

# DAIRY VALUE CHAIN IN PAKISTAN



**State Bank of Pakistan**  
Agricultural Credit & Microfinance Department  
[www.sbp.org.pk](http://www.sbp.org.pk)

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## Preface

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The value chain financing (VCF) is evolving as an attractive model of spreading the various risks in agri/rural finance among different fund providers. Keeping this in perspective, and to sensitize lending institutions about the potential business prospects in VCF, SBP carried out a research study to identify the potential agri. value chains in Pakistan through reputable consultants. The study highlighted various layers and players within different value chains in terms of activities, potential for investments, issues & challenges in strengthening VCF.

The desired research study and its findings' report were completed in December, 2014. The report provides a detailed assessment of six main value chains in the country: i) Potato, ii) Tobacco, iii) Beef, iv) Dairy, v) Basmati Rice, and vi) Aquaculture and Inland Fishery.

This report on Dairy value chain in Pakistan is a part of that comprehensive report. Its basic aim is to enable financial institutions to more clearly understand the specific value chain dynamics and prepare their related strategy for increasing agri. financing thereto.

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## Executive Summary

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The dairy value chain is an important subsector of Pakistan's agriculture that dates back to the early Indus Civilization as livestock remained an integral part and parcel of earlier economies. Accounting for 55% of agriculture value added and growing at 4% livestock forms the bedrock of Pakistan's economy. Approximately 96% of the milk collected comes from informal sources while the formal economy dominated by processors accounts for the remaining 4%. Yield per animal remains low at 3.15 -4 liters per day and 80% of production comes from smallholders comprising between 2-5 animals.

Nearly 20% of milk gets wasted between farm gate and distribution owing to absence of cold chain thereby necessitating investments into cold chain in addition to high milk yielding animals trend seen in the advanced economies. Input costs and milk prices are rising simultaneously. Milk supplies are growing at 5% while demand is growing even faster at 15% thereby creating huge gaps between demand and supply as the ever burgeoning population with increased affluence and consumer awareness is creating demand for quality milk.

Greater efficiencies and higher profit margins lie in consolidated farms with maximum number of animals (7-50 milking animals). The informal sources i.e. pekars, dhoochies, beoparis and arthis remain the main financiers within the dairy value chain involving cash flow cycles of one week to 6 months. Business transactions with the value chain are based on trust and remain informal and involve no formal written contract. The informal value chain actors prefer informal sources of finance because of its hassle free environment in spite of the fact that informal credit is more expensive. Whereas with the exception of ZTBL and a few other commercial banks value chain financing from the formal banking sector remains limited thereby creating a dilemma where 80% of the producers (small holders with 2-5 animals) remain non-bankable as they normally possess between 0-5 acres of land are regarded as non-bankable and in the process imperiling the economic growth prospects of the world's fourth biggest milk producer.

Analysis of the value chain involved travel to major dairy production areas including the peri- urban Landhi Cattle Colony Karachi besides Interior Sindh, Southern, Central and Northern Punjab and parts of KPK including Peshawar and Charsadda and adjoining areas. The methodology used included search of secondary data sources in addition to primary information gathered via workshops, focus group discussions, and semi structured interviews and cross validation. Dairy farming is highly input intensive and involves high volumes and good profit margins. Value chain finance is a dire need of the hour for new start-ups, business expansion, and product diversification, establishment of cold chain and introduction of high yielding breeds. The option of advancing finances to producers and other SMEs via the middlemen like pekars, beoparis, arthis, and dhoochies to reach 80% of milk producers needs to be seriously considered in addition to development of sharia compliant financial instruments to inject much needed finances into the dairy value chain.

## List of Abbreviations Used

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Punjab Livestock and Dairy Development Board	PLDDB
Pakistan Dairy Development Company	PDDC
Punjab Agriculture and Meat Company	PAMCO
United States Agency for International Development	USAID
Artificial Insemination	AI
Ministry of Food Agriculture and Livestock	MINFAL
Value Chain Analysis	VCA
Non Governmental Organizations	NGOs
United States Department of Agriculture	USDA
Agri. Business Support Fund	ASF
Gross Domestic Product	GDP
International Farm Comparison Network	IFCN
National Agriculture Research Council	NARC
Pakistan Standards and Quality Control Authority	PSQCA
Milk Collection Centers	MCC
Training Service Providers	TSPs
Total Mixed Ration	TMR
Khyber Pakhtunkhwa	KPK
Small & Medium Enterprise Development Authority	SMEDA
Zarai Taraqiati Bank Limited	ZTBL

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## Value Chain Overview

Different types of milk and milk products sold in Pakistan include liquid milk, flavored milk, yogurt, powdered milk, lassi (sour milk), butter, desi ghee, ice cream cheese, sweets and bakery items and khoya (sweetened condensed milk pastry). Pakistan has a huge domestic milk market and in spite of being the world's fourth largest milk producer, the country is a net importer as it meets the short fall between demand and supply through imports of powdered milk. Processors account for between 3-4% of the total milk produced in Pakistan and formulate different types of milk chiefly UHT milk, condensed milk, skimmed milk. The Karachi market consumes 4 million liters per day while Lahore consumes between two to three liters.

Khula doodh (or unpackaged loose milk) is the preferred choice for domestic price sensitive consumers who consider it purer and prefer to buy at lower prices. Gawalas or dhoodhies (milk salesmen) have an extensive network that has deep forward (market penetration) and (backward producer) linkage. They collect fresh milk from farmers and deliver at consumer doorsteps.

The Pakistan Dairy Development Company (now defunct) highlighted the rising gap in demand and supply that it projected to reach 3.6 billion liters by 2015. Saud Pasha Director Agri. Business Services at Engro Foods believes supply is growing at 5% whereas demand experiencing growth rates of 15% is outpacing supplies thereby creating huge gaps in the demand supply equation. Karachi alone is said to have a daily shortfall estimated at atleast 4 million liters with a retail value of 300 million rupees.

The problem lies in low productivity as yields per animal in Pakistan in 2011-12 stood at 3.15 liters per animal. Ministry of Food Security & Research projections put raw milk production at of 48 billion liters from its estimated 55 million milking animals out of a total cattle and buffalo population of nearly 70 million assuming 70% lactating animals (other being dry). In contrast the US with only 34 million animals produces 94.5 billion liters with per animal daily yields of 28.35 liters. Yield per lactation period for a Pakistani cow or buffalo stands at 1350, in contrast to an Israeli Holstein with 40 liters of milk per cow per day that in terms of per unit animal yield stands at number one in the world with 12,000 liters of milk per cow per lactation of 305-310 days.

