



Fig. E: The milk sold in Assi ghat is transported on bikes (Metzkow 2015)

Economies of Milk

Keywords: Value chain, Economic geography, Transport, Mobility, Animal husbandry

1 Introduction - milk and milk trade in India

Milk is one of the most important staple foods in India. It has cultural significance in the Indian diet. As many people are lacto-vegetarian for religious reasons, milk and dairy products are an important source of protein. Even though dairying is still mainly a smallholder activity, within the last decades milk production has increased tremendously. Today, India is the world's largest producer of milk. It accounts for more than 15 per cent of the world's total milk production and consumes almost all of its own milk (Kumar and Prabhakar 2013). The per capita consumption of milk and dairy products is one of the highest in Asia and is still growing due to factors such as population growth, urbanisation, increases in income levels, and changing food habits and lifestyles (Delago 2008).

Milk trade historically has been a local and small-holder activity in India. Just within the last few decades, an industrial milk processing sector has developed which uses a western-style dairy processing (pasteurisation), packaging and marketing (Jesse 2006). There are many studies about the industrial milk processing sector, while studies about the local milk trade are hard to find. However, the local dairy sector still attributes to 75 per cent of the milk trade and thus, is an integral part of the milk business in India (Jesse 2006). This paper aims to contribute a better understanding of the local dairy sector by analysing the economic, spatial and social organisation of the rural-urban dairy production, marketing and distribution in Varanasi, Uttar Pradesh (U.P.), using the commodity chain approach promoted by Gereffi (1994, et al. 2005). As the industrial dairy sector has grown rapidly during the last two decades due to deregulation policies, its impact on the local dairy sector is investigated as well.

2 Conceptual framework - The Global Commodity Chain Approach

The global commodity chain approach of Gereffi (1994, et al. 2005) is commonly used on a global scale. In the context of globalisation, many labour-intensive steps of production were outsourced in the last decades through multinational companies. The global commodity chain approach was developed to enable the analysis of the cross-linking and allocation of different production sites and their stakeholders. Originally, the approach focuses predominantly on the production of goods. Within this context, a commodity chain could be defined as a network of labour and production processes. The result of those processes is a finished commodity (Hobkins and Wallerstein 1986). Beyond that, Gereffi (1994) distinguishes four dimensions to analyse the structure and organisation of a commodity chain: input-output-structure, territoriality, governance-structure and institutional framework. Socio-political, institutional and cultural aspects were included along with the pure economic issues. The analytical framework intends to point out how the different economic agents are linked (Hassler 2009) and examines "the spaces through

which consumers are connected to producers” (Hughes and Reimer 2004, 1). The approach offers a suitable framework for the analysis of dairy production and trade in and around Varanasi as it can be used on a local or regional scale too. Addressing the four dimensions with reference to urban and rural dairy producers it allows identifying the different terms on which they are working and what different challenges they face. The framework isolates key variables that provide a clear view of fundamental forces underlying specific empirical situations such as the production and processing of milk in and around Varanasi (Gereffi et al. 2005). In the following, the four dimensions are briefly presented.

Input-Output-Structure

The input-output-structure examines the process of adding value itself. The different steps of a commodity chain are described as nodes. By analysing the inputs, outputs and their differences it is possible to contrast rural and urban dairy production and distribution. The inputs can comprise resources as well as know-how, labour or certain techniques that increase the value and quantity of milk. Looking at inputs and outputs in local dairy production the hierarchies between different producers, merchants and/or nodes can be made visible.

Territoriality

The dimension territoriality focuses on the geographical dispersion of commodity chains. The different locations of dairy production and their connections to the local milk markets are analysed. In this way areas of activities of the different stakeholders can be identified. In addition to aspects of production, the consumers’ locations, competitors, innovations and industrial capabilities can deeply influence the dimension of territoriality (Gereffi 1994, Hassler 2009).

Governance-structure

Within the scope of governance-structures, the possibilities of controlling, regulating and influencing the production network are examined. It is possible that interactions between different stakeholders are characterised by asymmetrical power relations that determine how financial, material, and human resources are allocated and flow within a commodity chain (Hassler 2009). Gereffi (1994, et al. 2005) especially emphasises this dimension and analysed different types of commodity chains according to their governance-structure. He distinguished producer-driven and buyer-driven commodity chains. Producer-driven commodity chains are mostly dominated by one powerful stakeholder that controls backward and forward linkages. This type is typical for mass productions where production patterns shape the character of demand. Buyer-driven commodity chains are often more flexible and the producing and buying stakeholders within the commodity chain are more at one par with each other. The consumption patterns influence where and how manufacturing takes place. Typical for a buyer-driven commodity chain is high pressure of competition and partly changing consumer behaviour (Gereffi 1994, Gereffi et al. 2005).

Institutional framework

National laws and rules can provide the institutional frame for the production and trade processes of dairy products, and state policies can play an important role for commodity chain analysis.

3 Research Framework

The main objectives of the study in Varanasi were the analysis of the rural-urban dairy production, the commodity chains of the local dairy sector and the impact of the industrial dairy sector. Figure 3.1 illustrates the research framework including the objectives, research design and methods. After an initial period of theoretical preparation and literature review, the empirical research was conducted within two weeks in Varanasi and its surrounding suburban and rural areas. In order to investigate the production process, nine dairy farms were visited and examined, which included farms in rural (Muradev village), urban (Assi Ghat) and suburban (Seer Gate) areas.

