ANALYSING DAIRY BUSINESS VALUE CHAINS IN FAR-WESTEN TERAI DISTRICTS OF NEPAL

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ABSTRACT

Dairy sub-sector is recognized as fast growing profitable agro-business in far-western Terai districts but past studies to support that statement is lacking. The field survey was conducted from February to April 2012 with the aim to analyse business capabilities of operational service providers, investigating value chain analysis and market analysis of the overall milk business. The study collected primary information from 103 respondents by applying multi-stakeholder discussions along with constraint-opportunity analysis. The identified value chain functions were: input supply, milk production, collection, chilling, processing, trading and consumption. The major business stakeholders included 28 private dairies, 34 milk producing cooperatives,7 chilling centres, Dhangadhi Milk Supply Scheme, 25 milk vendors, 44 sweet houses, and more than 100 hotels and restaurants which were transacting 20800 tons equals milk and milk products. Value margin analysis revealed that milk producers were earning higher profit in comparison to the additional cost required for product transformation. Nevertheless, accounting dominance of services offered ultimately on market functions, private dairies were capturing higher profit margins through retailing short shelf-life products disposing through local market outlets. Gross margin analysis on few dairy products sold by the private dairies revealed that selling curd, paneer, *Khoa*, and ice cream were respectively two times, five times and twenty times profitable, than the selling standard milk. The market analysis indicated 26 percent higher supply of milk in flush season months to the end market outlets. The leverage point of future interventions were: immediate need of preparing at and working upon dairy business plan in coordination across value chains actors, strengthening backward linkage particularly input and production management, and encouraging to manufacture long shelf-life dairy products.

Key words: value chain function, actor, margin, lean season, self-life

INTRODUCTION

Value chain approach (VCA) is a newly practiced market-based tool determining how sub-sector receives raw material as input, add value due to product transformation and sell finished products to the intended customers (GTZ, 2007). It describes the full range of activities that firms and workers do to bring a product from its conception to its end use and beyond. The use of VCA is to studying linkage (horizontal and vertical), costs (production, processing and distribution), market (local, regional or terminal), operational service providers (micro, meso and macro) and governance (demand and supply dominance) besides value addition (cash vs kind services) (Chhetri *et al* 2008). Modern market chains not only connect national market but also concern regional markets (World Bank 2012). The result shows that VCA is becoming a proved tool to make a more relevant selection of stakeholders or building partnership together among public and private stakeholders (Schmitz 2005). This implies that the approach is all about value creation, value distribution and management.

Government of Nepal through Ministry of Agricultural Development has been formulating business policy of dairy sub-sector in various ways. Agriculture Perspective Plan (1995- 2015) highlights livestock as the output-base profitable sub-sector. Developing dairy pocket for bulk production of milk was the basic approach of APP. National Agricultural Policy 2004 aims to change

subsistence production level to competitive agricultural system to improve the living condition of the producers in the sustainable way. Agri-business Policy 2006 specified the National Agriculture Policy to promote subsistence-base livestock keeping system to commercial on through public-private or public-cooperative partnership. Dairy product is considered as one of the import substitution product as well as exportable commodity that government has therefore reduced tax for importing infrastructures to promote quality management standards of the milk products.

Kailali and Kanchanpur districts are self-sufficient in per capita milk production (RLSD, 2012).Per capita milk production in Kanchanpur and Kailali were 65 and 80 litres respectively which was higher in comparison to national record (per capita 57 liters). The herd size averages 2 to 3 livestock units. The fiscal year 2011/12 shows 77143 cattle and 80240 buffaloes comprising local, cross and improved milking breeds (DLSO Kailali, 2012 and DLSO Kanchanpur, 2011). Same report estimates per lactation average 340-400 litre milk getting from a local cow in comparison to 2000 litres of cross breed. Likewise, local buffaloes lactates 800-900 litres in comparison to two times more for cross breeds.

Attaria, Dhangadhi and Mahendranagar are major market hubs for dairy inputs and outputs. Better road network, proximity to Indian boarder, electricity connection, productive land, experienced farmers and rapid urbanization et cetera provide substantial supportive environment for dairy business in these areas. Although it is reported that dairy business is significantly gaining its popularity in far western terai districts, the studies regarding its value chain is lacking.

METHODOLOGY

Field survey was conducted from February to April 2012 and primary information were collected from 103 respondents through questionnaire interview. In order to collect data, the semi-structured checklist was prepared for focus group discussion (FGD) and key informant survey (KIS). Study conducted 11 FGDs (five in Kanchanpur district at: Bhimdatta Nagarpalika-2, Dodhara, Chandani, Suda and Tribhuvanvasti) and six FGDs in Kailali (Masuria, Tikapur Nagarpalika, Phulbari, Sripur, Geta). Altogether, 80 respondents were involved in 11 FGDs including producers, traders, cooperative member as well as collection centre staff. Further method was using constraints and opportunities matrix analysis (Figure 2) in order to find future scope of working for milk business promotion.