Whereas in Pakistan lactation milk yield per animal stands at 1350 liters in rural subsistence households to 3450 liters in commercial peri-urban operations such as Landhi Cattle colony Karachi and peri-urban farms in other cities. Conversely, the lactation yields for cows between lows of 450 liters in barani (rain fed areas) up to 1800 liters in the peri-urban farms. Likewise, lactation yields achieved at progressive farms is up to 2500 liters. The huge gaps in milk yields per animal between Pakistan and advanced countries like Israel, Australia, New Zealand and USA highlight the fact that the future undoubtedly lies in greater production efficiencies rather than large herd sizes.

## Background

According to the latest figures released by the Federal Ministry of Food Security & Research by December 2012 Pakistan's gross milk production was estimated at approximately 38,690 thousand tons or 38.69 billion liters falling short of the original projections of 48 million metric tonnes (i.e. 48 billion liters) of fresh milk with a retail value estimated at Rs. 360 billion (inclusive of 20% post production wastages). The milk spoilage mainly occurs at the farm gate as well as during aggregation / distribution by dhoodhies because of lack of cold chain. Since the hot summer temperatures hovering over 50 degree Celsius reduces the shelf life of fresh milk. In a nutshell, absence cold chain (milk chillers is responsible for the bulk of fresh milk spoilage. Those figures include between 23.21-25.15 million tonnes of milk

(or 60-65%) consumed at farmers households. Pakistan is the fourth largest milk producer in the world behind India, China and the United States. Between 35-40 million of rural population derive their incomes from livestock.

**Table: IFCN's RANKING OF TOP 20 MILK PRODUCING COUNTRIES IN 2011**

IFCN top 20 milk production and processing countries 2011					
No.	Country	Milk production in mill t ECM	Milk production in mill t natural content	Milk delivered in mill t ECM	Milk delivered in mill t natural content
1	India	137.5	121.2	23.0	20.5
2	USA	84.3	89.0	83.8	88.5
3	Pakistan	41.6	35.6	1.3	1.1
4	China	33.9	37.4	29.2	32.8
5	Brazil	32.0	33.0	21.8	22.5
6	Germany	31.1	30.3	30.1	29.3
7	Russian Federation	30.1	31.7	15.5	16.4
8	France	25.2	25.3	24.6	24.7
9	New Zealand	21.3	18.9	21.3	18.9
10	United Kingdom	14.1	14.1	13.8	13.8
11	The Netherlands	12.7	12.0	12.4	11.6
12	Turkey	12.2	12.8	6.7	7.1
13	Poland	12.0	12.1	8.9	9.0
14	Argentina	11.4	12.0	10.2	10.7
15	Italy	11.3	11.6	10.5	10.8
16	Mexico	11.1	11.1	7.7	7.7
17	Ukraine	10.2	11.1	4.3	4.6
18	Australia	9.8	9.6	9.5	9.3
19	Iran	9.8	9.7	7.2	7.3
20	Canada	8.9	9.2	8.6	8.8
	<b>World</b>	<b>721.4</b>	<b>708.7</b>	<b>447.0</b>	<b>453.2</b>
ECM correction: As the dairy farms operate with very different fat/protein contents of the milk the IFCN is using the energycorrect milk (ECM) approach to standardised milk volumes to 4% fat and 3.3% protein. The use formula is the following one: ECM milk = (milk production * (0.383* % fat + 0.242 * % protein + 0.7832) / 3.1138).					

**Source: International Farm Comparison Network (IFCN)**

Agriculture is the mainstay of the country's economy where livestock is a key subsector. According to Economic Survey of Pakistan, livestock sector contributed 55.1 % to agriculture valued added and 11.6% to the national GDP during 2010-12 and contributes more than all cash crops put together. While gross value added of livestock sector surged from 672 billion to 700 billion thereby experiencing 4% growth inspite of the massive damages from floods during the same period. Livestock sectors gross value added stood at 21% of the national GDP. Livestock serves as a major source of instant cash for farmers in times of hardship as it meet the liquidity requirements for hard pressed farmers.

The industry is highly fragmented across Pakistan while consolidated farms make a very small fraction particularly in the major city markets such as Landhi Cattle Colony Karachi, peri-urban farms in Lahore and a few other cities. Different sources have different quotes for Pakistan's raw production as in 2011 the IFCN ranked Pakistan at number three in the world behind India and USA in terms of milk production stating that it registered 41.6 million liters, while others rank it at number four.

### **Core Functions and Processes of Transformation in Value Chain**

Milk is procured at source by dhoodhi's or processors' agents purchase and transported to different channels. Between 3-4% of milk is channelized via the formal sector for processing by processors such as Engro, Nestle, Millac, Nurpur, Good Milk, Prema, Haleeb, Anhaar and others. While between 60-65% is consumed at home and surpluses collected by dhoodhies and distributed to various channels as shown in the Milk Value Chain Map. A whopping 20% of the total production gets wasted during the peak summer temperatures in Sindh and Punjab. Nearly 70% of the milk produced originates from the dairy pockets of Punjab.

Until recently only processors had a cold chain that came equipped with milk chillers in major production areas. Milk is collected in Milk Collection Centers (MCCs), chilled at 4°C and then transported to the regional processing units. Nowadays bigger dhoodhies have also started establishing their own chillers with capacities ranging from 1000 liters to upwards of 10,000 depending on the market being served. Most dhoodhies based in major cities have higher chiller capacities.

Contractors are also involved in milk distribution and may own their own transportation coupled with wholesale or retail outlets just like dhoodhies. Another difference is that owing to their bigger operations, contractors don't have the same intimate relationships with the farmers as a dhoodhi as the contractors don't do any grocery and extend the same kind of services as a dhoodhi. Many contractors in the rural areas of Pakistan also happen to be big landlords who own thousands of acres of land and who operate in accordance with "a formal contract" with the big processors or other large consumers of milk. The terms "**Dhoodhi**" and "**Gawalla**" are used for the same person interchangeably in various parts of the country particularly Punjab and Sindh. Essentially there is no difference at all between the functions they perform and the services they provide as people in various areas prefer to call them by different names.