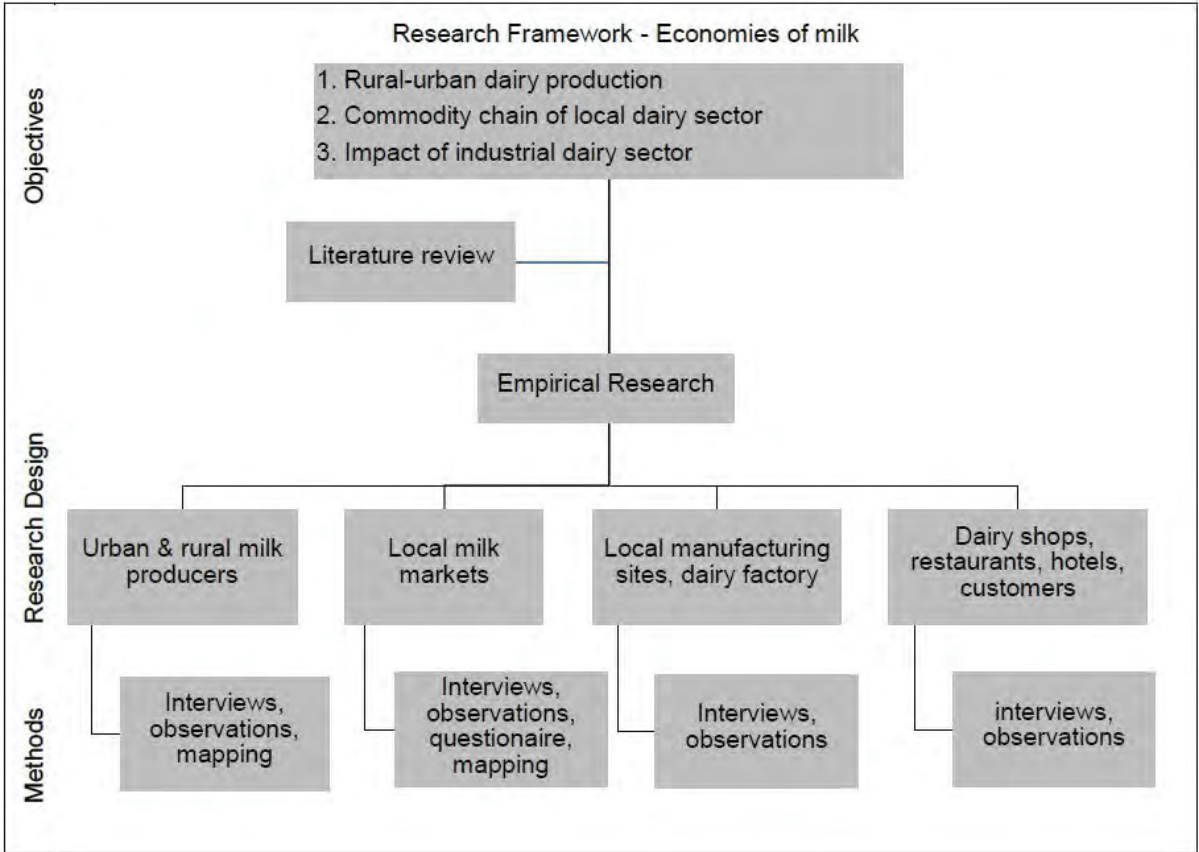


Fig. 3.1: Research Framework - Economies of milk (Source: own design)

At each farm an in-depth qualitative interview was conducted with the owner of the farm. To get a better understanding of the local milk marketing and distribution system, four local milk markets were visited: Godaulia and Visheshwarganj in the old town (city centre), Kaccheri north of and Lanka south of the old town. The markets look rather unorganised and crowded. There is no reserved space with tables or booths for the merchants, no entrance or gate, no sign indicating the presence of a market. There is

simply a crowd of milk men standing next to their large milk cans in a small ally or along the street. Observations and ten in-depth qualitative interviews were conducted, as well as a brief questionnaire survey (n=70). Furthermore, the production-based catchment area of each market was mapped.

In order to get a deeper insight into the commodity chain, several short interviews were conducted at a variety of small local manufacturing shops including *ghee* shops (two interviews), curd shops (two interviews), *paneer* production sites (two interviews) and *paneer* shops (one interview), sweet shops (two interviews). To gather information about the organisation and influence of the industrial dairy sector, a processing plant of the private company *Parag Milk Foods Pvt. Ltd.* in Ramnagar was investigated and a manager interviewed. Also, the owners of three dairy shops selling packaged milk and processed dairy goods were interviewed. To evaluate the consumer side of the chain, restaurants, hotels, guesthouses (three each) and customers - both at the local milk markets and at small dairy shops (ten each) - were interviewed. The research process was facilitated by an Indian interpreter.

4 Rural-urban dairy production in Varanasi

Before taking a closer look at the commodity chain and its dimensions, some basic aspects about the organisation of the milk production in rural and urban areas in the study area have to be dealt with. It has to be pointed out that milk production is mainly a rural and smallholder activity. About 70 percent of the milk producers in the conducted survey have less than 20 cattle. Only two out of 70 producers have nearly 100 cattle. Most dairy farms are family-run and dairy is generally the main income source. More than 80 percent of the rural milk producers interviewed are also involved in subsistence agriculture.