The researcher also conducted key informant survey (KIS) with 23 respondents from District Livestock Service Office, Dhangadhi Milk Supply Scheme, Regional Livestock Directorate, Livestock Service Centre, Private Dairies, Management Committee of Livestock Hat Bazaar in Attaria and Tikapur, vet-keepers, Chamber of Commerce, Private Dairy Association, Truck Association, Hotel Association, tea shops and sweet house owner. Volume of production, sale, processed products, prices, payments, assets and liabilities were triangulated and checked through direct observation of their records, or notes.

For analysing tabulated information qualitatively and quantitatively, simple statistical tools as well as descriptive methods were used. Main analysis part was calculation of value addition: total value added for all services and product produced in the economy for consumption and investment**.** Average, minimum and maximum values in prices and volume were used while expressing raw or processed dairy products. Nodes of intervention were pointed out based on FGDs and KIS. The chain maps were drawn using Microsoft Word 2007 SmartArt by recapitulating value chain functions, chain supporters, value addition, market volume, prices and linkage levels (Figure 3).

RESULTS AND DICUSSION

Value chain functions and chain actors

According to ICIMOD (2010), upstream value chain actors are small-scale milk producer, traders, or processors who are closed to the origin of the product or service. While downstream value chain actors included large traders and processors who are close to end market. Following six functions and respective actors were identified as by considering this definition.

1. Input provider

As indicated in Figure 3, varying array of the stakeholders provided inputs. Farmers managed forage, fodder, homemade feeds as well as cash expenses. Most of the farmers fed grasses and fodders in bulk rather than feeds to their livestock. The farmer's coordination committees were established resource centre of breeds and improved grasses along with support of District Livestock Service Office (DLSO). The Regional Livestock Training Centre (RLTC), Regional Veterinary Lab (RVL), provided training and treatment services. Under local breed improvement programme of DLSO, 15500 animals received artificial insemination service in the last six-year. Apart from these input providers, Dhangadhi Milk Supply Scheme (DMSS) supported chilling vats, tools and chemicals to the leading milk producing cooperatives (MPCs). However, additional demand of breeds were fulfilled from the informal traders.

2. Raw milk producer

The DLSO registered 8372 households rearing dairy animals who were in form of groups of 8 to 25 members. Respondents reported 1-3 litres, 3-5 litres, 4-6 litre milk for local, cross, and improved buffalo respectively, while 0.5 to 1.5 litres, and 6-10 litre amount for local and improved cow, respectively.Villagers usually milked their cattle twice daily: early in the morning and next in the evening and collected the milk in cans or vessels. Annual milk production was 69260 metric tons, of which, 60% was from buffaloes and rest from cow, with the average of 517 litres per buffalo and 360 litres per cow, respectively.

3. Milk collection, test and chilling

The milk producing cooperatives and some private dairies collected milk through temporarily established 42 collection centres having collected 20 litres to maximum 300 litres. Each collection centre provided services like; milk weight taking, sample test and recordings for cash payment to the individual collectors. The milk collection and testing was finished at 8 AM and raw milk was carried to nearby chilling centres (cold chain) and private dairies (hot chain). The average collection of 28 private dairies in an average 322 litres per day in lean season to 418 litres per day in flush season whereas maximum consumption per day was 3500 litres. Capacity of the seven chilling vats were 8000 litres milk at a time. Private dairies completed milk collection in two hours but Dhangadhi Milk Supply Scheme usually had 5 to 8-hour time lag in reaching chilled milk at Kohalpur. Eight-month record of DMSS reported highest 95,430 litres milk collection during 15th February to 14th March followed by 12921 litres as the lowest during 15th September to 14th October.

4. Milk processing

Out of 20800 tons raw milk sale annually, estimated 60 percent was used to manufacture locally popular processed dairy products (Figure 1) by organised or unorganized sector. The unorganised sector, not recognised by Nepalese Dairy Act, constituted sweet shops, hotels, restaurants and tea

shops who manufactured short to medium shelf-life milk products such as *Dahi*, *Khoa*, *Barphi*, tea, etc which consumed a 7700 tons milk per annum.