However, in contrast to a "dhoodhi" a "contractor" has primarily a large operational setup & with a larger fleet of mini vans or delivery trucks and consequently trades bigger milk volumes on a daily basis and has bigger chiller capacity. A contractor routinely supplies fresh milk to very large consumers i.e. to big milk processors i.e. Engro, Nestle and others and covers a larger geographic area in contrast to a Dhoodhi. However, the Dhoodhi has the added feature of supplying to small consumers including homes, milk shops and bakery chain in addition to supplying in certain cases the large processors i.e. Nestle, Engro and others.

Depending upon the dynamics of competition in certain milk producing region or cluster a contractor may supply to relatively large consumers i.e. big processors, bakeries, milk shops, hotels, ice cream factories and other milk based beverage manufacturer's i.e. flavored milk and halwa (traditional sweet makers etc).

However, dhoodhies enjoy the greatest market penetration and have developed very strong backward linkages with producers. After processing major processors distribute milk in tetra packs via their own distribution network all across the country. Whereas fresh milk supplied by dhoodhies and big contractors involves no processing. Value added milk products sold include lassi (sour milk), flavored milk, butter, cheese, creams and the like. At the farm level desi ghee, lassi and paneer (cottage cheese) are some of the valued added traditional by products.

### **Regulatory Environment**

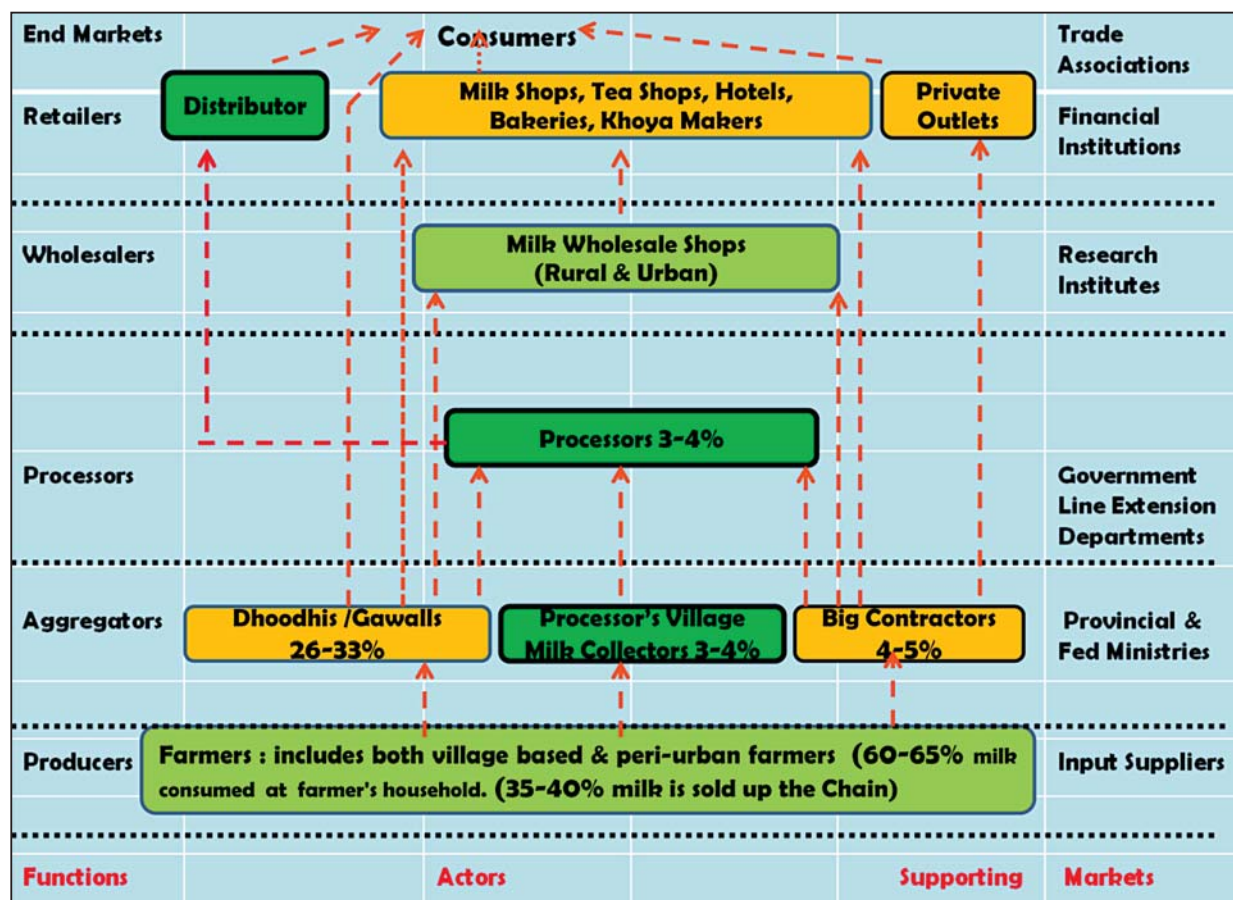
In the post 18<sup>th</sup> Constitutional Amendment scenario the provincial livestock ministries have been further strengthened since most activities are now completely devolved at provincial level. Each province has an elaborate network of line extension departments with Punjab and Sindh leading the pack.

Municipal governments regulate milk and meat prices a practice seen by many as adversely affecting the incentives as such measures to ensure availability of cheap milk and meat end up eating into the potential profit margins of producers in a free market economy thereby creating hurdles in the way of much needed private sector investments into the sector. Municipalities also charge taxes on each milking animal entering their cattle mandis (markets).

Following the devolution of livestock ministries to the provinces, the Federal Government has created Ministry of Food Security & Research taking stock of the importance of food security.

All provincial governments with Punjab and Sindh being at the forefront provide extension services that include free of cost vaccinations against disease outbreak. PAMCOs "Save the Calf" initiative aimed at slaughtering of week old male calves has been hugely successful as it offers Rs 3200 cash incentive per calf after six months. Resultantly, prices of week old calves have gone up from Rs800-1200 to upwards of Rs. 4,500 while farmers have begun to retain the male calves for fattening. Playing a facilitator's role, the government actively encourages the private sectors competitiveness, profitability and efficiency.

**Figure: PAKISTAN's DAIRY VALUE CHAIN MAP**





It must be noted that milk wastages of 20% are not depicted in this Value Chain Map. When the percentage of wastages factor is taken into account, then only 15-20% milk is sold up the chain and the share of dhoodhies is also reduced subsequently. However the value chain map assumes that wastages happen between farmers and the next channel and therefore the value chain map depicts only the percentages available milk fit for marketing.