The milking is usually done once or twice a day (in the morning and afternoon). Afterwards, the unprocessed raw milk is immediately transported in large milk cans (*balta*) to an urban milk market as the raw milk deteriorates quickly and has to be fresh. This task is done by a male member of the family, e.g. the father or the eldest son. When it comes to other tasks such as milking, feeding, or bathing the cattle, cleaning the shed and milk cans, there is no clear division of labour. In addition to selling the milk at the market, some producers offer a home delivery service to regular customers.

Generally, about 30 percent of the produced milk in India is retained in the villages for food and feed (Jesse 2006). The interviewed farm owners reported to keep between seven to ten litres per day for their own use. In the countryside, it is very common to keep at least one or two cattle for subsistence even if the family is not involved in dairy business. Consequently, the demand for milk in the countryside is comparatively low. In the densely-populated urban areas, on the other hand, only few people keep cattle, and the demand for milk and dairy products is high and still growing due to socioeconomic and demographic factors such as urbanisation, rising income levels and changing food habits (Delago 2008). Although a number of urban milk farms exist in Varanasi city (among others in the Assi Ghat district), they cannot meet the high demand of the urban population. This leads to a close rural-urban linkage between the rural producers and urban consumers.

Around 90 percent of the milk sold at the milk markets is buffalo milk and only ten percent is cow milk. It has a higher fat content (six to seven percent) than cow milk (four to five percent) and is used for many traditional dairy products such as butter, *ghee* (butter fat), *dahi* (curd), *malai* (cream), *paneer* (fresh cheese) and sweets. Cow milk is used in particular for religious ceremonies, special kinds of sweets and as baby food (due to its higher nutrient content).

5 Commodity chains in rural-urban dairy production

Figure 3.2 shows the different possibilities how the raw milk or the milk products reach the customers in the local dairy sector.

- The producer sells his milk directly to customers and processing sites.
- The producer brings his milk to a local milk market where he offers his product to different customers.
- The producer sells his milk to a milk man who sells it at the local markets. This milk man acts usually also as producer and simply buys additional milk to increase the amount to be sold at the market (cf. chapter 5.1).
- The milk that is processed to dairy products such as *paneer*, *ghee*, *malai*, sweets, curd, butter etc. is sold mostly to private customers. Many bigger restaurants process the raw milk by themselves.

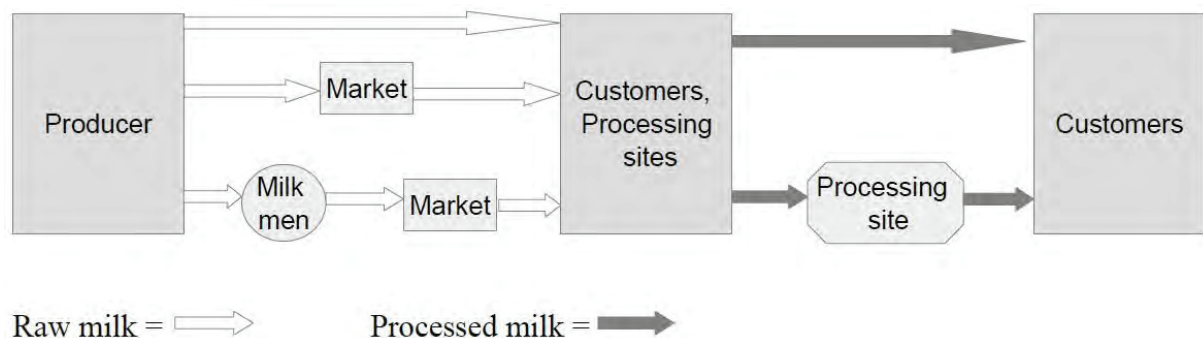


Fig. 3.2: Commodity chain of the local dairy sector (Source: own design)

Some shops also buy processed dairy products such as *malai* and just do the further processing on their own (for example *ghee* shops may buy *malai* and make *ghee* from of it).

Figure 3.3 shows the commodity chain of the industrial dairy sector. The producers give their milk to a committee (village cooperative societies). This is only common in rural areas (cf. chapter 6). After the collection, it is brought to the factory. After several processing steps, packaged milk and different dairy products are transported to the wholesale market. From there they are delivered to the different shops in the city where the customers finally buy the products.