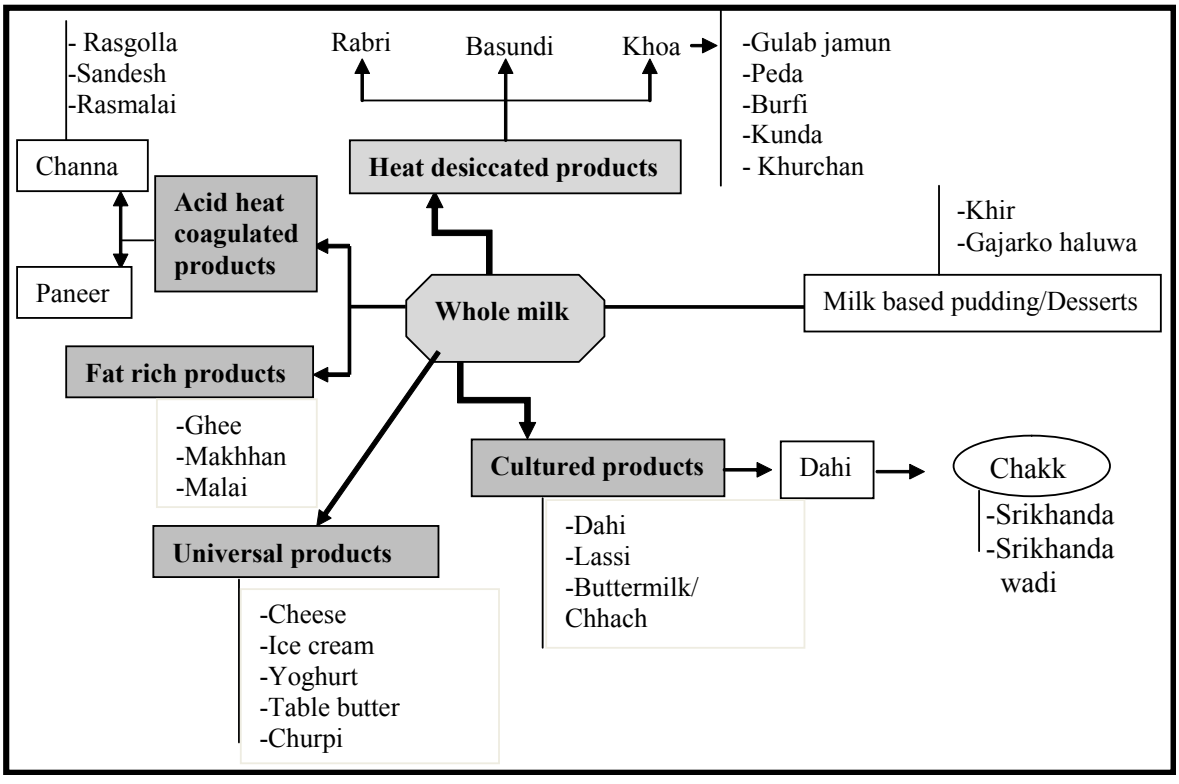

Figure 1. Milk processing and products in the study area

Source: Field survey (2012)

Figure 1 Traditional milk products in the study area

The organised sector constituted private dairies, Dhangadhi Milk Supply Scheme, and MPCs and its' union. The private dairies sold 5300-6000 ton equivalent milk products annually and their average processing capacity varied 30 to 500 litres per day. Having higher processing capacity, 7 larger dairies manufactured universal temperature ambient as well as frozen products like cheese, paneer, ice cream. Of the 6000 tons milk, 3000 tons milk was used to prepare: 25% for yoghurt and ghee, 10% for paneer, 15 % for *Khoa* and 10 % for ice-cream and *Churpi*. Rest of the milk was either sold in chilled or fresh form.

5. Trading

The MPCs and DMSS together acted as wholeseller as well as retailer of dairy products**.** The wholesale prices, 12.5% lower than retail ones, were relatively same in the two districts. Khaptad, Aama, Pathak, Sagarmatha dairies supplied cream and paneer to Butwal, Chitwan, Pokhata, and Kathmandu dairies. *Khoa* was traded to few dairies of Baitadi and Doti. The private dairies were retailing products to the consumers in the prices fixed by the Private Dairy Association. Proximity to city area, the farmers were directly retailing fresh milk and yoghurt in a bargained price. DLSO also reported 25 milk vendors that retailed raw milk to the city consumer, teashops, hotels and office

quarters. Among them, 15 milk vendors sold 9000-11000 litres raw milk daily to Aachal Dairy, India.

6. Consumption

Figure 3 pointed almost 70 % of total milk and milk products consumed at home in the simple processed forms and 30% milk was consumed by the populace living in Dhangadhi, Attaria, Mahendranagar, Deepayal, Baitadi, Bardia, Pokhara, Chitwan and Kathmandu valley along with Indians.

Constraints and opportunities analysis of chain actors

The stakeholder analysis matrix supported to identify key constraints and opportunities in the study area are illustrated in Figure 2.

