

## Smallholder participation in milk markets in Sri Lanka: A livelihood analysis

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**Abstract.** Smallholder farmers make up a significant component of the rural poor in Sri Lanka. Government policies in Sri Lanka have been directed towards poverty alleviation through commercial dairy development. This study uses a case of 28 smallholder farmers in Gonapinuwala in Southern Sri Lanka to explore how and why smallholder farmers engage in commercial dairying and to understand how dairy development initiatives in Sri Lanka can support poverty reduction. Analysis of data identified three groups of smallholders distinguished by their milk selling, production systems and livelihood portfolios. The members of each group had a similar livelihood portfolio in terms of their mix of activities and stability and regularity of income. The portfolio these groups had shaped the way they engaged in commercial dairying. Moreover, how smallholders put together their livelihood portfolios determined the significance of commercial dairying for their living. Our results highlight the importance of taking a holistic approach in designing commercial dairy development interventions. Also, poverty alleviation policies need to address issues related to ownership and access to assets to ensure all smallholders' well-being through commercial dairying.

**Keywords:** livelihood, livelihood portfolio, smallholders, commercial dairying

### Introduction

Rural poverty reduction is one of the development challenges in developing countries. Some development interventions in developing countries are revolving around commercial dairy development as a pathway out of rural poverty (FAO 2010, Datta et al. 2019). If we want to understand the significance of commercial dairying for rural livelihoods, it is important to explore how and why farmers engage in it. This paper uses a case of Sri Lankan dairy smallholders to explore how and why they engage in commercial dairying and understand how can dairy development initiatives in Sri Lanka support poverty reduction.

Agriculture is an important component of the rural economy in Sri Lanka. At present, more than 30% of rural people are engaged in agriculture as their main livelihood. The agricultural population in the country is dominated by smallholder farmers (GOSL & FAO 2012), who produce nearly 80% of the total national food production (Ministry of Agriculture 2018). Smallholder farmers are those engaged in agricultural activities on small area of lands, mostly less than 2 hectares (Okidegbe 2001). Recent results from the economic census in Sri Lanka revealed that about 46% of the smallholder agriculture holdings in the country are less than one hectare.

Smallholder farmers are concentrated in rural areas in Sri Lanka. These areas generally have higher levels of poverty in the agriculture sector than in the non-agricultural sector (Department of Census and Statistics 2009). Smallholder farmers in the country are engaged in a range of agricultural (crop and livestock farming) and non-agricultural activities (e.g. masonry, private sector occupations, vehicle hiring) to make their living (De Silva & Sandika 2012; Hitihamu & Epasinghe 2015). Dairying has been an important part of their agricultural activities since ancient times. Most smallholders keep dairy animals in crop-livestock integrated farms (Bandara et al. 2011) where by-products of crop farming are used as inputs for livestock farming and vice versa. These dairy animals include both cattle and buffalo. Most importantly, the milk that comes from these animals provides a traditional secondary income source for the majority.

Markets, where Sri Lankan smallholders sell their milk are categorised into formal and informal markets (Ibrahim et al. 1999; Ranaweera 2009). This categorisation has mainly been based on the actors who operate the markets. Accordingly, the formal market is operated by large-scale dairy processors and dairy cooperatives. Milco (Pvt) Ltd, Nestle, Fonterra and Kothmale are a few examples of actors in the formal milk market. Informal market actors consist of individual households, hotels, restaurants and small-scale dairy processors (Subasinghe & Abegunawardena 2013; Hitihamu & Epasinghe 2015). Though accurate statistics are not available, it is roughly estimated that nearly 60% of the total milk production in Sri Lanka reaches the formal market (Vernooij et al. 2015). The rest of the milk (nearly 40%) is sold in the informal market.

The most important recent dairy policies in Sri Lanka are set out in the development policy framework launched in 2010. This dairy policy states that the dairy sector is 'the priority sector for public investment' (Ministry of Finance and Planning 2010, p. 29). The government and other development agencies in the country are working on the promotion of commercial dairying to alleviate smallholder poverty. At present, dairy development programmes in the country support

and encourage smallholders to boost milk production for sale, especially in the formal market. Other than that, some of the national strategies that are being implemented to develop the dairy sector are genetic improvement of dairy animals; improvement of milk marketing, processing and value addition; improvement of service delivery systems; and promotion of liquid milk consumption (Ministry of Rural Economic Affairs 2016).