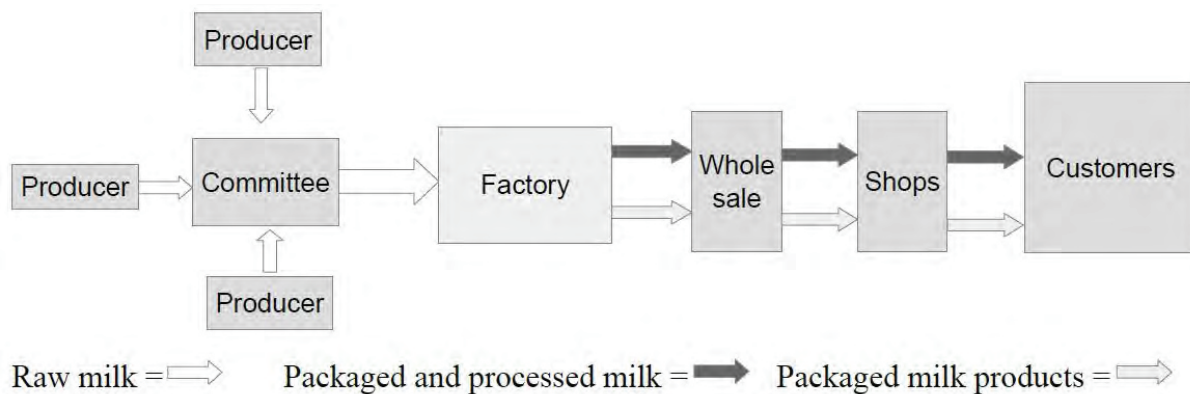


Fig. 3.3: Commodity chain of the industrial dairy sector - the example of Parag Milk Foods Pvt. Ltd. (Source: own design)

5.1 Input-output structure

The input-output-structure examines the process of adding value between different nodes of production. However, as the survey essentially examines the production and trade of raw milk, there are not many different nodes of adding value to be distinguished. Only three out of 70 interviewed clients are not merchants and producers at the same time. These three just act as merchants and milk men (cf. chapter 5). One third of the remaining 67 clients buy milk in addition to their own produce to sell it at the markets. They are producers, milk men and merchants at once. It can be assumed that this part of the milk trade is based on partner-like relations. The additional milk is mostly bought from neighbours and other smallholder producers from a closer social environment of a particular merchant. The production and trade of milk is not the main activity of these smallholder producers that sell their left over milk for a lower price. Due to the regional allocation of all stakeholders and the short distance of the commodity chain they are all underlying similar producing and market conditions. This reduces the chance that big hierarchies arise. However, differences that have to be considered between producers are their location (urban or rural) and their herd size, both determining the input-output ratio.

The amount of milk a cow or buffalo gives is highly dependent on the amount and composition of the forage. The vast majority of the rural producers (80 percent of the interviewed clients) are involved in agriculture. They are able to grow up to 50 percent of their feed by themselves. By-products from crop production and *chari* (fresh green grass) are mainly used as forage. They contain many nutrients that are essential for the cattle's health and the production of a good amount and quality of milk. The rural and, therefore, more natural environment are beneficial for a healthier life of the cattle in general. They move more, breathe cleaner air and are not endangered by the consumption of garbage and plastic. These conditions are not given in the city. The restricted space of the city does not enable to produce forage by means of own agriculture. The availability of *chari* is very limited and so an urban producer has to supplement the cattle's forage with additional nutrients, vitamins, medicine and concentrated calories (butter or/and glucose). Table 3.1 gives an overview about the usual components of forage.

Tab. 3.1: Usual components of forage (Source: own data)

Forage	Price per Kg
Bhusa (dry wheat, straw, broken particles)	10 Rs. /Kg
Chokar (broken particles of wheat and rice)	15 Rs. /Kg
Khari (waste material of mustard oil production)	50 Rs.
Chuni (pulsus/hulls of pulses)	8 Rs. /Kg
Chari (resh green grass)	No fixed prices - only available in the countryside
Concentrates (Butter, Sugar)	-

The cattle receive a daily forage mixture of 10-20 kg per animal. The daily ration of forage should be around 3.4 percent of the live weight of a buffalo (assuming an average buffalo weight of 500 kg) and 4.2 percent for dairy cows (assuming an average cow weighs 400 kg) (Powell 2010). The final amount in kg highly depends on the actual composition of forage.

The restricted space also limits the number of cattle a producer can manage in the urban areas. Urban producers need higher monetary inputs as they have to buy supplements of different kinds to compensate the described disadvantages of urban milk production. However, they save costs and time due to the spatial proximity to their customers (cf. chapter 5.2). The rural producers, on the other hand, need much more time for transporting their milk to the urban market and may have to invest in a motorcycle and petrol to cover long distances. The distance can also be understood socially referring the milk buying customers (cf. chapter 5.2). The non-existing private network regularly forces the rural merchants to spend much more time at the milk markets, where sales are nearly exclusively determined by the price and quality of the milk. Rural producers need more monetary and non-monetary inputs in the section of transport and selling (petrol, capital in kind, time).

The size of the herds also influences the needed input to gain a certain amount of output. With an increasing number of cattle the additional input for each further animal is decreasing until a critical point to achieve a certain amount of milk per animal (economies of scale). The results of the survey are not clear enough to prove this effect in monetary expenditures per animal. The clients were asked for monthly expenditures and the number of cattle they have, but how the producers split their expenditures between animal breeding, transport, agriculture or other private investments and consumption was not distinguished. Further research is necessary to clarify the monetary input-output calculations. Nevertheless the described economies of scale apply also to non-monetary inputs such as bathing the cattle.

Another important factor is the seasonal variation of inputs and outputs. Due to heat stress the cattle are giving less milk in the summer months. Again, additional inputs such as fresh forage, more liquids or a higher bathing frequency are needed to keep the output close to the winter level. If the producers cannot afford the supplementary inputs the output is decreasing in the summer months, directly influencing the milk price (cf. chapter 5). Apart

from milk, *ghori* can be seen as another output. *Ghori* is the dung of the cattle, which is formed into a round cake and dried. It generates just a fraction of the whole income but it can be used in many ways as fuel for cooking and heating. Fresh manure is used as fertilizer on the fields. In a few cases producers also rent out their bulls for reproduction. One of the interviewed clients charges 200 Rs. per session. Many producers, however, lend their bulls for free or use sperm injection (around 150 Rs. per injection).