Economic Survey of Pakistan puts milk production figures at 48 million tons or 48 billion liters per annum. Pakistan's poor yields per animal are further compounded by the fact that whopping 20% milk gets wasted owing to absence of cold chain since milk has a short shelf life of around two hours during the peak summer demand period when sweltering heat spoils almost 1/5<sup>th</sup> of the produce. Such losses translate into 9.6 million tons (9.6 billion liters) in wastages per year with an estimated lost retail value put somewhere between 169 to 172 billion rupees in 2012 alone<sup>7</sup>.

**Table: PAKISTAN's MILK PRODUCTION STATISTICS for YEARS (2009-2012)**

Species	Units	2009-10	2010-11	2011-12
<b>Milk (Gross Production)</b>	000 Tons	44,978	46,440	47,951
<b>Cow</b>	"	15,546	16,133	16,741
<b>Buffalo</b>	"	27,848	28,694	29,565
<b>Sheep</b>	"	36	36	37
<b>Goat</b>	"	739	759	779
<b>Camel</b>	"	808	818	829
<b>Milk (Human Consumption)</b>	000 Tons	36,299	37,475	38,690
<b>Cow</b>	"	12,437	12,906	13,393
<b>Buffalo</b>	"	22,279	22,955	23,652
<b>Sheep</b>	"	36	36	37
<b>Goat</b>	"	739	759	799
<b>Camel</b>	"	808	818	829

**SOURCE:** Ministry of National Food Security & Research

In 2011-12 Pakistan's herd size comprised of 69.6 or approximately 70 million heads of animals 36.9 million cattle, 32.7 million buffaloes, 28.4 million sheep and 63.1 million goats. Pakistan ranks number two in the world in terms of buffalo and goats after India and China respectively. Put together buffaloes and cows make up around 69.6 or approximately 70 million heads a figure that is counted amongst the world's biggest but instead of becoming an exporter of milk, the country remains a net importer since yield are very low by international standards. Given that almost 45 million people or nearly 20% of the population derive their livelihoods from the sector the value chain has not received the attention viz. a viz. its inherent growth potential. Though being the number two goat producing country in the world there are goat breeds whose milk is consumed but no account is available on the volumes.

<sup>7</sup>Published in The Express Tribune, August 5<sup>th</sup>, 2012.



Predominantly, the SME sector lies at the producer and processor and wholesale and retail levels. Once a farm is establishment the key part is operations costs and aggregation that involves the process of trading of live animals where animals live change hands with no value addition at all. At the producer level farms maintaining between 7-50 animals valued between 1-5 million rupees (inclusive of shed and farm equipment) are considered small. While those anywhere between 51-4000 animals at the peri-urban Landhi Cattle Colony and other cities across the country are considered large with investment requirements starting from 6 million rupees to upwards of 150 million up to 500 million rupees (inclusive of shed and farm equipment). According to Pakistan Green Fodder based in Landhi Cattle Colony 50% of the farms have 50-100 animals, 25% of farms have 200-500 animals, 15% farms have 500-1000 animals and 10% of farms have between 1000 up to 4000 animals and total animals in Landhi is estimated between 650,000 to 700,000. According to Landhi based Salman Babar of Pakistan Green Fodders who also runs a 400 animal dairy farm the daily milk production at Landhi is roughly estimated at between 5-6 million liters.

**Table: PAKISTAN's LIVESTOCK POPULATION STATISTICS for YEARS (2009-2012)**

Livestock Population			
Species	2009-10	2010-11	2011-12
Cattle	43.3	35.6	36.9
Buffalo	30.8	31.7	32.7
Sheep	27.8	28.1	28.4
Goat	59.9	61.5	63.1
Camels	1.0	1.0	1.0
Horses	0.4	0.4	0.4
Asses	4.6	4.7	4.8
Mules	0.2	0.2	0.2

**SOURCE:** Ministry of National Food Security & Research

## **Value Chain Actors Their Roles and Relationships**

### **a) Input Suppliers**

Input suppliers include live animals beoparis who replenish farm animals besides providers of green fodder, forages and veterinary medicines, feed concentrates, molasses blocks, nutritional supplements, providers of AI services and embryo implant services, animal suppliers, farm equipment manufacturers.

### **b) Producers**

Small holders maintaining 2-5 animals account for 80% of milk production but on the down side they are by and large landless (possessing little or no land of their own) and resultantly are considered un-bankable by commercial banks. It's a pity that 80% of the producers in the fourth largest 4th milk producing country in the world avail little or no formal bank credit at all thereby putting into doubt prospects of economic growth within this vital sector of the economy. Often times farmers also delivery milk direct at the MCCs or alternately milk is collected by the processor's agent for onwards delivery to MCCs. Around 40% of the milk is collected from farmers who deliver around 2-3 liters of milk per day.

Whereas large progressive farmers keeping commercial size herds of say between 20-50 milking animals also supply to the processors who prefer to do business with them because of the greater economies of scale. Alternately, the dhoodhi may collect milk from the commercial farmers and sell onwards in their end markets.

**c) Aggregators**

Out of the total milk produced 60-65% is consumed at homes while various actors are involved in fresh milk aggregation counting milk processors, contractors and most importantly dhoothies' each accounting for 3-4%, 4-5% and 26-33% of the 35-40% of the surplus milk that is collected at supply sources. For their 3-4% share the processors set up milk collection centers (MCCs) that are manned by their company representatives. Milk is delivered to the MCCs directly by farmers or collected by the MCC representatives who earn a commission of Rs. 2/litre for collecting from producers and delivery at MCCs. Unlike the MCCs private milk contractors engaged by processors through a formal contract deliver milk to large regional milk collection centers where the milk from MCCs is also transported.

Dhoothies rake in big money since they have the leisure to sell to anyone including the processors and others as specified in the value chain map. Milk adulteration goes on unbridled by the dhoothies but they remain kings of the fresh milk trade. Dhoothies traverse the nook and corners of the milk producing area and often cover the rural, urban and semi urban areas and at times covering between 10-30 kilometers. In certain areas the dhoothies exert a bigger clout and have a network of collectors working for them on motor bikes and could even cover between 15- 60 kilometers. Between the urban and rural areas they may collect between 33% to more than 50% percent.

After requisite quality checks and chilling at 4 degree Celsius milk from MCCs shipped to the processing facility. Big contractors may collect between 1000-4000 liters on a given day. Likewise bigger dhoothies may also collect between 100 up to 2000 liters per day. However, the big contractor besides delivery to processors may also transport milk to the bigger cities for bulk consumers like bakery chains, restaurants, khoya makers and ice cream factories.

