entrepreneurial skills to match their technical skills. The training provided to the SPEs when they were first established focused more on the technical aspects of the model and less on business aspects. As a consequence, being able to market their services to grow their business is still a hurdle for SPEs. It was also noted that SPE members did not keep good records of their transactions, making it difficult to assess profitability of the business for work done individually. As Lunguli and Namusonge (2015) show, there is generally a high failure rate of youth enterprises, owing to market and entrepreneurial limitations. The challenges of SPEs are mainly in the high dropout rate of group members (approximately 57%), although the groups continue to exist and offer some services. This attrition can be linked to the seasonality of the business and the challenge of being able to reach and serve more clients. This has affected the potential for consistently making a decent income and growing the SPE businesses. Additionally, some of the members left the SPE and moved into other forms of employment; for example, some joined extension teams of the DFCS and others went to county livestock offices. This mobility can be seen as a benefit of the technical and leadership skills acquired in the SPEs, which further underlines the scarcity of staff with practical skills in the dairy sector.

These dynamics within the SPEs raise questions about underlying assumptions of youth and entrepreneurship. As Mgumia (2017) has argued, there is a need to understand young people's aspirations in promoting programme-induced entrepreneurship models. This can guide in the design and promotion of entrepreneurial models that can attract youth who have aspirations beyond initial program support and see real opportunity in agri-entrepreneurship. Finding a good fit between aspiration and opportunity and providing the necessary entrepreneurial support to the youth-led SPE model may result in thriving enterprises offering decent incomes. These are some factors that need to be considered in order to stem the high dropout rates and mobility.

## 5.5 SPEs as an inclusive model

By design, the SPE model aims to attract youth to opportunities in agribusiness in other nodes of the value chain beyond production. This can be considered as part of an inclusive approach to agrifood sector development. Providing rural youth with appropriate skills and complementary support is increasingly promoted through policy and development programmes as a strategy for creating employment and livelihoods for youth in agriculture (AGRA, 2015; MoALF, 2017). The SPEs have generally achieved this goal. But some of the findings indicate the model is subject to seasonal fluctuations, and that there are other technical and business challenges that affect the viability of such youth-focused business models.

Furthermore, the findings show that few (youth) women joined, and even fewer remained active after recruitment in SPEs. There was a retention rate of just 6% for the women in the sampled groups. This model has therefore been more appealing and beneficial to young men than to women. The reasons young women are not as engaged in the SPEs, including at recruitment or in staying longer in the group business, could be linked to many factors. This points to the need for a gendered analysis and approach to the issue of youth and agriculture, paying attention to how best to engage women to enable equitable participation and opportunities in agri-enterprises (Filmer and Fox, 2014; Heinrich Böll Stiftung, 2015).

The evidence suggests that promoting livelihood opportunities for youth in agribusiness is not only about being inclusive, but also about enabling thriving and sustainable businesses that contribute to agrifood sector development. Thus public and private sector policies (e.g. those of DFCS) need to rethink how their support and collaboration with SPEs entrench these broad goals. Policy support needs to approach SPEs as small and medium-scale enterprises that require a range of services such as targeted financial services and business development support. However, the SPE model needs to be looked into from a more integrated approach that considers the range of challenges facing youth in relation to agricultural transformation and broader employment issues (Muiderman et al., 2016).

## 5.6 Evolution of the SPE model and some lessons learned

The underpinning framework that informed SPE model design assumed that the SPEs offer services to producers in a dynamic agricultural sector with a growing demand for inputs and service delivery. The SPEs would start offering a specific service and would then evolve to offer more, and more sophisticated, services (Maina, 2010). This would enable SPEs to continually offer value to farmers who demand certain services but who, over time, may enhance their own capacities to undertake some of the services on offer. This evolution indeed appears to be the case, as some farmers have started making their own silage and some groups have expanded their services bundle. However, the evolution is not only about increasing the number of services offered, but also about ensuring that services are oriented towards offering a “best fit”, that is, to meet farmers’ needs to optimize their production and enterprise results (Birner et al., 2009). This also implies understanding the demand for the new products and services. Some services, such as advisory support, are more difficult to sell, especially in a smallholder-dominated context with low farmer willingness to pay, even for those transforming towards a more commercial orientation (Bebe et al. 2016).