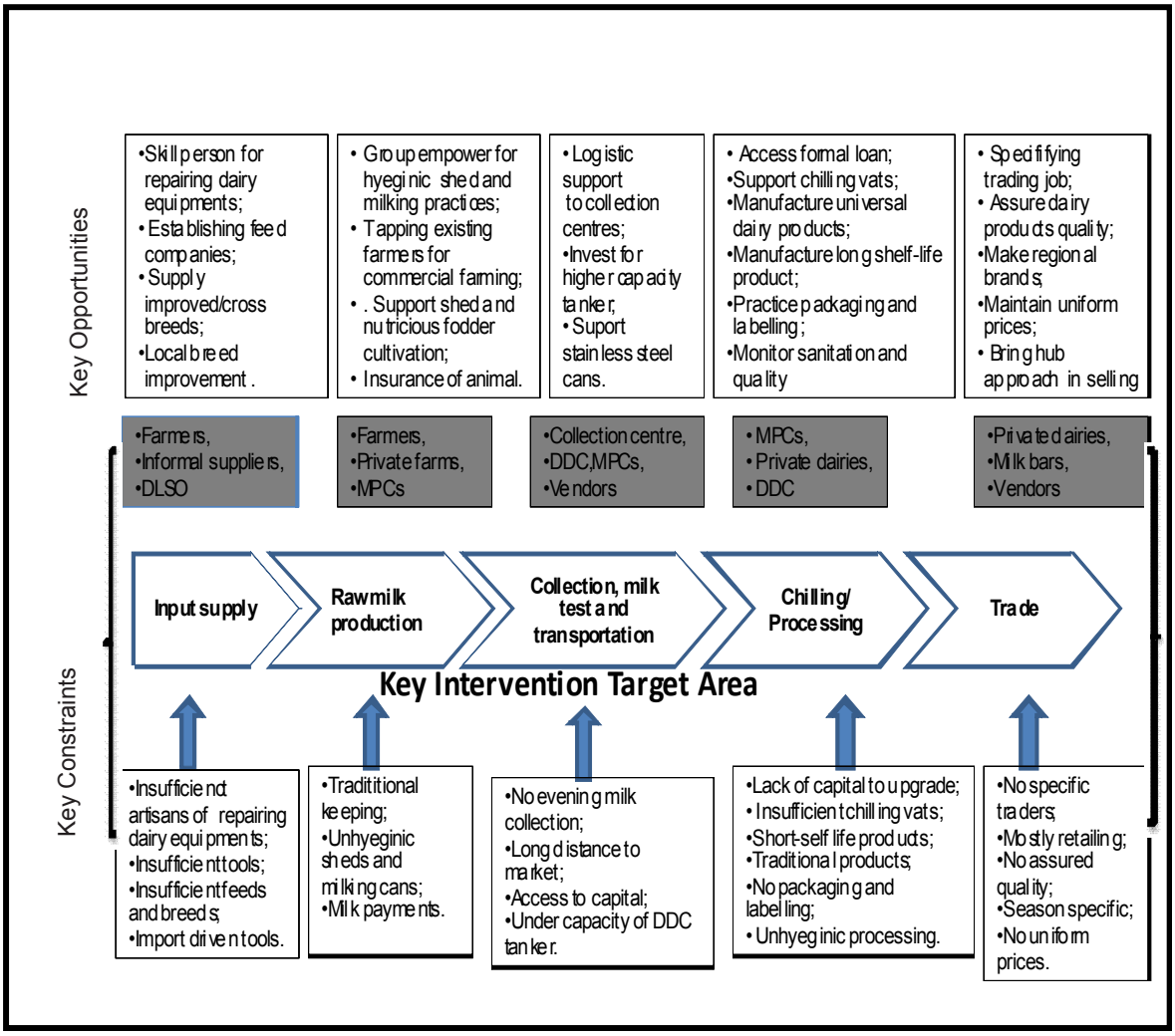

Figure Key constraints and opportunities of milk business in the study area

Chain supporters

Aforementioned micro-actors were partially or fully getting some sorts of support from meso-level to macro-level chain supporters which are mapped at the right side of the figure 3. Acting

as service providers to the micro-actors, the meso-level actors include member-base organizations, District Livestock Service Office, Regional Livestock Service Directorate, Project for Agricultural Commercialization and Trade, District Development Committees, Village Development Committee, Commercial banks, Wetland Terai Land Escape Project (WTLCP) and Truck Association. The policy level chain enablers, resembled as macro-actors, constitute of Dairy Development Board, Nepal Agricultural Research Council, Department of Livestock Service, Ministry of Agricultural Development, and line ministries. The World Bank and Asian Development Bank were donor agencies executing government-implemented projects (CLDP and PACT).

Economic analysis

Value addition and margin analysis was second important economic analysis which is depicted in table 1. To make calculation easier and understandable, one litre whole milk possessed by the Dairy Development Corporation was taken into analysis.

The cost of production (CoP) of milk was Rs 24.0 per litre in case esimating it for single cross-buffalo breed while it was Rs 20 per litre for a cow. Similarly, CoP wasRs 21.40 and Rs 22.00 per litre respectively when two buffaloes and cows milked. It revealed from the analysis that CoP was lesser for a firm having greater number of milking animals at a time by implying economies of scale.