At present, little is known about the impact of these dairy commercialisation initiatives and how and why smallholders engage in these activities. As argued by scholars (Zhou et al. 2013; Hagos & Geta 2016) a realistic understanding of smallholder commercialisation is important to enhance favourable factors for commercialisation while minimising the constraining factors. Therefore, this paper reports on preliminary findings related to smallholder commercial dairying in Sri Lanka. Research questions that frame this paper are: how smallholder farmers engage in commercial dairying in Sri Lanka and why and how can dairy development initiatives in Sri Lanka support smallholder poverty reduction. Findings of the paper will better inform commercial dairy interventions by providing more knowledge about the actual circumstances of smallholders engaged in dairying. As the analysis of the paper focuses on how people make their living, it applies the livelihood approach to best answer the research questions.

### **Conceptual framework: The livelihood approach and livelihood pathways**

According to Chambers & Conway (1992), a livelihood is comprised of capabilities, assets and activities. They define activities as a set of strategies people develop using assets to make their living. Assets include tangible and intangible assets that are further categorised into human, natural, financial, physical and social assets. As argued by Scoones (1998, p. 5):

A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base.

A prominent factor of the livelihood approach is its focus on people (Scoones 2009; De Haan 2012; Morse & McNamara 2013). Situating people at the centre, it emphasises the active role of people and insists on their participation in development endeavours. This view is further explained by Krantz (2001), stating that even the 'poorest of poor' play an active role in making their living rather than being passive victims. In general, the livelihood approach stresses that poor people develop their livelihood strategies by combining a diverse set of capitals that they have at their disposal.

According to De Haan & Zoomers (2005), Scoones (2009) and Prowse (2010), the livelihood approach concentrates on the micro level. Notions of agency are also important. Agency refers to 'people's capacity to integrate experience into their livelihood strategies and to look for outlets of aspirations, ambition and solutions to problems' (De Haan 2012, p. 347). Agency is embedded in actors or people. Actors can influence and change the social and economic structure through their agency (De Haan 2012). Another core aspect of the livelihood approach is its stress on the importance of a holistic understanding of people's lives. In that way, it assists in understanding all the constraints and opportunities and their interactions that shape peoples' livelihoods (DFID 1988). A holistic focus on people has made the livelihood approach appropriate for identifying feasible interventions to reduce poverty (Glavovic & Boonzaier 2007; Khayyati & Aazami 2016).

Discussions aimed at operationalizing the livelihood approach by linking people to the development conversation led to the development of the Sustainable Livelihood Framework (SLF) in 1998 (DFID 1999; Scoones 2009). The SLF consists of five livelihood elements: vulnerability context, livelihood assets, transforming structures and processes, livelihood strategies and livelihood outcomes (DFID 1999; Farrington et al. 1999) and it provides a checklist of areas and their interrelationships that facilitates understanding of the complexities in rural livelihood and poverty (Ashley & Carney 1999; Liu & Liu 2016). As argued by De Haan (2012), the SLF's attention to elements of livelihood is fundamental for policies as it aims to identify exact areas where interventions need to be done to alleviate poverty.

Despite its wide application in development activities and research, criticisms have been made regarding the SLF. For example, Kaag (2004) and Prowse (2010) argued that SLF overemphasises the actors' ability to strategise their livelihood activities while paying less attention to structural constraints such as power relations. According to Kaag (2004), actor centredness creates a narrow view of people, focusing on how they use assets to gain economic benefits. This view pays little attention to peoples' perceptions, ideas, norms and values (Sakdapolrak 2014).

The critiques outlined above contributed to the emergence of the pathways concept in the livelihoods literature. According to De Haan and Zoomers (2005, p. 43), livelihood pathways are the:

patterns of livelihood activities which arise from a co-ordination process among actors. This co-ordination emerges from individual strategic behaviour embedded both in a historical repertoire and in social differentiation, including power relations and institutional processes, both of which pre-structure subsequent decision-making.