In addition to primary production sites further processing sites were investigated. Figure 3.4 exemplifies the added value using the example of the production of *paneer*. The interviewed client is using 500 l milk per day for the production of *paneer*. He is buying the raw milk at the market rate. After processing all the milk he added a value of about 2500 Rs. The price for raw milk as well as for *paneer* is increasing in the summertime.



Fig. 3.4: Proportion of milk/paneer and its added value (Source: own design)

All in all, the production of milk is labour intensive and a large number of non-monetary inputs are needed. The main tasks, i.e. milking, feeding, cleaning the barn etc., are time consuming and often have to be done repeatedly a day, seven days a week. In that field, urban and rural producers face similar challenges of everyday life in the local dairy sector in and around Varanasi. Moreover, the profit margins of the producers are small. For most milk producers and merchants a low milk price directly causes lower input factors. Especially rural smallholder producers are vulnerable to droughts, fluctuating milk prices and increasing prices for petrol.

5.2 Territoriality

With respect to territoriality, the commodity chain is regional and concentrated within close rural-urban relations in the daily milk supply. The majority of the milk production takes place in villages around Varanasi (Fig. 3.5). Distance is a major factor for choosing the milk market. This is quite obvious considering that most of the transport is done by bicycle, which is time consuming and hard labour. Figure 3.5 shows that the markets Visheshwarganj, Lanka and Kaccheri have a sectorial catchment area with respect to the origin of the milk. The catchment area of Godaulia market is larger than all the other ones, including and intersecting the other catchment areas. The dairy farms are dispersed and milk men travel up to 36 km to reach the milk market of Godaulia even though other markets are much closer to their farm. Thus, distance is not the only factor for choosing the market.

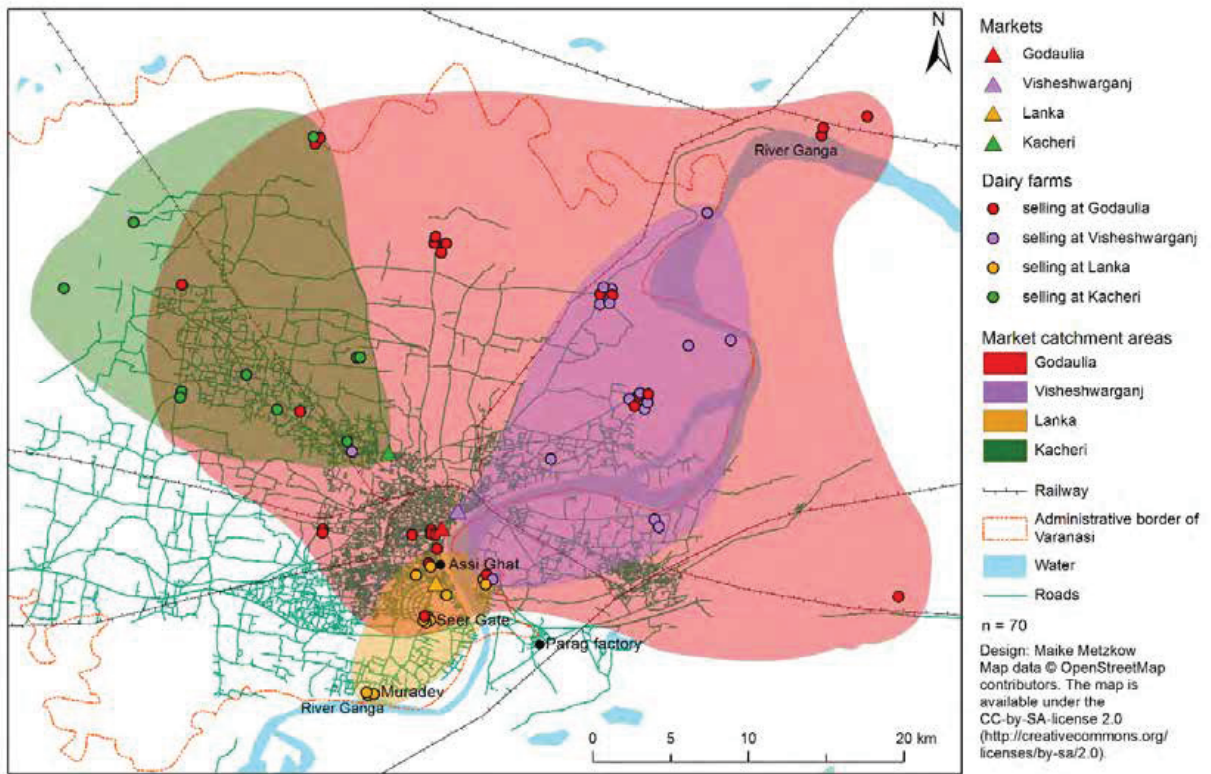


Fig. 3.5: Milk production catchment area (Source: own design)