Table 1. Value addition (Rs. per kg) of cold milk chain

Parameter	Producer	Collector	Chiller	Processer	Distributor	Retailer	Total
Production cost	24.0						24.0
Buying price	0	30.0	33.0	35.5	45.5	47.0	
transport cost	1.0	1.20	1.00	3.5	0*	0.5	6.70
Testing/admin cost	0.0	1.0	0.4	1.5	0.5	0.0	
Processing cost	0.0	0.0	0.5	2.65	0.3	0.0	
Packaging cost	0.0	0.0	0.0	1.5	0.0	0.0	
Total cost	25.0	32.2	34.90	44.65	46.3	47.5	
Added cost (NRs)	25.0	2.2	1.90	9.15	0.8	0.5	39.55
Added cost (%)	63.2	5.6	4.8	23.1	2.0	1.3	100.00
Sale price (NRs)	30.0	33.0	35.5	45.5	47.0	48.0	
Profit	5.0	0.80	0.6	0.9	0.7	0.5	8.45
Added profit (%)	59.2	9.5	7.1	10.1	8.3	5.9	100.00

* The DDC bears transport cost of the dairy product distributer.
Source: Field Survey 2012

Table 1 depicts value addition of one litre standard milk having retail price Rs 48.0 in Kathmandu and its margin distribution. Milk booth at Kathmandu was taken into account because of part of the milk supplied from Dhangadhi Milk Supply Scheme was processed in the standard milk form via Balaju Milk Supply Scheme (see figure 3). Per litre profit was Rs 5.0 at farm-gate which is 59% of total profit. Subsequently, the collectors captured 10% profit by adding 6% cost, milk chiller

received 7% profit by adding 2% cost, and processor (DDC at Balaju) received 10% profit by adding 9 % cost. The cooperatives could receive Rs 24-26 per kilogram as commission of the total solid sold. The distributer and retailer could receive 8% and 6% added profit in spite of their 2% and 1% cost addition, respectively. In sum, the raw milk producers received 59% profit and rest micro-actors received 41% by transacting 930 tons fluid milk.

However, value margins were varying at district level. The profit per litre raw milk was Rs 5.5 at farm-gate having added profit 47%. The collectors captured 16% profit by adding 7% cost. The private dairies having performed chilling, processing and retailing job, added 18% cost but received 37% of the total profit share. In some cases, the private dairies were able to capture 52% profit margin.

The comparison was made while selling either fluid milk or selling it's products is shown in table 2. It revealed that selling a litre milk could earn Rs 3.5-5.5 net profit but selling milk products like curd, *Khoa*, paneer and ice-cream could earn Rs 11, Rs 25, Rs 27, and Rs 110, respectively from the same amount of milk equivalent. It meant preparing diversified products had consecutively two times, five times to twenty times more profit margin.

Table 2. Convert 1 litre milk equivalent milk products

Cost categories	Selling fresh milk	Curd	Khowa	Ice cream	Paneer
1 litre milk equals	1	0.975	0.20	0.66	0.25
	40	**48.75**	**75**	**214.5**	**75**
Firewood for boiling milk		1	3.5	7	5
Labour	0.5	0.5	10	20	5
Citric Acid				0	3
Other materials				58	1
Utensil and preserve	1	1.2	1	20	2
Total value addition	**1.5**	**2.7**	**14.5**	**105**	**13**
Total cost	**36.5**	**37.7**	**49.5**	105	**48**
Profit (Hot season)	**3.5**	**11.05**	**25.5**	**109.5**	**27**
Profit (Winter season)	**3.5**	**2.3**	**25.5**		

Source: Field survey (2012)

Market analysis

Input marketing actors performed multi array functions. 151 Agro-vet shopkeepers supplied equipments, tools, chemicals, feeds, medicines, vitamins, minerals and fodder seeds. There were 16 local tools and equipments suppliers in Dhangadhi, Attaria and Mahendranagar selling imported or second-hand products. There was high demand for inputs and services and these were provided by a number of uncoordinated service providers. Furthermore, the supply was not sufficient. Attaria and Tikapur Hat Bazaar committee were established weekly-running Hat Bazaar where dairy and draft animals were sold on the spot. The committee reported sale of 10-15 dairy animals per week.

Table 3 Season-wise milk consumption at major market outlets.

Types of consumption	Seasonal consumption		
Place of milk demand	Flush season	Lean season	Total
Private dairies	5100	3900	9000 (13)
Tea shops	3000	1800	4800 (6.9)
Hotels	1100	800	1900 (2.7)
Sweet houses	600	400	1000 (1.4)
Export to India	1800	900	2700 (3.9)
Collected by DMSS/DDC	530	400	930 (1.3)
Consumption at home	31500	16975	48475 (70.0)
External market demand	250	150	400 (0.6)
Losses	15	40	55 (0.1)
Total	43895	25365	69260 (100)

Note: Figures in parenthesis represent percentage of the total figure.
Source: Field survey (2012).