As such, the livelihood pathways concept acknowledges that people's livelihoods are influenced by past experiences (history) and social differentiation (power and institutions). As further argued by De Haan and Zoomers (2005, p. 43) 'pathways show that people do make their livelihoods, but not necessarily under conditions of their own choosing'. The pathways concept allows for identification of patterns of livelihood among social groups (De Haan 2005).

To understand the dynamic nature and complexity of livelihoods, scholars have applied the pathways concept in developing country contexts (Roden et al. 2016; Vicol 2016; Belton et al. 2017). Applying the pathways concept to understand the actual circumstances of rural livelihood in India, Vicol (2016) argues that people's livelihood pathways were conditioned by their history and by class differentiation processes. In addition, their study provides insights about linkages between local level and macro level processes. Accordingly, Vicol (2016) reveals that people's livelihood outcomes are shaped by both global and local factors. Another study by Belton et al. (2017) in Bangladesh, also used the concept of livelihood pathways to unpack the dynamic nature of people's livelihoods. Findings of this study explain how people's livelihoods were influenced by a domestic crop boom (pangasius aquaculture), driven by domestic markets and increased demand. Further, Belton et al. (2017) report that influences of this market driven crop boom have encouraged people to develop a wide range of income generating activities (livelihood portfolio diversification). These studies have highlighted the suitability of the pathways concept in understanding the dynamic nature of rural livelihood. It is therefore relevant to understand how and why smallholder engage in commercial dairying and the influence of experience and social differentiation. Most of the livelihood studies have concentrated only on understanding how people make their living in a particular period and claim that their livelihoods are influenced only by their asset portfolio and vulnerability context. However, a limited number of empirical studies have applied the concept of livelihood pathways to understand people's livelihood. Therefore, this study will contribute to the livelihood literature by understanding how the complex and dynamic nature of smallholders' livelihoods are shaped by history and structural factors.

### **Research methodology**

This is an inductive research study that used a qualitative single case research strategy to gain an in-depth understanding of smallholder commercial dairying. Case studies facilitate the understanding of complexities through intensive examination (Ritchie et al. 2013). As Baxter & Jack (2008) explain, it allows the researcher to investigate the case using different data sources: in-depth interviews, observations, documentation and archival records.

Gonapinuwala divisional secretariat, which is one of the traditional dairy production areas in Southern Sri Lanka was selected as the site for this case study. Gonapinuwala varied from other divisional secretariat divisions in Sri Lanka in terms of presence of formal and informal milk market actors and facilities available for smallholder dairying. The fieldwork took place from January to mid May 2018. Primary data was collected from 28 smallholder dairy farmers through in-depth interviews. Smallholders were selected based on records held by the divisional veterinary office in Gonapinuwala, with smallholders who engaged in commercial dairying purposefully selected. Other than that, their herd size, milk production, income and availability of other income sources were not considered. Interviews were undertaken with member or members of the smallholder households who engaged in commercial dairying. In some cases, it was only one male or female while in some cases two, mostly husband and wife. All the in-depth interviews were carried out in Sinhala language (mother tongue of Sri Lanka) and audio-recorded.

Data were gathered related to smallholders' milk production systems, how and why they sell milk through formal and non-formal markets, history of dairy farming, resource availability, their interaction with villagers, milk buyers and input suppliers and other livelihood activities they pursue. In-depth interviews provide access to people's interpretations and descriptions about personal and social matters (Granot et al. 2012; Ritchie et al. 2013) and are a useful interactive method to collect qualitative data. Primary data collection was coupled with observations and gathering of relevant documents (e.g. government documents, reports, journals).

Data was analysed with thematic analysis methods. It involved three steps: describing the phenomena, classifying data and connecting concepts (Dey 1993). Through the classification, the researcher interprets the participants' narratives and identifies topics, similarities and differences disclosed by participants (Miles et al. 2014; Sutton & Austin 2015). First, all the interviews were transcribed into Sinhala language. Then descriptions were prepared for each transcript to provide an overview of data and identify important aspects (Dey 1993). Analysis was carried out in

Sinhala. The researcher read all the transcripts and data were classified manually to identify themes relevant to the research question. Finally, identified themes were connected to understand the patterns of dairy commercialisation in the study location.