**d) Processors**

Ordinarily, milk processors have their own collection and distribution facilities that are linked with a cold chain and have in house transportation or engage third parties such as bigger contractors to do the collection for them. An elaborate supply network delivers fresh milk to the processors including of farmers, gawalas, and big contractors. Processors require huge volume of milk and normally have a strong presence in major milk production regions of the country particularly Interior Sindh, South and Central Punjab.

**e) End Markets Buyers**

The end markets buyers for milk comprises of a diverse range of end users including private homes, wholesalers, retailers, hotels / restaurants, khoya makers each having backward supply linkages the dhoothi being at the forefront. Different types of informal buying arrangements are in place with each supplier.

**f) Supporting Institutions**

At the federal level livestock falls under the Ministry of Food Security with the mandate to address food security issues of which livestock make an integral part. While with the passage of the 18th Constitutional Amendment livestock is declared a completely devolved subject that has further strengthened the already existing provincial ministries of livestock and fisheries. Besides, there are various institutions at the Federal and Provincial levels i.e. Federal Ministry of Food Security and Research and Provincial Livestock Ministries. It also has numerous other institutes including National Agriculture Research Council (NARC), Pakistan Standards and Quality Control Authority (PSQCA), University of Veterinary & Animal Science Lahore and Faisalabad Agriculture University. It also has buffalo and cattle research at Bahawalnagar besides a Fodder Research Institutes at Sargodha aside from many other supportive public institutions.

## **Input Supply**

### **Input Suppliers and Other Participants in Value Chain**

To understand the supplier dynamics one has to take kaleidoscopic view of the entire dairy and meat value chains. The fragmented nature of the farms where 80% of the farmers possess between 1-5 animals and essentially possess little or no land scope for commercial bank remains very limited because of the banks financing criterion. That criterion effectively shuts the door on small holders that interestingly account for 80% of the milk production and meat production effectively making Pakistan the world's fourth largest milk and 8th largest meat producer.

Informal suppliers (or financiers) of live animals within the largely fragmented livestock sector number in the thousands and are spread all over the length and breadth of the country. Beoparis or traders of live animals are primarily based in the urban cities. However big beoparis also based in the major livestock clusters of Pakistan including Northern Sindh and Southern Punjab. Beoparis supply animals not on the basis of live weight but based on back of the mind calculations where no weighing balances are used.



**Green Fodder Is Supplied to Landhi Cattle Colony Karachi from Nearby Thatta District.**

Though at the second stage or slaughtering stage the financing is done by the meat beoparis where the payback period is from a week to one month in contrast to 5-6 months for the dairy value chains owing to the faster cash flow cycle involved in. Besides supply of animals, other inputs within the value chain include fodder suppliers, suppliers of feed concentrates, nutritional supplements, veterinary medicines, farm equipment manufacturers, AI and breeding and training services providers (TSPs) for animal husbandry and farm management.

### **Leading Input Suppliers**

The cotton, rice, maize and sugarcane belts of Punjab and Sindh are home to the suppliers of raw material i.e. cotton seed used in making cotton seed cake, rice and maize wastages in addition to molasses extracted at sugar mills as well as brown sugar producing units. Feed concentrates nutritional supplements and Total Mixed Rations (TMR) is either made at the area of raw material source or the wastages are transported to bigger cities for feed manufacturers. Small feed concentrate producers have their own individual manufacturing facilities located right within the major dairy clusters or in the nearby towns. Depending upon the prices and availability of the raw materials, the small feed manufacturers have their own formulations where the ingredients vary from one producer to another. Nearly 90% of all raw materials are supplied on cash and the remaining 10% is supplied on credit to be paid back within a month of sales. However, larger manufacturers i.e. Ghazi Brothers, ICI, Delaval, Altaf and Company, Real Sear, Doctors Feeds at Landhi (Karachi) and Sanam based in the bigger cities

also source their raw materials from the same production zones but their feed formulations are thought to have been manufactured under higher standards.

The raw material sources in Punjab include Multan, Lodhran, Bahawalpur, Bahawalnagar, Rahimyar Khan, Sahiwal, Okara, Jhang and all areas lying between Lahore and Rawalpindi. Whereas in Sindh the raw material is sourced from areas including Sukkur, Dadu, Shikarpur, Khairpur Mirs, Nowshero Feroz, Hyderabad, Nawabshah and all areas further South up to Thatta and Karachi. Notable names in AI service providers in the country include Ghazi Brothers, Profarm Delaval, Altaf & Company, Real Sear, K&R and Sanam.

Companies have dealerships based in most major urban and rural centers and their business arrangements range from formal as well as informal depending upon the size of their business volumes.

### **Contractual Arrangements**

At Karachi the norm is for dairy farmers to enter into contracts with pekars or big milk aggregators who in turn supply the commercial sector of Karachi besides having a delivery network that also delivery at homes. Karachi already has a demand and supply gap of 4 million liters per day.

At the Landhi Cattle Colony Karachi green fodder is supplied by the Green Fodder Manufacturers association that also sets the prices for a given period ranging from a week up to a month. Green fodder at Landhi is mainly sourced from Thatta and green fodder is supplied to farmers at agreed rates for a month. Farmers are supplied green fodder on cash basis and many farms have arrangements where they source their supplies and pay back at an agreed date of the month<sup>8</sup>.

More than 90% of all transactions within the livestock sector comprising both dairy and meat value chains all over Pakistan are based on word of mouth with little or no written contracts involved. Purchase price of green fodder fluctuate between Rs. 100 / 40kg and Rs. 200 / 40 kg depending upon the season as well as type of fodder. For instance the price of green fodder on 12th Nov 2012 at Landhi was Rs137 / lot (40 kg) including Rs. 17 profit margin for the green fodder supplier who chops the fodder and then supplies dairy farmers.

#### **a) Delivery and Payment Conditions**

All inputs are available at retail and wholesale stores located within the production areas within since milk serves as instant source of cash while similar arrangements exist for feedlot fattening farms as many dairy farmers also raise feedlot fattening animals at the same farms. The fact that meat is a by product of the dairy industry, feedlot animals raised at the same dairy farms are extended the same facility by default by the informal sector. Green fodder is supplied at credit and in turn is linked with the cash cycle of the dairy farmer that normally is a month. The business relationship is based on intimate trust developed with no formal contract involved. Payment period for input supplies involving green fodder and other feed concentrates is between one week and up to a month.