Regarding output marketing of 20780 tons milk in sale form, farmers themselves supplied 62%, followed by milk vendors (23%) and MPCs (15%). The dominance of farmer's supply was reported at local hotels, tea shops, local dairies and cooperatives market outlets. Major consumption outlets, as shown in table 3, were producer themselves (70%), private dairies (13%), teashops (5%), export to India (4%). Rest amount was utilised at hotels, sweet shops, distant market users and losses. Important to note was 27% higher supply was in flush season. The market for heat-desiccated products (e.g. *Khoa*) as well as cultured products (e.g. curd) far exceeds the local market for universal products (e.g. ice cream, table butter and cheese).

Value chain map

Figure 3, consecutively from left to right sight or bottom to up depicts operational service providers, traded volumes, whole milk price, linkages and end market outlets. Average milk price inside the quadrant illustrates constantly increasing rate as from farm-gate to consumer-gate as per indicated in table 1.The range of price for cow milk was Rs 28 to 30 while that for buffalo milk was Rs.29 to 33. The weighted average was Rs 30 for farm-gate while taking both ranges. The raw milk was channelled to collection centres, private dairies as well as other informal sectors in that farm-get price. The price fixed by cooperatives was Rs. 33 to 35 which included the charges of test, storage, as well as profit margin. Milk and its products were also sold by private diaries Who sold milk at Rs. 45 per litre. It was also noted that the marketing margin was higher for hotels, tea shops and sweet houses (Rs 25-30) which was higher in comparision to farm gate. While at the cold milk chain side, Dhangadhi Milk Supply Scheme was collecting milks from chilling centre at Rs 36 and supplying to Nepalgunj Milk Supply Scheme (NMSS). The latter one supplied around 700 tons milk to Balaju Milk Supply Scheme Kathmandu. The consumers had to pay Rs 48 for the processed standard milk.

The traded volume indicated to the micro-actors illustrates whole milk plus equivalent volume of processed products. For making map simpler and understandable, the sale amounts of manufactured products of the private dairies are omitted. Vertical linkages are mentioned in figure 3 by solid, bulk or broken arrows. The bolder and continues arrows illustrate strong linkage from where more percentage of products and services flow. Unlike it, the broken arrows illustrate weaker linkage across or between actors on products or rendered services. It meant it is the major area of works in future. As per figure, farmers with unorganised sector had poor linkage in milk selling because of occasional sale and no contract made with. Also, private dairies with the general consumers had

broken linkage because of no regular types of buyers of their products. In comparison to these actors, milk vendors and cooperatives had lucid supply and sale exits.