## Results

From analysis of livelihood data, three smallholder groups emerged as high, middle and low distinctly relevant to the research questions. Identified groups showed significant differences in their milk selling activities. The high group smallholders sold most of their milk regularly to the formal market. Volumes they sold to the formal market were constant throughout the year. Compare to the high group, low group smallholders sold varying volumes of milk irregularly within a year. Most of low smallholders delivered most production to the informal market. The three smallholder groups were further distinguished by their milk production systems. High smallholders' production systems were characterised by high inputs (e.g. land, money, feed, labour) usage. Parallel to their input usage, high smallholders' production levels were relatively high (10-120L/day), and they produced regularly through out the year. In contrast to the high smallholders, all the low smallholders operated low input-output systems and their daily production rarely exceeded five litres. Differences between smallholder groups were further reflected in ownership and access to assets (e.g. land, money). Finally, smallholder groups differed significantly by their livelihood portfolios. Smallholders of each group had similar portfolios in terms of the mix of livelihood activities, level of diversification and regularity of overall income. In order to highlight the differences of smallholders, this paper describes findings regarding only high and low groups who operate at two extremes of commercial dairy activities. Table 1 presents a summary of the key findings discussed in the paper.

**Table 1: Summary of key findings related to milk selling, production systems and livelihood portfolio of smallholders in high and low groups**

<b>Smallholder groups</b>	<b>Milk selling</b>	<b>Milk production</b>	<b>Livelihood portfolio as a whole</b>
High group	Sell consistent volumes regularly, the majority of the production to the formal market	10-120L/day  High input use (land, labour)	Highly diversified  Stable, high income sources
Low group	Not regular, highly fluctuating volumes, the majority of the production to the informal market	5 or less than 5L/day  Low input use – (land, labour)	Less diversified  Uncertain, irregular activities

### ***Milk market participation of high and low smallholders***

Dairying generated a regular income for most high smallholders throughout a year. The regularity of selling was an output of their milk production, which maintained throughout the year. High smallholders sold consistent volumes daily and they decided the volume based on the maintenance cost of the herd, family expenses and presence of livelihood activities other than dairying. High smallholders were aware that profit is a critical factor that enables the long-term viability of farms. A high smallholder who had 19 cattle and maintained selling volume around 40 litres daily explained:

It is hard to maintain the herd and keep a profit if I don't sell at least 40 litres daily. We should definitely spend part of milk money for the herd. So, I maintained it since the beginning.

High smallholders' home consumption did not make an impact on the volume of milk they sold though milk was an important daily food item for many. They consumed 1 to 3 bottles (one bottle equals 750ml) per day depending on the family size. However, they managed to produce a surplus for consumption in addition to the quantity of milk they wanted to deliver to markets. Also, interviews showed that high smallholders occasionally diverted small volumes of milk for gifting to villagers and relatives and that volume did not influence the quantity they sold. As explained, their gifting was associated with selected people in the community. The people they gifted to tended to be selected people who were significant in the dairy sector or those deserved receiving milk (e.g. patients, older adults). The following quote provides an example of one of high smallholder's gifting:

A university student came to buy milk yesterday. His leg has been broken. How can we charge from a child who is in such kind of situation?

Importantly all the high smallholders sold most of their production to the formal market regularly. Also, they were able to deliver consistent volumes throughout the year. All the high smallholders' main buyer was the state-owned Milco (Pvt) Ltd that was the only formal market milk collector in the area. High smallholders' scale of production makes them more dependent on the formal market. Regardless of volumes, these smallholders could sell the entire production to the formal market, but they had limited freedom in the informal market as buyers decided the quantity of milk they purchased. Smallholders with high production levels, therefore, had to seek two or three informal buyers to complete daily transactions, but this process was time-consuming. A high smallholder whose average daily production was nearly 30 litres describes the importance of the formal market for farmers with high production levels:

We can sell only small quantities to informal buyers. It's easy to sell milk to Mandale [Milco (Pvt) Lts]. It [Milco (Pvt) Ltd] takes whatever the quantity we supply.

In terms of informal selling, all high smallholders sold small volumes (e.g. average of 3-4 litres) of milk more or less frequently only to other households who requested milk from them. Most of the high smallholders sold milk to the same households for a long period even if they made small breaks in buying their milk. A high smallholder explains his experience as:

Neighbours who buy milk from me do it every day. Currently, I'm selling to five. Sometimes they stop when their children get sick and again continue. They have been buying my milk for years.