While AI, veterinary services and feed concentrates are paid for in cash by the farmers at the time of service delivery. Beoparis deliver animals at the desired location of the urban or city mandis and payment is accepted in cash or on credit where the payback period for credit is up to five and six months.

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<sup>6</sup> Source: Salman Babar of Pakistan Green Fodder at Landhi Cattle Colony Karachi



**b) Quality Control Measures**

Dairy farmers well versed in the trade determine the quality of animals delivered by beoparis or pekars or other financiers within the dairy value chain. Quality determines the price and here the farmer is the sole judge has reasonable bargaining power if upfront cash payment were involved. Since farmers buying milking animals at deferred payment credit arrangements remain the predominant mode, therefore the beoparis or pekars have an upper hand in all cases where animals are delivered on credit.

Animal quality is determined by the purchasing dairy farmer. However, for other farm inputs quality gets scant attention and again is subject the prevalent prices. However progressive farmers and big peri-urban farmer remain quality conscious particularly in case of milk production since they cannot afford to compromise the input quality which ultimately affects the profit margins and raise overhead costs. But for most price sensitive small holders price remains a key diver of purchase decision.

**c) Degree of Contract Formalization**

By and large there is very little contract formalization as most transactional relationships are based on trust. However, in the peri-urban markets all over Pakistan since huge sums of money are involved the pekars' dhoochies or gawalas maintain a register where all details of all transactions including milk supply, credit and payment records are maintained. Processors and big contractors do enter into contracts with supplying farmers and maintain elaborate records as milk is purchased based on total solids or solid fat content. Sophisticated buyers i.e. processors enter into formal contracts.

**d) Opportunities for Enforcement of Contractual Obligations**

The trend increasingly is towards consolidation as small fragmented farms lack economies of scale. Rapid population growth and increasing demand for milk coupled with a widening gap between demand and supply offer the greatest opportunities enforcement of contractual obligations. Entrance of large processors and establishment of bigger farms with ever greater number of animals have in the process created an environment where formalization of contracts is becoming more and more pronounced.

**e) Financial & Non-Financial Services Provided by Input Suppliers**

Within the dairy value chain pekars (big milk traders) were observed to be the main informal financiers in the peri-urban market of Landhi Cattle Colony Karachi also considered as Asia's biggest. Whereas in other urban as well as rural areas live animal beoparis and other big actors pekars are also involved in financing since the returns are high and quick involving a five month period to pay back the principal for buffalo finance understood to be between 125, 000-150,000 rupees for buffaloes as well as the profit amounting to between 10,000 -12,000 rupees.

Similarly, good cows breed with principal amount of 150,000- 200,000 rupees and even up to a high of 300,000 rupees and corresponding profits of 10,000-12,000 and for superior breeds to a high of Rs. 15,000-20,000 per cow. The pekars or live animal beoparis deliver these milking animals at the dairy farm gate and have guaranteed earnings in a short time span of five months. The title of the asset is transferred at the time of delivery of animals and all risks associated with animal mortalities are borne by the farmer. The only risk borne by beoparis, traders or other financiers is during transportation.

All other inputs i.e. feed concentrates, green fodder and AI and other services are supplied by local wholesalers and retailers who in turn at times may also be the agents or dealers of large suppliers i.e. ICI, Ghazi Brother etc.

**f) Subcontracting**

Subcontracting in the dairy value chain exists at both production and aggregation levels in the formal sector as well as at the informal level. At the formal sector big processors have formal contracts signed with progressive farmers who supply milk at agreed rates where rates for milk in turn is determined by



the total fat content of the milk. Similarly, for milk aggregation the processors sign contracts with big contractors as well as dhoochies /gadwalls. In the same way similar informal contracts exist between producers and milk aggregators and producers within the value chain.

## **Logistical Activities in Inputs Supply**

### **a) Logistics**

From the procurement of animals are rural and urban mandis up to the final delivery at dairy and feedlot farms the logistics costs are borne by pekars, beoparis or gawalas or any other informal financier within livestock sector (inclusive of dairy and meat value chains). Large ruminants i.e. cattle and buffalos and small ruminants are rounded up by the beoparis or their agents based in the villages and taken to the nearest rural cattle markets either on foot or on small trucks and Suzuki vans. Alternatively, farmers may choose to take their cattle directly to the rural cattle markets where the first live auctions take place on specified dates.

**Figure: ANIMAL TRANSPORT by PEKARS / BEOPARIS - CATTLE COLONY KARACHI**



**Animals are supplied to Dairy Farms in Mazda Trucks**

### **b) Organization of Logistics**

Logistics costs and all related taxes and fees are part of the animals being traded and are borne by the suppliers i.e. beoparis, pekars and gawalas. All logistical arrangements up to the final destination are borne by the suppliers unless agreed otherwise by the buyers. There are no specialized vehicles for animal transport and animals are crammed into vehicles and moved to their final destinations i.e. urban cattle mandis.

Animal taxes, toll taxes, government cess, inclusive of the animal prices and transportation charges are fully paid for by the suppliers. Animals are sourced from the major production clusters of interior and Northern Sindh and Southern, Central and Northern Punjab to the final places of destinations which includes Karachi in The South, Quetta and even onwards to Iran and Afghanistan in the West and Rawalpindi, Peshawar and other parts of KPK and Afghanistan in the North West.

### **c) Lead Times**

Within the dairy business lead times for milk delivery may range anywhere between a few hours up to

one week since making new arrangements involving dairy farmers, pekars, wholesalers and retailers takes between 24 hours up to a week. However, lead times for transportation of live dairy animals being sourced at the rural areas of Interior Sindh and Punjab takes anywhere between 2 days up to two weeks since live dairy animals have to be sourced from cattle mandis in the rural areas whose dates vary from place to place depending upon the final destination.

## Production System

### Geographical Mapping of Primary Producers

Within the country production of both large and small ruminants is fragmented and remains concentrated in larger livestock cluster in the two major provinces of Punjab and Sindh. While the largest production clusters are based in the provinces of Punjab and Sindh. Supplies to the rest of the country originate from these two provinces. While the KPK and Baluchistan remain far behind as being net consumers of animals sourced from the two bigger provinces. Punjab and Sindh have the biggest concentration of farm animals and particularly the areas lying between Sargodha in Northern Punjab, Lahore and Sahiwal and Jhang in Central and Bahawalpur, Vehari, Lodhran, Multan and Rahimyar Khan in Southern Punjab have major production areas. While in Sukkur, Larkana, Dadu, Shikarpur, Khairpur Mirs in Northern Sindh and Hyderabad, Nawabshah and Thatta in Interior and Southern Sindh have the largest dairy clusters. Farmers who are considered bankable possess between 7-50 large animals account for 16% of the national production.