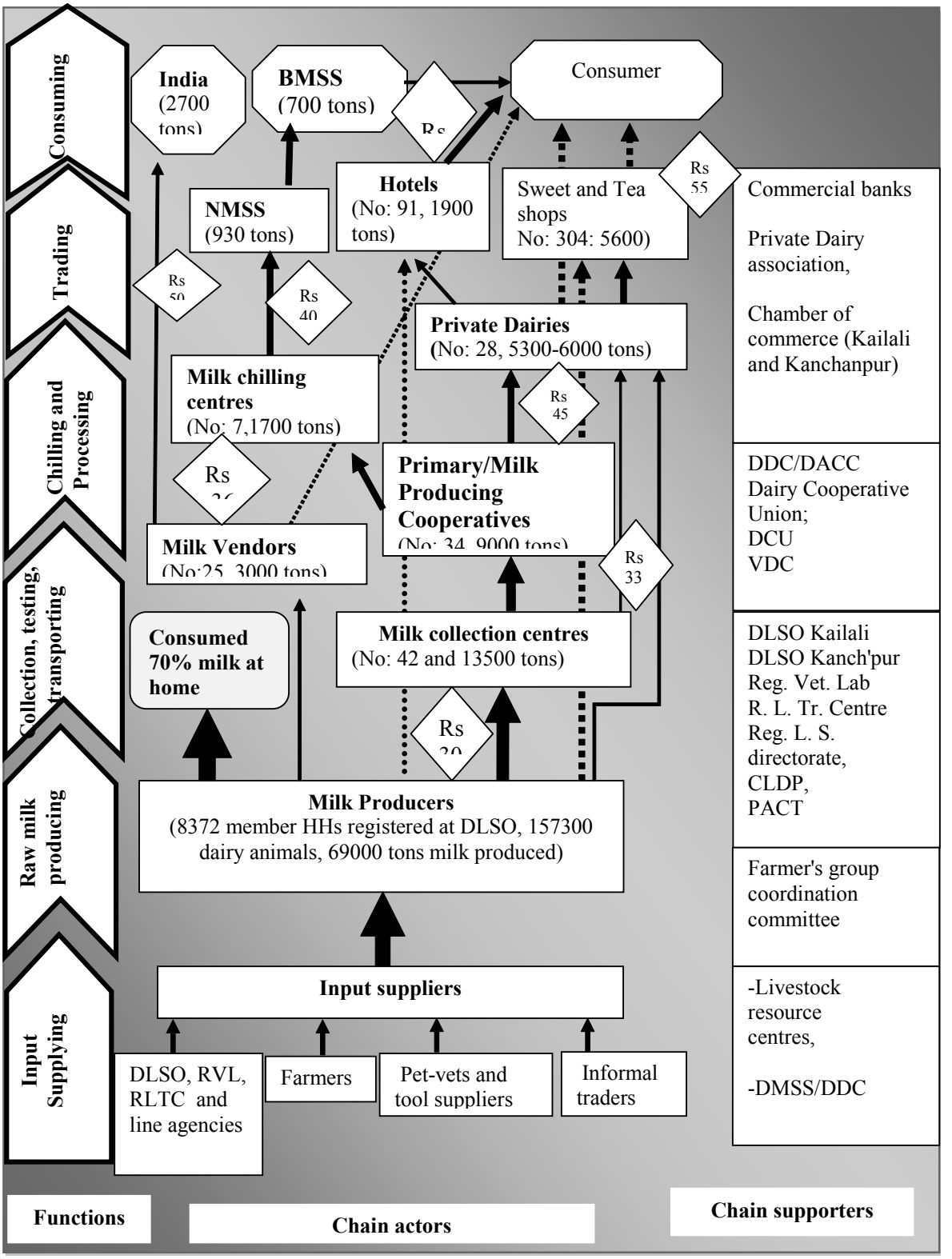

Figure Value Chain Map of Dairy Sub-sector in Far-western Terai District.

Since both districts were proximity to India majority of the farmers were dependent to informal market of boarder in order to buying major inputs. Almost all agro-vets supplied imported feeds, concentrates, forage seeds, tools and medicines. The observed 99 % farmers were keeping local breeds under traditional shed, feeding rice straw dominant forage and milking in unhygienic condition. It indicated that farmers had irrational knowledge on shed improvement, feeding arrangement and hygienic milking practices. consequently, farmers reported escalating business risk because of: spiking price of dairy animals caused due to limited supply, green grass shortage due to poor irrigation in summer months, labour shortage because of younger' indifference in raising animals and feeling drudgery while milk selling and getting payments. Moreover major causes of negligence were poverty and low education of the farmers. As value chain works on pro-poor approach, substantial focus must be paid on input and production management (as first and second intervention points) for linking these market participants into long-term base milk business.

The milk collection centres had insufficient materials like stainless cans, testing chemicals,and other equipments which led to poor sanitation of milk keeping. The availiabel imported improved equipments require technical skill which was lacking in the area of study. The repair and maintenance of chilling vat was found difficult locally. Since the appropriate milk handing efficiency of collection centres was at least 300 litres and the milk availability was very less in this comparision (50 to 250 litres per day, sufficient benefit could not be gained. Only the cost reduction strategy of the collection centre were in practice in evening milk collection It was possible to chill Only 15 percent of available milk at a time via seven chilling vat i.e. capacity to store raw milk was very less. Thus, supporting chilling vats in combination to introducing batch pasteurization technique was third most intervention for increasing keeping quality of bulk amount even considering surplus milk of the flush season.

Value chain analysis revealed value distribution status across the micro actors. Certainly, marketing margin from farm-gate to consumer-gate was Rs 18.0 (48-30), out of that Rs 13.55 was added actual cost (Rs 6.7 transportation, Rs 3.40 admin costs, Rs 3.45 processing cost and packaging and labelling Rs 1.5). Thus, profit margins for producer was only Rs 4.45 distributing other milk products as well as district sales keeping constant (see table 1). Varying status of cost addition and profit margin capture made unequal money flow situation among value chain actors. Second importance of value addition analysis was calculation of economics of value distribution and value share across vertical chain actors. Straightforward sell of 20800 tons milk in a year could earn 915 million capitals at retailer's gate. Out of that, growers received 68 percent cash income with net profit 104 million, 17 million profit by the collectors, 12.5 million by the chilling centres, 19 millions by processors and so on. Even much income was estimated to the downstream value chain actors who were selling processed products. Horizontal income distribution for a raw milk producer was roughly Rs 11,910 with monthly Rs 953 as flat profit from the dairy business for taking into account of 8372 farmers' household registered at DLS office. However, there is scope of detail research on measuring horizontal distribution of the income among other micro-actors.

Those who had not sufficient information on value chain or service marketing concept often had misunderstanding that middlemen were the only profit taking agents and must be replaced by the cooperative marketing. The study therefore has a significance role in explaining the importance of study to large mass in far-west districts that "middlemen in between" were not looting profit but taking minimum charge of services they were providing. Value chain practitioners, indeed, were not just mobilised there for depleting misconception among those that not to boycott market intermediaries but to continue and upgrade their marketing services so that cost additions would be lesser while developing or designing future products. Other important point of the value chain analysis was

commercialisation of the highly profitable milk products: paneer, *Khoa* or ice cream. Nevertheless, the appropriate level of commercialization, rational decision to produce profitable products upto the market consumption level by considering income (because paneer as income elastic commodity) and season (because curd (*Dahi*) and ice cream are summer season sale specific products). Side by side, research and development on value addition is priory intervention.