The SPEs indicate that vocational training by experts (e.g. PUM and Perfometer) and some mentorship by the original SPEN groups had been key to building their technical competencies in offering good services. Such technical skill acquisition from hired experts and continued support/coaching is therefore key to the success of this model. This was supported through a development programme, but further propagation of the model requires broader support, including from other public and private sector actors. Furthermore, taking on new services requires SPEs to continually upgrade their technical skills. Beyond the technical aspect of the services, SPEs members must pay equal attention to the business dimension of their work, in order to recognize and realize business opportunities and create viable enterprises. The majority of partners working with SPEs are those that collaborate on technical matters; more are needed in the area of business strategy or entrepreneurship support.

The following factors need to be considered in strengthening the SPE model:

- **Broad skills acquisition and stimulating demand for those skills:** Mitigation of the seasonality in silage making involves acquiring additional skills to smooth the income fluctuations; opportunities to achieve this include regular training of farmer groups on various dairy topics. An example is Unique SPE in Nyeri County. Some SPEs received training on hydroponic production technology and hoof trimming, but they are yet to commercialize on the skills and ideas acquired.
- **DFCS support and SPE performance:** SPEs that received continuous support from the partnering (anchor) DFCS show better performance. Enhancing such business partnerships is key to supporting an SPE but is also predicated on how willing and able the farmers within the DFCS are to make the necessary investments to grow their enterprise. This is linked to the larger context of the supply chain.
- **Personal attributes:** Facilitating youth entry into agribusinesses such as SPEs needs to take into account that entrepreneurial competencies constitute a broad mix of skills, including marketing and relationship building. These are shaped by personal characteristics and ambitions. Some SPEs were able to diversify their services, while others focused on one service only. This points to the need to better understand the aspirations of youth when inducting them into programmes promoting agri-entrepreneurship.

# 6 Recommendations

## 6.1 Recommendations for policy makers and development agencies

**Support broader training:** For this model to work more efficiently, exposure beyond silage making at the initial training and recruitment of SPEs is key. There is a need for more diverse skills to be provided at the initial training, as silage making on its own does not provide a sufficiently stable source of income. Identifying a good mix of potentially in-demand services that can be offered by SPEs from the outset can guide the development of a practical training programme. As well as such vocational and technical skills, entrepreneurial skills are needed for this model to thrive. In other words, in order for the SPEs to be able to grow as agribusinesses, there is a need to balance vocational, technical and entrepreneurial skills during recruitment and training.

**Public investment is needed:** This study shows that the SPE model has potential not only to engage youth in agriculture but also to support development of the dairy sector. This positive transformation of the dairy sector is worth investing in, and the initial costs are in areas such as skills development so people can develop SPEs. Start-up capital is also needed to buy, for example, machinery that is crucial for the success of the model. Facilitating easier access to affordable finance can go a long way to providing start-up capital. Public investment can contribute to these initial support services to SPEs, which will catalyse embedding and scaling of similar entrepreneurial models within the broader innovation support services architecture of various sectors.

**Inclusiveness:** In order to make the model more gender- and youth-inclusive, the needs of young women, who are the minority in the SPE model, and the needs of youth more generally need to be factored in during recruitment, to reduce the high dropout rate. The challenges women face that prevent them from staying in SPEs need to be addressed prior to recruitment, to ensure that they are motivated to stay in the business.

## 6.2 Recommendations for DFCSs

**Facilitate SPE creation and strengthen business partnerships:** The DFCSs are in the position to help SPEs form and provide their unique services to their members. In facilitating the business partnership, DFCSs should include SPE services as part of the productivity-enhancing bundle of services they offer to their members. This could facilitate assignments for SPEs and improve fodder availability for DFCS members, resulting in mutual benefit.

**Inclusiveness:** DFCSs are uniquely positioned to help make the model more gender- and youth-inclusive. Their position as local business enterprises can support the agenda of youth employment in agriculture. This includes factoring in the needs of young women, to enable them to be involved in and benefit from such youth-led enterprises.