None of the high smallholders sold milk to small-scale dairy processors in the area (such as yoghurt producers) as milk collection by these processors could not be consistently relied on. One high smallholder recalls his experience:

Once I sold milk to two yoghurt producers. They don't collect milk on public holidays and rainy days. Likewise, they don't come here for a week in New Year festival season. We can't do milk selling with such buyers.

Unlike the high group, milk selling provided seasonal, irregular incomes for all low group smallholders. They had no or little control over the milk volumes sold in markets due to limited resources (e.g. land, labour). The quantity of milk they sold was low and fluctuated frequently. For example, a low smallholder who sold five litres of milk on a particular day failed to supply the same volume in the following day or a few days after. A low smallholder explains the nature of his milk selling:

We don't have land to keep a large herd. Currently, I have only two cows. So, there are certain periods we can't get an income by selling milk as production goes down. Just after calving, I got 10 litres from two cows. Now it's less than five litres. It is getting low as both are about to dry off?

Only half of low smallholder households occasionally consumed milk. Their milk consumption was shaped by two factors. First, low smallholders wanted to sell the entire production as the volume they produced was low. One of the low smallholders describes this:

We don't drink milk. Everyone seeks to sell whatever the quantity they have.

Second, most of low smallholders believed that fresh milk produces phlegm, causing health issues. So, they avoided milk consumption.

In addition, the practice of milk gifting influenced the low smallholders' marketable volumes and their milk incomes. Unlike the high smallholders, as an expression of cordiality, low smallholders gifted regularly on a daily or weekly basis to neighbours, relatives and friends or visitors to their homes and for religious activities. This reduced the volumes of milk they could sell in the market. However, low smallholders did not pay attention to reducing or avoiding gifting to increase marketable volumes. For example, a low smallholder whose main income comes from dairying and produced only three litres per day gifted 250 ml of milk weekly to one of his cousins.

Low smallholders sold highly varying volumes of milk irregularly. More than half of low smallholders supplied most of their production to the informal market buyers (small scale yoghurt processors and households). Unlike the high group, they were never concerned about the volume of milk supplied to the formal market. As such whatever the amount left after informal selling was delivered to the formal market [Milco (Pvt) Ltd]. A number of factors were important in low smallholders' decision to supply milk to yoghurt producers. They included low production levels, high price, free transport facilities and personal loans they received during financial hardships. Apart from that all the low smallholders sold at least a few litres of milk to neighbours.

### **Milk production systems of high and low smallholders**

The high group's herd sizes ranged from 6-50 animals and daily average production ranged from 6 to 120 litres. Most high smallholders mentioned that they managed to produce milk throughout the year with minimal fluctuations, even in unexpected situations. For example, there were situations when milking cows died due to diseases or a cow's milk production ceased due to infections in the udder. The following quote of a high smallholder explains how he manages to maintain the continuity of production:

Production fluctuates in general. During the calving season, it goes up, at the time of drying animals it goes down. Somehow, I make sure to sell 40 litres every day. I did it since the start. If there is any production drop, I buy a milking cow to keep that constant.

High smallholders' input use (e.g. land, labour) in dairying was greater than the low group. This was possible because of other livelihood activities. For example, nearly half of high smallholders used income received from crop farming for buying animals, feeds, and other equipment for dairying. Similarly, a few smallholders mentioned that they received access to lands for dairying through their employment in estate sector jobs. A greater number of high smallholders maintained pasture cultivations in separate lands to feed their animals. The size of pasture cultivation ranged from 0.1 to three hectares. Additionally, they had access to neighbours' lands and common lands in the village to graze animals. They fed concentrates to all the animals in the herd despite the cost. Similarly, high smallholders paid family and hired labour for dairying in addition to free family labour.

In addition to resource allocation, high smallholders were concerned about proper replacement of unproductive animals in the herd as it makes a significant impact on their production. The practice of culling and selling animals to slaughterhouses is noteworthy, because it is outside accepted local norms. A quote of a high smallholder provides an example for this:

When the production drops, I sell animals. Also, all male animals are sold. We can't worry about it. If it is, this cannot be done as a commercial activity.