Gross effect of member-based organizations-176 farmer's coordination committees, a Private Dairies Association, and 34 primary cooperatives etc entailed gradually strengthened horizontal linkage and second-tier network. Transaction of large amount of milk with unorganised sector or presence of informal sector in the survey area meant, upstream as well as downstream value chain actors were either compelled or unaware on establishing solid linkage or contractual relations. Here consequently competition for milk not only occurs among the private dairies themselves but also between informal and the formal market. Interviews with stakeholders strongly implies that positive and negative reactions about to selling milk to the particular outlets with informal price-agreements between processors occurs. Although Private Dairy Association are in function, the member dairies had internal conflict in producer selection, back-biting about neighbourhood dairy shops, homogenous products manufacturing and selling, pricing and payments. Same situation was also reported in some extent to the milk cooperatives. Although 34 in number, but only 30 percent of the cooperatives were running smoothly, others just registered form in the hope of getting support from DDC or government, otherwise would be in the collapse state because of poor management. Similar case was also reported in Nakuru region of Kenya (Bickenbach *et al,* 2009).

Interesting fact was involvement of same actor into multiple value chain functions. It meant ladder of function was not specialized on specific dairy product in lieu of that vertical linkage showed unstable, parallel networks and overarching. majority of large-scale private dairy owners were performing milk chilling, primary processing, wholesaling as well as retailing of products are the examples (see figure 3). It is illustrated in the figure by showing many arrows originating from the same point. Another argument was exposure of their unspecialised championships for capturing value share. The latter argument can be proved in reality in the survey area because of buyer's driven governance adopted by the downstream value chain actors in terms of dominance in ultimate decision making on product design, volume and price. Key intervention would be selection of right actor specialization for right function that can balance buyers and suppliers, take over the role of informal sector and fulfil the gaps (as shown by the broken arrows in Figure 3).

While analysing local as well as adjoining market outlets, skewed consumption pattern was observed for milk and milk products because of season specific, festival-focus, and special occasion-focus products manufactured by the private dairies (Table 2). Major ethnic delicacies includedmilk-made sweets habitual especially at festival times. Although universal products had higher gross margin, however, processed but traditional products had higher mass demand. By observing similar kind of processed products in both districts meant dairy entrepreneurs were copying similar manufacturing skill rather than investing for producing newer products. Large hotels only demanded income elastic dairy products like paneer, ice cream, *Khoa*, and sweets. Whatever the processed products made there, yet these had no any brand and company label. Indian dairies captured international market after diversifying their processing into universal dairy products manufacturing having it's brand name, package and label (Export Victoria 2009). It meant private dairies not to late in beginning of long self-life dairy products leading manufacturing where far-western dairies could add one milestone. That could be highly valued intervention for linking products into national market chains.

For improving constraints and tapping opportunities as shown in figure 2, key leverage points of intervention were preparing and working upon dairy business plan and backward linkage supports

(preferably improved breed supply, modern equipments, AI services, improved shed management and disease management support). The DDC, private dairy association and cooperatives needed evening shift milk collection from the producer. Slightly increasing the farm-gate price of raw milk during lean season months could encourage producer to supply enough milk even in lean season months. The Ministry of Agricultural Development could coordinate with Dairy Development Board for manipulating farmer's pricing adjustments. The above raised points are quietly addressed in "Agri-business Policy 2006" and "Dairy Development Policy 2008", launched by the Government of Nepal. However, these policies could not address adequately on milk holiday, importing issue of skim milk power, high customs duty while importing dairy equipments and local taxes. One of the future interventions could be providing intensive training on value addition technique could reduce marketing inefficiencies to the concerned stakeholders working in the survey area. Side by side strengthening business-to-business (B2B) service principle of the vertical chain actors, under public-cooperative-private collaboration, could take sustainable pick-up of dairy business in far-western terai districts.

CONCLUSION

Region-specific value chain analysis identified major functions, chain supporters, market-margins and market outlets for dairy sub-sector. The study mapped how per litre raw milk price Rs 30 at farm-get would add value upto Rs 48 to 60 through different market participants. Moreover, rapid survey calculation concluded that curd, paneer, *Khoa*, and ice cream were the most profitable value adding products in terms of profit than selling standard milk. The market analysis concluded 26 percent higher supply of milk in flush season months to the end market outlets. It was revealed that, the far-west dairy market was becoming self-run and competitive because of the rising number of private dairies, milk producing cooperatives along with the commencement of the DDC. The findings of this study clearly revealed that downstream value chain actors performing multi-market functions but priory intervention of the micro-actors would be manufacturing milk products in a standard packaging and brand name to compete into or with national dairy market.

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