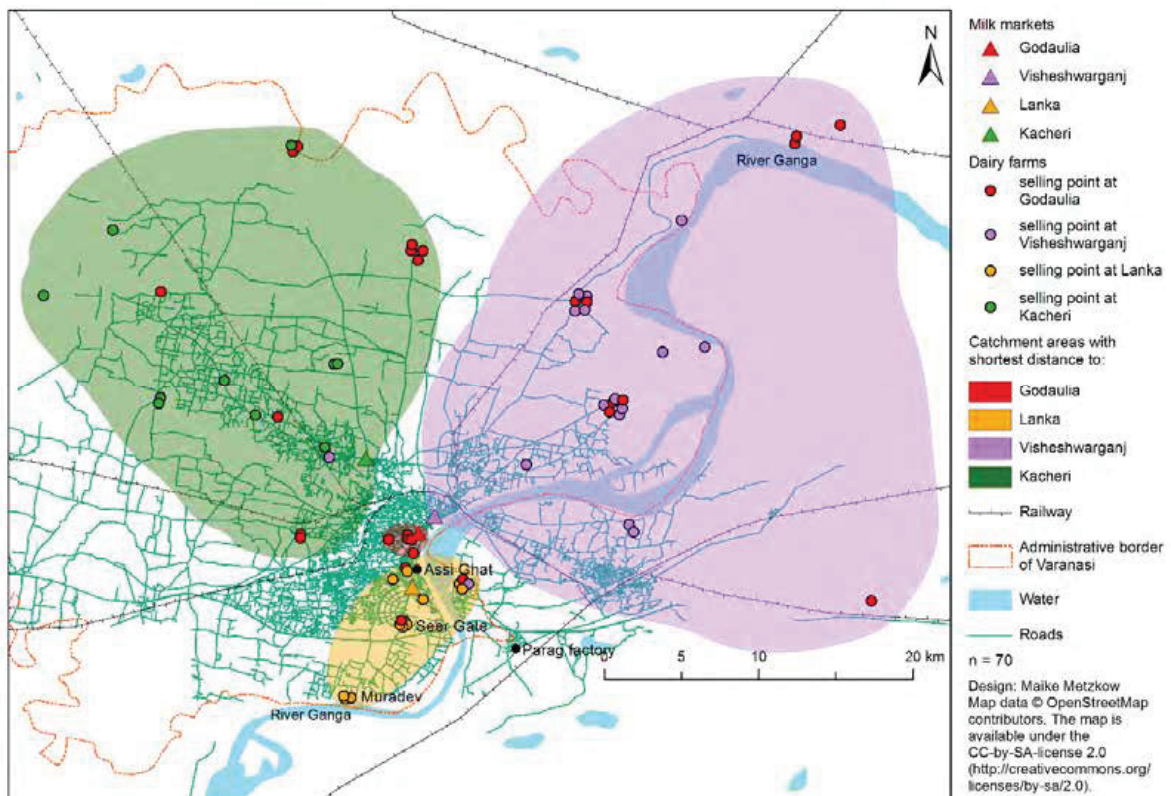


Fig. 3.6: Distance-based milk production catchment areas (Source: own design)

This is also illustrated by Figure 3.6, which shows the catchment areas of the markets with respect to the shortest distance between farms and markets. The large and disperse catchment area of Godaulia can be explained by its high degree of centrality. Godaulia market is located in the centre of the old town, a busy area with many tourists, guesthouses, hotels, restaurants, dairy shops and the most important temple in Varanasi (Vishwanath). Consequently, the demand for milk and the frequency of customers are very high. The market is also the only one that is open 24 hours a day, which again exemplifies the constant demand of milk in Varanasi day and night.

The urban producers often only sell a part of their milk at the local milk markets and sometimes none at all. The reason is that they have established a network of regular customers in their neighbourhood and surrounding areas. They mostly sell their milk directly from their urban farm or deliver it to their regulars. Figure 3.7 exemplifies the catchment area for an urban producer residing at Assi Ghat. The farthest customer is only two kilometres away and when including all customers, the total route is about eight kilometres long. The spatial proximity to the customers is a major advantage for the urban producers with regard to milk marketing and sale.