Compared to the high group, low smallholders had small herds as they were landless or marginal landowners. Their herd size ranged from two to six animals. The number of milking cows in most farms did not exceed two. Hence, low smallholders' production levels were small. At the time of data collection, the average daily production for the vast majority was five litres or less per day.

As explained, all the low smallholders had no or a little control over the milk production due to lack of resources. The interviews revealed that low smallholders had experienced frequent production drops, even zero production periods within a year. Apart from small herds, their production levels were impacted by factors including problems in breeding, loss of milking cows from death or health issues and lack of financial resources that caused poor feeding, inability to provide proper shading and buying of good quality animals. For example, none of the low smallholders had cultivated pastures and they were highly dependent on common lands (e.g. woods, road sides) and neighbours' land to graze animals. As they stated, common lands were accessible to all the smallholders in the area for tethering animals. Moreover, they provided low amounts of concentrates if at all. A low smallholder describes how she feeds animals as:

I tether animals in paddy fields during the day time. I sometimes give animals rice polish (by-product of rice polishing process which is used as concentrates). But I missed it one or two days. The veterinarian advised me to feed my female calf with cattle feed. But I can't buy it. Instead I feed it grass.

Like the high group, low smallholders highlighted the importance of other livelihood activities for the continuity of dairying. Sometimes other livelihood activities provide them income or sometimes reduced their cost of living making them more capable of investing in dairying. A low smallholder states how crop farming supports him to continue dairying:

We need money to maintain the herd. I carry out dairying with the help of all other things: I grow rice and vegetables for home consumption. I've got some banana in the home garden. If not, it is hard to survive in dairying.

Likewise, low smallholders were aware that other livelihood activities make an adverse impact on dairying in terms of resource allocation.

Low smallholders' attitudes regarding animal replacement influenced the continuity of milk production. They were willing to protect the lives of their cows at any cost due to the strong relationship they maintained with them, as a way of paying gratitude to animals who helped their living. As such, low smallholders were reluctant to sell unproductive animals even though they were experiencing severe financial hardships. For example, one smallholder who does not have a

regular income source explains production drops and desire to protect his unproductive animal under any circumstances as:

During the last few years, there were periods our milk production ceased. I have only two cows. Usually when one cow is dried, next one calves. Sometimes they do not come into heat on time. Recently, I artificially inseminated one of the cows two times, and it was not successful. So, after this lactation period, I can't produce milk for the next five or six months. Whatever, I do not want to sell the unproductive cow. It delivered five calves and gave us milk for years. A few days ago, a person came and asked for that cow for LKR 45,000. I said no to him.

### ***Livelihood portfolio of high and low smallholders***

All the high smallholders had a stable primary income source supported by several other smaller but stable livelihood activities that also generated relatively good incomes. Agriculture provided the primary income source for most of the high smallholders interviewed. Agricultural activities also comprising many of the other secondary livelihood activities. Unlike low smallholders none of the high smallholders received government remittances for living. Accordingly, high smallholders received income from more than one source at a particular time of the year. A high smallholder explains his livelihood portfolio as:

Dairying gives me an extra income. My main income comes from the government sector employment I did. I'm getting a salary and a pension. Additionally, I have four acres of tea plantation. It also produces a good income.

High smallholders had the highest level of diversification in their livelihood portfolios. The number of livelihood activities carried out by them ranged from four to eight.

On the other hand, the low smallholders had a limited level of diversification in their livelihoods. Many of them had two to three livelihood activities. Family and government remittances were important income sources for their living. Low smallholders' primary income came from dairying or labouring. They engaged in crop farming at subsistence level and sometimes earned a side income by selling the surplus. All the low smallholders mentioned that they do not have stable income sources. Their livelihood portfolios comprised a bunch of uncertain activities which generated seasonal and low incomes. A low smallholder explains his livelihood activities as:

I do poultry farming and sell eggs to local shops and neighbours. There are months (religious festival seasons) when I cannot sell eggs. Egg production also changes with the number of birds. For example, I had 34 layers a few months ago. Now I have six. Additionally, I do dairying. After this lactation period, I do not have milk to sell until the next calving. Sometimes I sell home garden vegetables and ornamental plants to villagers and get a small income.