**Business model sustainability:** To increase the sustainability of the SPE model, there is need to consider the pros and cons of having SPEs as independent businesses versus having the SPEs anchored to the support of DFCSs. While DFCS coordination can ensure a market base for SPEs, SPEs may not necessarily benefit from more DFCS control over the business, where they might for instance dictate SPE service charge levels.

**Business coaching:** A support structure is key to the growth of SPEs. The SPEs are in need of mentorship/coaching, perfecting of technical and entrepreneurial skills, moral support and marketing support. SPEN played this support role at the initial stages of the SPEs, which helped them kick-start their businesses successfully.

## 6.3 Recommendations for SPEs and private service providers

**Broadening service offer:** For SPEs to become viable businesses with a stable source of income, they need to complement silage services with a good mix of services that are in demand from farmers.

**Improving skills:** SPEs need to improve and broaden their skills, in terms of both technical/vocational skills and entrepreneurial skills. Depending on the services offered, skills may need to include advisories on feeding, fodder establishment, young stock raising, hoof trimming and/or construction of zero-grazing units. As well as such vocational and technical skills, entrepreneurial skills are needed so that SPEs can grow as agribusinesses. This will include the skill to define the need for capital and to apply for it.

**Seeking out business coaching:** SPEs need to proactively seek support in developing their businesses. This will include mentorship/coaching and other support as well as enhancing technical and entrepreneurial skills. Marketing support will be important so SPEs can commercialize more services, including those offered for free or at minimal charge. The business support needs to deliver value for money to the SPEs by translating to business expansion.

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# Annex 1: Key informant (DFCS representative) questionnaire

**Detailed CBE Key Informant Interview**

**The information collected is for research purposes particularly the 3R Kenya and ADIAS projects and is strictly confidential.**

**General CBE group information:**

| | | |
|---|---|---|
| Date (dd/mm/yyyy) | | Time Start: |
| Country | **KENYA** | Time Stop: |
| County | | |
| Sub-county | | |
| Sub-location | | |
| Village | | |
| Name of CBE | | |
| Legal entity type (Ltd, DFCS etc.) | | |
| Name of CBE representative (respondent) | | |
| Designation/position | | |
| Phone no. | | |
| Email address | | |
| Geographical coordinates | | |
| Latitude | E _____°_____M_____ S | |
| Longitude | N/S _____° _____M_____S | |
| Elevation (meters above sea level) | | |
| Short description of area | | |

| CBE composition / membership details | | | | | | |
|---|---|---|---|---|---|---|
| Number of registered members (farmers) | | | Total: | Women (no. or %) | Men (no. or %) | |
| Number of active suppliers (last 6 months average) | | | | | | |
| No of suppliers that are not registered members | | | | | | |
| Age range of members | | | Youngest | | | |
| | | | Oldest | | | |
| What categories of farmers can you distinguish among the suppliers of the CBE for instance in terms of herd size or/and scale of production (small, medium or large) and what percentage for each type? ). | | | | | | |
| **B. Milk collection, income and costs** | | | | | | |
| i. How many litres (on average) of milk are currently collected per day? | | | Minimum (l/day) – What months? (i.e. in the last 1 year) - | | Maximum (l/day) – What months? (i.e. in the last 1 year) - | |
| ii. Who does the CBE sell the milk to? | | | | | | |
| iii. How many litres (per day) to each buyer? | | | | | | |
| iv. How much does the CBE currently get per litre of milk from each buyer? (KES/day) | | Minimum | | | | |
| | | Maximum | | | | |
| v. How many KES/litre is withheld for services like transport to CBE, transport to client, and storage & handling? | | | | | | |
| vi. What is the trend of the average price per litre that you have sold to processors over the last 5 years? | | | | | | |
| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Minimum for each year | | | | | | |
| What months | | | | | | |
| Maximum for each year | | | | | | |
| What months? | | | | | | |
| CBE prices (payment to CBE members by the CBE): | | | | | | |
| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Minimum for each year | | | | | | |
| What months | | | | | | |
| Maximum for each year | | | | | | |
| What months? | | | | | | |
| vii. What are the milk targets that the CBE strives to achieve? [l/day ] [l/month] | | | | | | |
| viii. What is the average milk production per cow/day of your members? | | | | | | |
| ix. Has this always been the average productivity of your members? Yes / No | | | | | | |
| If not, ( as above) explain what has changed | | | | | | |