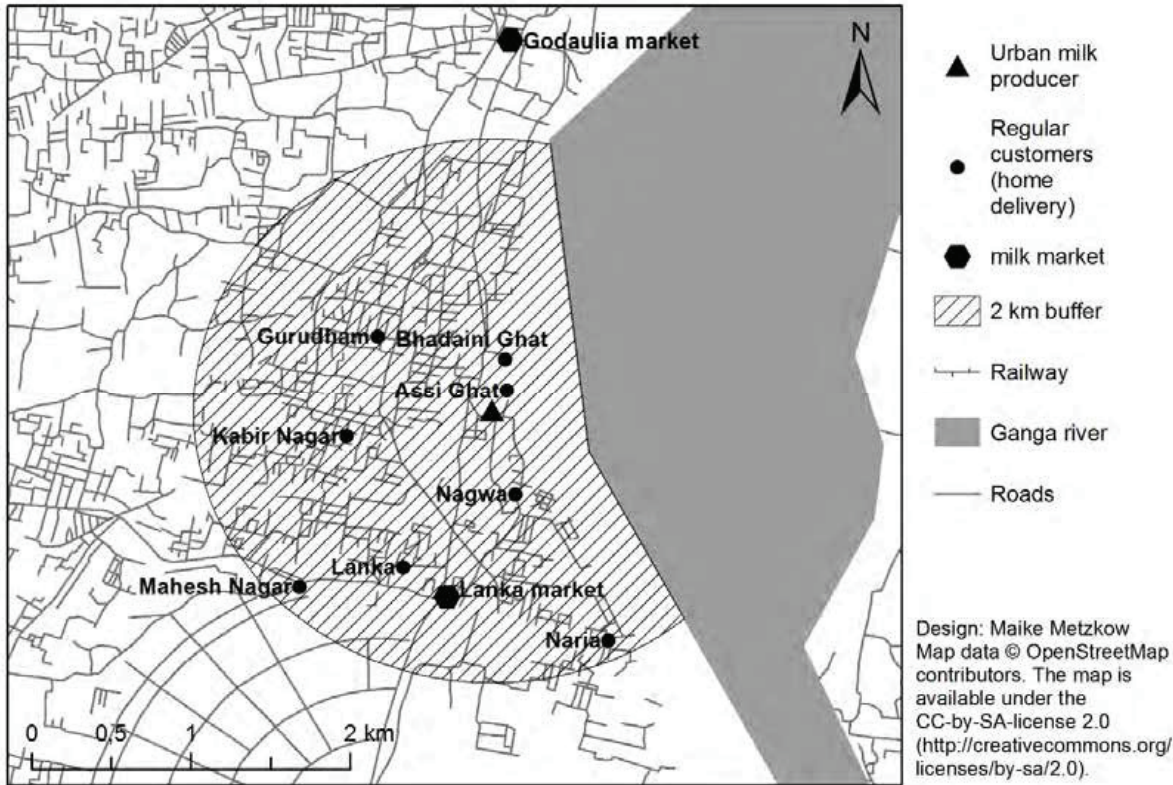


Fig. 3.7: Customer catchment area of an urban milk producer (Source: own design)

The manufacturing of traditional dairy products takes place on a local level in small manufacturing sites or shops scattered over the city. The consumption of the milk and dairy products takes place locally, i.e. in Varanasi city. As such, the geographical dimension of the commodity chain is concentrated in the city of Varanasi and its closer surroundings.

5.3 Governance

The local dairy sector is only slightly influenced by specific governance mechanisms. In general, it works on open competition without particular social entry barriers. The fact that more than 90 percent of the interviewed clients belong to the caste of *yadav*, which is the traditional milk producing and trading caste, can be explained by the traditional division of labour along the caste system. However, the conventional order was neither translated into contemporary legally binding market guidelines nor is it preserved in another way by any authoritarian structure. Supply and demand influence the price directly. They are the most important market regulating factors which is why a closer look at the price mechanisms is appropriate.

The following information is applied to the local milk markets and predominantly rural producers as most urban producers not depend on these markets. The price for one litre of milk was on average around 33 to 40 Rs. per litre in winter 2014/2015, whereas the average price in summer is up to 50 percent higher. In general, the demand is increasing by rising living standard due to changing food habits and lifestyles. The income elasticities for milk are between 1.07 in rural and 1.36 in urban areas in India (Jesse et al. 2006).¹² The price is further influenced by the quality of milk (fat content, water mixing). The customers test the milk for its fat content by putting their hand into the milk. Moreover, the sales skills have an influence. Seasonal changing prices can be explained by the fluctuating output (less in summer) which reduces the supply. The demand for milk is influenced by social aspects and religious events during which there are much more people in town. Especially hotels, restaurants and guest houses demand more milk (e.g. for tea, for coffee and milk products). The annual festival of *Shivaratri* as an important religious holiday is a good example where thousands of pilgrims and visitors come to the city and the demand for milk increases erratically. A temporary stronger demand can be partially explained by the preferred usage of cow milk for religious reasons although this factor might be often overestimated.

Another important aspect is the wedding season in rural areas. Around 80 percent of the interviewed clients are involved in agriculture, where most work has to be done in wintertime. That is why there are more marriages in summertime which strongly correlates with the demand of milk. More milk is retained in the rural areas because of the increased demand. Thus, less milk is distributed to the city where the demand is still high and the price at the local milk markets can rise significantly. Prices are also fluctuating over the day. Milk is a valuable product but it deteriorates rapidly. Due to a lack of storage possibilities the merchants have to sell all of their milk each day at the local markets. The demand for milk is generally high in the morning hours and the merchants get best prices during this time. Over the day the demand is decreasing, especially for milk that is not bought for the purpose of further processing. The price can be up to 50 percent lower than in the morning if there are still many merchants that offer milk but fewer customers. If the merchants cannot sell their milk at the local markets there are different possibilities to

¹² Income elasticities larger than one mean that with rising income the demand increases disproportionately. Goods with income elasticities larger than one are called superior goods in economics.

sell it for lower prices. Leftover milk can be sold to different processing sites and the price can go down to less than 50 percent of the local market price at the end of the day.