### Production Systems

#### a) Types of Production Systems in the Value Chain

As depicted in the table below production systems in Pakistan can be broken down into four broader categories including 1) Small Holder Subsistence, 2) Small –Holder Market Oriented, 3) Rural Commercial and 4) Peri Urban.

Whereas small holder market oriented having 3-5 animals mostly sell to dhoddies, retail and procurement agents of processors. The “Rural Commercial” possessing 50 milking animals supply to milk retail stores, dhoddies and procurement agents of processing companies. Whereas the “Peri Urban” possessing 100-200 milking animals either directly sale to milk retail stores or alternately sell to the dhoddies or gawalas (alternately called pekars in Karachi). The herd mix for the third and fourth categories is routinely 90% buffaloes and 10% cows.

**Table: PRODUCTION SYSTEMS & MARKETING CHANNELS**

PRODUCTION SYSTEM	NUMBER OF ANIMALS	MARKETING CHANNELS
Small-holder Subsistence	1-3	Milk not marketed due to lack of regular access to market. Markets processed goods like desi ghee
Small-holder Market Oriented	3-5	Retail Shops, Middlemen, Procurement Agents of dairy processing plants.
Rural Commercial	More than 50 (90% buffaloes & 10% Cattle)	Retail Shops, Middlemen, Procurement Agents of dairy processing plants.
Peri-Urban	100-4000 (Livestock with 90% buffaloes and 10% cattle)	Direct Sale to Retail Shops, with Contract with the middlemen (pekars/, Dhoddies), Sales to Consumers

**SOURCE:** ANALYSIS of MARKETING CHAIN, FAO PAKISTAN - 2006

**Figure:** TYPICAL MILK COLLECTION CONTAINER at LANDHI CATTLE COLONY KARACHI



**Milk Hygiene Gets Scant Attention. Picture of A Fly-Infested Milk Containers**

Each of these systems has its own peculiar farm dynamics and marketing channels. Between 60- 65% of milk produced by small holder subsistence is consumed at home with the surplus produced in flush season (i.e. November-March) is marketed in areas where the doodhi or processors have presence.

**Figure:** TRUCKS TRANSPORTING MILK from LANDHI CATTLE COLONY TO KARACHI CITY



**Pekars Pay all Transportation Charges from Dairy Farms at Landhi Cattle Colony up to the Wholesale and Retail Distribution Points at Karachi City**

## **b) Contractual Arrangements**

Formal contract are almost not existent with the dairy industry as informal relationships build over time remain the norm within the dairy value chain. Such relationships essentially entail no written contracts and the dhoodhies or pekars at often times give advances to the farmers to ensure that they get uninterrupted supplies that are guaranteed at farm gate level.

At Karachi's Cattle in Landhi the pekars routinely extend cash advances of Rupees one lakhs per maund (40 liters) of milk produced at the farm per day. One dairy farmer with 800 animals (10% cows and 90% buffaloes) with average farm production of 160 maunds per day was being availing sixteen million rupees from the pekar. In addition to the sixteen million advances farmers are regularly paid for the daily milk sales. Cash payments are made at Landhi either by end of a week or end of month of milk sales. The pekars have their own transportation arrangements where collect the milk at farm gate and deliver to the end users within the city markets.

The pekars, dhoodhies or gawalas ensure door step collection and buy milk at prices that are routinely higher than that offered by the competition. The dhoodhi offsets his higher purchase prices by adding water to milk. Unlike the processors who buy milk on the basis of total solid contents or TSNF. The dhoodhies ensure continued supplier loyalties by often providing services that are unrelated to the sector which may comprise a wide spectrum of services provided. A few of these include the following:

- He makes an annual contract with the producers and offers loans and advances if needed.
- He delivers household utility items to the producers who are working with him.
- The producers also have the convenience of getting paid as desired.

## **Technical and Quality Requirements**

Unlike the processors who buy milk on the basis of total solid contents or TSNF, dhoodhies buy milk without performing any tests. Even processors procure between 52-56% of the fresh milk supplies from Dhoodhies while between 44-48% comes from traditional rural farmers.

Dhoodhies have a delivery network comprising of rural and urban markets that includes amongst others milk retailers, hotels, khoya makers, and MCC and individual households. He sources all his raw milk supplies from rural milk producers.

Due to his price remaining flat throughout the year, there are times in the flush season where the dhoodhies price can be higher than the price offered by the processor-owned milk collection centers (MCC). The processors pay against total fat content or TSNF; the higher the milk tests the better the payment received per liter and vice versa. The MCCs are becoming an increasing part of the dhoodhies total sales. The dhoodhies however purchase raw milk by fluid liter, not by quality.

Dhoodhies leverage their strong market presence owing to the set of unmatched services he offers at farmer's doorsteps. The incentives on offer include door step collection, advances, delivery of household goods and provisions to producers, milk payment on demand, arrangement for green fodder, feed concentrates, wheat straw, and cotton seed cake and even charging of cell phone batteries for the farmers. Often times he contacts veterinary service providers upon the farmer's request and pays the charges to be later deducted from milk payments. Dhoodhies pays a year round flat price per year and in during flush periods he even pays higher than the processor owned MCCs thereby remaining a step ahead of the competition.



Production of synthetic milk is a serious threat to Pakistan's dairy sector besides posing serious health hazards to consumers. Originating in India and taking a firm foothold in the Pakistani urban milk market preparation of the synthetic milk is said to account for nearly 15-20% or an estimated two million liters produced in urban areas per day. Under current testing regimes this fraud gets undetected and in fact confirms to as it passes all tests for butter fat and solid non fat.

In addition growth hormone injections containing bovine somatotrophin (BST) and oxytocin are also administered to dairy animals in Pakistan and the manufactures of the injection take pride in having introduced a wonderful product that enhances milk production to everyone's benefit.

Both hormones are banned the world over and India has banned oxytocin for over 40 years now as they are harmful and thought to be the cause of cancer and other diseases.

## **Aggregation**

**Rural Enterprises** i.e. Hotels, Milk Retail Shops, Tea Shops and Khoya Makers.

Fresh milk is delivered to the rural enterprises either by the dhoddies or is supplied directly by farmers.