| | | | | |
|---|---|---|---|---|
| **C. Linkage with SPEs** | | | | |
| i. | What SPE groups does the CBE work with and what activities/inputs are sourced from each of the SPEs? | | SPE group (name) | Services/inputs sourced from the SPE |
| | | 1 | | |
| | | 2 | | |
| | | 3 | | |
| | | 4 | | |
| ii. | What services listed above are offered by the SPEs as a group and which ones are offered by SPE as individuals? | | | |
| Group activities | | | Individual activities | |
| | | | | |
| | | | | |
| | | | | |
| iii. | Does the CBE provide extension services to its members? Explain? | | | |
| iv. | How does this complement the services of the SPE group? | | | |
| v. | Does the CBE have a check-off system in the provision of services/inputs to it members and the cost would then be deducted from the milk payment? | | [Yes] | [No] |
| vi. | If the answer is Yes, what SPE services listed above in C(ii) does the CBE provide a check off-system for? (list) | | | |
| vii. | What is the quality of services (listed above in C(ii) above) provided by the SPEs according to the farmers? (poor, average, good, very good). Explain? | | | |
| viii. | What main challenges does the CBE face as a business (enterprise) in relation to buying and selling milk? | | | |
| ix. | In what ways can the challenges listed above in C(viii) be addressed by the SPEs? | | | |
| x. | Are there services that your members would like to get from the SPEs but which are not being provided? Please elaborate. | | | |
| xi. | In your opinion, which SPE groups that you know of are performing well? In what way do you think they are doing well? (*If they only know of one group we can ask them specifically about the group they work with*) | | | |
| xii. | What do you think are the reasons why some are doing well and others are not? | | | |

# Annex 2: SPE representatives questionnaire

**General SPE group information**

| | | | |
|---|---|---|---|
| Date (dd/mm/yyyy) | | Time Start | : |
| Country | **KENYA** | Time End | : |
| County | | | |
| Sub-county | | | |
| Sub-location | | | |
| Village | | | |
| Enterprise Name | | | |
| Name of SPE respondent | | | |
| Gender of SPE respondent | | | |
| Mobile No. | | | |
| Email | | | |
| **Geographical location** | | | |
| Latitude | _____°_____M_____S | | |
| Longitude | _____°_____M_____S | | |
| Short description of location e.g.: next to church | | | |

**Section 1: SPE composition and training received**

| | |
|---|---|
| **Name** | |
| **Role in SPE** | |
| **Gender (**code**)** | |
| **Age (**years**)** | |
| **Level of education (**code**)** | |
| **When they joined** SPE **(**year**)** | |
| **Training received related to SPE activities/roles** | |
| **Other training received (**can be agricultural or business related or any other field**)** | |

**Gender: 1**-male, **2**-female

**Education: 1**-primary school, **2**-secondary school, **3**-college/university, **4**-other formal training (course), **5**-post-graduate

**Section 2: Service delivery and income**

| Services provided to farmers - both as a group and individually (code) | Mode of service provision (code) | Geographically Area covered | Types of farmers targeted (code) | # of farmers served in 2016 | Availability of records of training (yes/no) | Service charges/fee (KES per farmer) | Mode of payment for service (code) | Follow-up activities (if any) | Challenges encountered in service provision |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Continuation from table above (for each service listed in the table above):

| Services provided to farmers - both as a group and individuall y (code) – *linked to previous table* | Hired labour (number of casuals per service) -hired by the SPE | Payment for hired labour (KES/session) (*only if the labour costs are incurred by the SPE and not the farmers) | Observed changes with the farmers in relation to SPE services (code) | Additional costs of service provision (expense type) | Additional costs of service provision (KES/month) | Income received as a group or individually (code) | Distribution of group income (code) | Individual income (Max) (KES/month) | Individual income (Min) (KES/month) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

1. Is it better to offer services as a group or individually? Why?
2. Working as a group and individually, which one provides more opportunities? Why?
3. What is the type of silage conserved and what quantity was conserved in 2016?