In one particular case soft forms of governance that are not related to the complex of price, demand and supply could be found. One market director arranged the trade of leftover milk at the end of the day to bigger customers such as hotels for a low price. He tries to implement additional incentives to get more merchants to his market. That way he can collect a higher municipal fee and the merchants can be sure to sell all of their milk. It is a mutual positive behaviour and a good example for the whole character of the local dairy production. Although the different merchants face hard competition at the local markets they are working on equal terms. In addition, there are no stakeholders with disproportionate potential influence. This also applies to urban producers. Mostly they sell their milk by home delivery or it is picked up directly. Compared to the rural producers and merchants they are the minority at the local markets. Another peculiarity is that they mostly offer stable prices all over the year (about 50 Rs per litre milk in 2014/2015). The relations between these urban producers and their customers are often long and steady over generations. They are more personal as they are at the local markets. All in all, the type of the dairy products commodity chains in Varanasi can be identified as buyer-driven. The producers are almost at one par with each other and face high competition, whereat the customers buying decisions at the local markets is influenced by small price and quality differences.

5.4 Institutional Framework

While the private and cooperative sector are subject to formal regulations (for instance the Milk and Milk Products Order) and the cooperative sector even receives subsidies and policy support, the Indian government has adopted quite a laissez-fair approach to the local dairy sector (Jesse 2006). Thus, formal institutions do not play a significant role in the interactions between agents in the commodity chain. Only the milk markets are formally



Fig. 3.8: Godaulia milk market (Metzkow 2015)

organised (Fig. 3.8). They are generally located on an open and public space such as an ally or the side of a road and are supervised by a market director. The market director is a private employee who obtains the authority over the market from the municipality against payment of a certain yearly fee. In turn, he collects a municipal fee (10-20 Rs. per day) from every merchant. There is no vendor license necessary nor do any other restrictions apply for selling at the market.

6 Impact of the industrial dairy sector

The industrial production of milk is carried out by dairy cooperatives and private processors. Within the scope of the liberalisation of the dairy sector since 1991 the market of Uttar Pradesh was opened (Kumar et al. 2011). All companies could sell their milk and

milk products nationwide. Today, industrial processed milk and milk products of three different suppliers can be found in Varanasi. A big factory operated by *Parag Milk Foods Pvt. Ltd.* exists since 1975 and is located close to Ramnagar. It is the only cooperative milk factory in the region of Varanasi. The other two companies are called *Shyam* and *Amul*. *Shyam* is also based in Uttar Pradesh and it is a private company while *Amul* originally started operating in Gujarat as a cooperative.

Especially within the last two years all of them scaled up the supply of packaged milk and other packaged milk products to the city. As *Parag* is a cooperative the milk is collected by a committee in rural areas. It consists of agents of the milk producers. They elect a representative in a democratic process. He is responsible for the daily transport of approximately 40.000 litres milk to the factory where the processing and packaging takes place. In return for the steady milk supply the *Parag* company supports the milk producers through the organisation of transport, the guarantee to buy all of their milk and by providing subsidised forage for the cattle. The prices of packaged milk are stable all over the year and range from 34-48 Rs. per litre according to the fat content. The factory can balance the lower milk supply in summer times. The surplus milk in winter is processed into milk powder and butter. In summer, when the demand is high, these ingredients can be mixed together with water to form milk.

The demand for packaged milk has increased. Its consumption is more convenient (fixed price, no water mixing, no bargaining, shorter ways to buy milk) and is sometimes seen as an expression of a more modern lifestyle. However, the competition between the local milk market system and the industrial system is not seen critically as it serves different target groups. Local production sites prefer milk from the local milk markets as they need fat buffalo milk to get a good amount of traditional dairy products such as *paneer*, curd, *malai*, *ghee*, sweets etc. per litre. Packaged milk is mostly preferred by the upcoming middle class and just a few customers switch in summertime from fresh raw milk to packaged milk when the prices for the fresh products are high. It can be assumed that the industrial milk production system will not threaten the local system in the near future.

7 Conclusion

The aim of this paper was to contribute to a better understanding of the local dairy sector in Varanasi using the commodity chain approach promoted by Gereffi et al. (1994, 2005). Milk production is mainly a rural, smallholder and household-based activity. Regarding the local milk supply, there is a tight rural-urban relation with a net flow from the rural areas (low demand) into the city (high demand). The milk is mainly traded at urban local milk markets subject to the price-building mechanisms of supply and demand. Rural and urban milk producers face different challenges. Whereas the rural producers face long distances to and price fluctuations at the milk markets, urban producers are mainly constricted in space and forage supply.

The commodity chains of the local dairy sector are small-scale, local and concentrated on the city of Varanasi and its surrounding rural areas. They have been identified as buyer-driven commodity chains. Despite varying profits and welfare between the interviewed

clients no dominant stakeholder or structures could be found. Distance from production site and centrality are major factors for choosing the milk market as they determine time constrictions and sales opportunities.

Although the global orientated commodity chain approach is putting emphasis on power relations and hierarchic structures, it proved to be a beneficial tool in creating a better understanding of the dairy production and its value flows in Varanasi. By using the four dimensions of the approach the central economic concerns and connections could be supplemented by social, institutional, geographical and partly religious explanations.

The industrial dairy sector has been growing during the past decades, so far without posing a threat to the local dairy sector. Yet, the major disadvantage for the local milk producers refer to the price building mechanisms at the local milk markets which leaves them vulnerable to fluctuations of the milk price. Milk producers supplying their milk to private or cooperative firms have more stable revenues.

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