### **Discussion**

The previous section has outlined differences between the high and low smallholders in terms of their commercial dairy activities. In the discussion, I focus on some of the findings which include smallholders' milk selling in the formal market and informal markets and regularity of milk selling, their inequalities and gifting of milk. The distinction between the two smallholder groups' commercial dairying reflects multiple factors described in the concept of livelihood pathways: the structure of the livelihood portfolio, assets, and adherence to norms.

The main difference between smallholder groups in terms of their milk selling in the formal and informal markets. The high smallholders highly participated in the formal milk market and their milk selling was regular. In contrast, the low smallholders' participation in the formal milk market was low and this translated into irregular, unstable supply of milk. Also, what emerged from the research is the high group was less dependent on milk selling for their livelihood as they had many more diverse livelihood activities which produced higher incomes regularly. This enabled them to engage in commercial dairying regularly. However, milk selling was highly significant for the low group for living. This was due to the uncertainty of income sources they had in addition to dairying. As such, when the diversity of the portfolio increased with more regular income generating activities, the significance of commercial dairying to smallholders' livelihoods declined. This could be seen only by situating commercial dairying within the overall livelihood portfolios. A holistic understanding of the livelihood portfolio enabled the identification of diverse factors that constrained or provided opportunities for commercial dairying and how it relates to other livelihood strategies as is argued by DFIS (1999) and De Haan & Zoomers (2005). From a development perspective, if the government wants to increase smallholders' overall wellbeing by implementing strategies around commercial dairying, they need to tailor those interventions differently for those who are highly dependent on selling milk and less able to engage regularly in the formal milk market.

This study shows that smallholder farmers are not equal, and the inequality is reflected in ownership and access to assets (e.g. land, income). The relative inequality of assets significantly

affects how smallholders use assets (livelihood strategies). High smallholders were relatively large agricultural landowners with higher incomes from many sources. Their milk production and input use in dairying (land, labour, money) were also higher than that of the low group. This research supports the argument that if a country is to implement development interventions, it is important to acknowledge the significance of inequalities among rural people as failure to do so will increase existing inequalities (Adams 2002; Poole et al. 2013). In Sri Lanka, this research suggests that dairy development interventions that aim to increase smallholders' participation in the formal milk market will produce more benefits for smallholder farmers who are well resourced (e.g. land, money, machinery). Therefore, poverty alleviation policies need to address issues related to smallholders' ownership and access to assets to ensure their well-being through commercial dairying.

The differences between high and low smallholders are significant not only in terms of livelihood portfolios and the engagement in milk markets but also in how socio-cultural norms shaped their behaviours. A clear example of this is seen in the gifting of milk to villagers (e.g. neighbours, friends and relatives) which directly affected the marketable volume of milk and milk income. Both groups gifted milk to others and felt responsible for gifting milk when opportunities arose. There was a common acceptance of the norm of obligation to gift. However, the extent to which the norm of gifting was adhered to was stronger for the low group. However, this highlights the importance of non-commercial activities in smallholders' livelihoods and for their dairying. From a policy perspective, it is vital to pay attention to strengthening existing social relationships through development interventions in the target community.

### Conclusion

This study explores how and why smallholders engage in commercial dairying in Sri Lanka. The study reveals that smallholders show diversity in commercial dairy activities. Smallholders who are well resourced sell milk regularly, generating a year-round income from milk. Comparatively, resource constrained smallholders are not capable of selling milk regularly. Therefore, poverty alleviation policies need to address the issues related to ownership and access to assets in order to ensure well-being through commercial dairying for all the smallholders. Also, smallholders' commercial dairy activities are shaped by their socio-cultural norms and livelihood portfolio. Socio-cultural norms related to gifting influence the smallholders' decision about the value of milk for commercial and non-commercial activities. In terms of livelihood portfolio, level of diversification and how smallholders situate dairying within the portfolio determine the significance of dairying for their living. This research, therefore, confirms what others have argued for the importance of taking a holistic view when designing interventions for smallholder commercial dairy development. It also provides insights into policies and development interventions aimed at facilitating commercial dairying. Most importantly, commercial dairy development policies aimed at smallholder poverty alleviation cannot operate in isolation. They must take account of how livelihood portfolios are put together. Also, it is important to strengthen the existing rural social relationships through development interventions.

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