**Services: 1**-silaging, **2**-hay production, **3**-fodder/forage establishment, **4**-farmer training, **5**-demonstrations (please specify), **6**-advisory service (please specify), **7**-other (please specify)
**Mode of provision: 1**-as a group, **2**-Individually, **3**-both 1 and 2
**Types of farmers**: **1 -** farmers with less than 5 cows; **2.** 5-10 cows. **3**. 10-20 cows. **4**. Other (please specify)
**Mode of payment: 1**-cash, **2**-check off through CBE, **3**-other (please specify
**Changes seen with farmers**: **1**-increased milk productivity, **2**-better milk quality, **3**-increased live-weight gains, **4**-higher feed intake, **5**-increased income **6**-other (please specify)
**Income received**: **1**-as a group, **2**-individually 3-some as group and some as individuals (please elaborate)

**Section 3: Inputs, costs and income**

| Inputs provided to clients (code) | Purchasing price for SPE (KES/kg) (indicate other units if so used) | Quantity sold to farmers (kg/month) | Selling price of input (KES/kg) | Payment for inputs - to group or individuals (code) | General comments on access to inputs |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |

**Section 4: Management skills**

1. How does the SPE market their services to farmers? (E.g. informal fora, personal networks etc.)
2. Through what ways does the SPE (as a group and as individual members) acquire new assignments/opportunities?
   a. As a group –
   b. Individually –
3. Through what ways does the SPE (as a group and as individual members) acquire new assignments/opportunities?
   a. As a group –
   b. Individually –
4. Does the SPE keep financial records?
5. What new services have been added to the SPE portfolio over the past years?
   a. As a group –
   b. Individually –
   c. Both (1 &2) –

6. Question for the Central Kenya SPE ONLY: What has been the transition process (i.e. changes made) from the original SPEN? (E.g. contributions, mode of sevice delivery (as a group vs. as individual members), scope (number of clients and geographical area covered etc.)
7. Question for the Central Kenya SPE ONLY: Why did the fourth SPE that was part of the SPEN fail?
8. What are the plans for the future? I.e. new opportunities for the SPE as a business? And/or new business opportunities for the individual member?

**Section 5: Support system and investments**

1. Which institutions/organizations/individuals have helped the SPE to establish themselves?
2. Which institutions/organizations/individuals have continued to provide support?
3. Which are the 3 most important organizations/institutions that the SPE does business with? What do they do business on?
4. Which other organizations/institutions would the SPE like to do business with? What would they do business on?
5. In what ways does the SPE member in question learn from clients?
6. Are there any types of ICTs used to enhance the SPE's business? (e.g. using social networks on the internet)*If yes, please elaborate.
7. What investments have been made to enhance the SPE's business as a group and individually? How much did they cost (KES)?
   a. As a group –
   b. Individually –
8. How did the SPE access finance to make the investment?
9. What challenges does the SPE face in accessing finance to enhance its business?
10. What did the SPE learn from the (original) SPEN trainers group?
11. How have the (original) SPEN trainers helped the SPE after the training?
12. What did the SPE learn from the (original) SPEN trainers group?
13. How have the (original) SPEN trainers helped the SPE after the training?
14. What other help would the SPE have liked to get from the (original) SPEN trainers?

**Section 6: Technical skills**

1. Gaps: What services are the farmers demanding that cannot be provided by the SPE and why not?
2. What additional technical skills need to be acquired to help the SPE in getting more assignments/clients?
3. What organizations/institutions/individuals can help with acquiring new technical skills?
4. Which area do you feel the SPE performs best and why?
5. Which area do you feel the SPE can improve on?

# Annex 3: Focus group discussion checklist

**General CBE group information**

| | | |
|---|---|---|
| Date (dd/mm/yyyy) | | Time Start: |
| Country | **KENYA** | Time Stop: |
| County | | |
| Sub-county | | |
| Sub-location | | |
| Village | | |
| Name of CBE | | |
| Contact person (name) | | |
| Contact mobile | | |
| Email address | | |
| Geographical coordinates | | |
| Latitude | E _____°_____M_____ S | |
| Longitude | N/S _____° _____M_____S | |
| Short description of area | | |

**Section 1: Individual questions (to individual farmers) on:**

**a. demographics, milk details, services received and feed conserved**

| | Farmer 1 | Farmer 2 | Farmer 3 | Farmer 4 | Farmer 5 | Farmer 6 | Farmer 7 | Farmer 8 |
|---|---|---|---|---|---|---|---|---|
| **Farmer ID** | | | | | | | | |
| **Name** | | | | | | | | |
| **Gender** | | | | | | | | |
| **Year they joined CBE** | | | | | | | | |
| **Milk produced per day (**l/day**)** | | | | | | | | |
| **Milk currently supplied to CBE per day (**l/day**)** | | | | | | | | |
| **Number of cows currently being milked** | | | | | | | | |
| **Total number of dairy cows** | | | | | | | | |
| **Highest milk produced from ALL dairy cows** | | | | | | | | |
| **Milk supplied to other markets (**l/day**)** | | | | | | | | |
| **Price per litre of milk sold to CBEs (**KES/l**)** | | | | | | | | |
| **Price per litre of milk sold to other markets (**KES/l**)** | | | | | | | | |

**b. Services received from SPEs and feed conserved**

| | Farmer 1 | Farmer 2 | Farmer 3 | Farmer 4 | Farmer 5 | Farmer 6 | Farmer 7 | Farmer 8 |
|---|---|---|---|---|---|---|---|---|
| What SPE services have you used? | | | | | | | | |
| Mode of service provision (group or individuals) | | | | | | | | |
| Do you conserve feed? (Yes/No) | | | | | | | | |
| Types of feed conserved | | | | | | | | |
| Type 1 (name): | | | | | | | | |
| Amount conserved (Type 1) please indicate units | | | | | | | | |
| Type 2 (name): | | | | | | | | |
| Amount conserved (Type 2) please indicate units | | | | | | | | |
| Type 3 (name): | | | | | | | | |
| Amount conserved (Type 3) please indicate units | | | | | | | | |
| Type 4 (name): | | | | | | | | |
| Amount conserved (Type 4) please indicate units | | | | | | | | |

**Section 2: Group questions (to all farmers as a group) on:**

**a. conventional practices, benefits from SPE services and investments made:**

1. What were your (conventional) practices prior to seeking SPE services?
2. What % of the farmers have milk as their primary source of income?
3. What are the primary income sources for the others?
4. What changes/investments did the farmers themselves have to make after receiving SPE services?
5. What were the costs of these investments (KES)
6. What changes/benefits have you seen as a result of the SPE services received?

**b. SPE performance**

1. What do you appreciate about SPE services?
2. What differentiates SPEs from other extension services/ they have used? Giving examples of these other approaches?
3. Are you satisfied with the quality of services provided by the SPEs? Yes /No. Please elaborate.
4. Are there services that you would like to get from the SPE but they cannot provide?
5. What challenges do the farmers face in accessing SPE services?
6. Which areas can SPEs improve on in order to serve farmers better?

To explore the potential of nature to improve the quality of life

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Wageningen Livestock Research creates science based solutions for a sustainable and profitable livestock sector. Together with our clients, we integrate scientific knowledge and practical experience to develop livestock concepts for future generations.

Wageningen Livestock Research is part of Wageningen University & Research. Together we work on the mission: 'To explore the potential of nature to improve the quality of life'. A staff of 6,500 and 10,000 students from over 100 countries are working worldwide in the domain of healthy food and living environment for governments and the business community-at-large. The strength of Wageningen University & Research lies in its ability to join the forces of specialised research institutes and the university. It also lies in the combined efforts of the various fields of natural and social sciences. This union of expertise leads to scientific breakthroughs that can quickly be put into practice and be incorporated into education. This is the Wageningen Approach.