**Market Trends:** Growth rate for this segment is stated to be between 4-5% and remains steady year round. A key hindrance being the poor rural infrastructure that has been worsened with the monsoon flood devastations during the monsoon seasons between 2010-12.

**Demand Trend:** Demand remains high with prices varying seasonally.

**Purchase Price Trend:** Price continues to fluctuate between flush and lean seasons peaking with summers and slowing down during winters.

**Incentives Offered by the Buyers:** Incentives here are characterized by cash advances and payments on delivery but village enterprises offer almost no incentives as growth is slow and milk suppliers remain aplenty.

**Needs of the Buyers:** The main criterion of village enterprises is milk freshness as in absence of viable cold chain milk easily gets spoiled. Consistency of supplies remains a key buyer requirement.

## **Incentives Commonly Offered by Dhoddies include the following:**

- Cash Advances starting from a few hundred up to Rs. 30,000
- Credit facility for input supplies
- No milk testing at time of purchase
- Groceries delivered to farmers doorsteps on demand
- Participation in village level social events i.e. weddings and funerals
- Provision of feed concentrate linked to milk sales
- Provision of mobile cards and easy loading facilities



**Table: SALIENT FEATURES OF DHOODHI's BUSINESS IN SINDH & PUNJAB**

Particulars <sup>9</sup>	Statistics in Sindh	Statistics in Southern Punjab
Distance covered /day in kilometers	25	65
No of village coverage	3-7	3-4
milk supply volume from milk producers (liters) during lean period	1.5	3.3
milk supply volume from milk producers (liters) during flush period	2.25	8.0
Maximum volume of milk collected on an average day (liters) during lean	102	139
Maximum volume of milk collected on an average day (liters) during flush	228	333
Average price of milk during lean (Rs)	39.25	37
Average price of milk during flush (Rs)	34	34.8
Cash Advances to milk producers	100%	83.33%
Cash Advances from processors	30%	38.88%

**SOURCE:** USAID ENTREPRENEURS DAIRY VALUE CHAIN ANALYSIS REPORT

**Processors:** Processors set the most stringent criterion for milk purchase as suppliers have to meet a set of parameters.

**Market Trends:** Faced with widening demand and supply gap, processors imported dry milk powder in 2012 to make up for supply shortages.

**Demand Trends:** Demand growing at 15% far outpaces suppliers growing at only 5% with each passing year widening the gaps to new levels.

**Incentives Offered by the Buyers:** To ensure supplier loyalty processors offer a wide array of incentives including cash advances of between 30,000-50,000 rupees. Additionally, processors purchase milk based on fat content and pay for quality rather than volume, they make payments on time which is linked to milk sales and offer animal husbandry. Costs for in-put supplies are deducted from future milk payments.

**Needs of the Buyer:** Processors demand fresh milk in timely manner and with consistency.

<sup>9</sup> Dairy Value Chain Analysis Report USAID Entrepreneurs Project.

## **Urban Milk Supply**

Tea shops, restaurants, bakeries, khoya makers and other large consumers remain the key urban based consumers. Dhoodhies, peri-urban farmers and big contractors remain the main suppliers.

**Market Trends:** This segment experiences demand growing at between 5-9% per annum. A combination of factors i.e. increasing urban population, rising demand and affluence amongst urban dwellers the demand is experiencing upwards trends.

**Demand Trends:** Primarily home based consumers are key buyers in this segment.

**Purchase Price Trend:** The prices willing to be paid reflect a slow-upward trend based on increasing end-consumer consumption. The purchase price is fixed during both the flush and lean seasons. Raw milk is purchased by liquid liter as opposed to fat content.

**Needs of the Buyer:** Milk is always preferred fresh and increasingly consumer awareness milk chillers are becoming a key feature of the distribution network.

## **Key risks in Production**

- Government role in price fixing remains the biggest disincentive for growth and the industry's attracting much needed fresh investments into the dairy value chain as the way forward lies in larger farms with lower overheads and greater economies of scale.
- Domestic dairy animals with low yields averaging 3.15 litres per animal per day remain way behind international standards of 28.5 litres in the US.
- There remain poor incentives for animal breeders as the market does not reward superior dairy and beef breeds since the purchase decision is driven not by quality. The prevailing system discourages high milk or meat yielding animals since return for the marginal investments remain uncertain.
- Increasing global competition and rising costs of inputs are shrinking the profit margins as Nestle and other processors resorted to imports of powdered milk in summer of 2012 to meet their supply needs as local fresh milk prices became higher.
- Lack of availability of finances for setting up of modern farms with high yielding animals that will enable local farms to match the yield per animal as experienced in the West.
- Wide gaps exist between extension services and the only provides curative and limited artificial insemination services.
- The cold chain infrastructure remains poor while milk adulteration ensures that the cheaters are rewarded at the cost of quality milk producers.

## **Financing of Production**

### **a) Types of Production Finance**

Big beoparis and pekars are key financiers of the dairy value chain as the meat value chain is an extension of the dairy value chain where dairy animals are readily financed by big beoparis or pekars (who are active in Asia's biggest peri-urban market namely the Landhi Cattle Colony). Greater details are given in the chapter on financing. This is one area where only where 16% of farmers possessing between 7-50 animals have an advantage by dint of their possessing sufficient land to show as collateral to commercial banks but sadly very little bank financing actually goes into dairy farming.

### **b) Key Drivers of Finance in Production and Aggregation**

A reflection of the production and aggregation driving value chain finance particularly in the larger commercial level peri-urban markets i.e. Landhi Cattle Colony Karachi can be seen from the fact that

every month at least 6% of the farms' dairy animals have to be replaced to maintain optimum level milk production. For a hundred animal farm that translates into 72 animals (2/3rd) of all farm animals to be replaced each year. Since the herd mix comprises of 10% of cows and 90% buffaloes such facts translates into 0.6 cows and 5 buffaloes replaced each month at a 100 animal dairy farm where the price tag ranges between 125,000 -150,000 for buffalos and between 150,000-200,000 for cows. That in turn translates into asset financing requirements of 6 cows and 66 buffaloes each year or farm animal financing demand between 10-14 million rupees excluding financing needs for equipment and animal sheds. Country wide financing needs of simply replenishment of farm animals alone runs into billions of US\$.

Currently there is no financing of fixed assets by informal sources such as pekars or live animal beoparis trading both dairy as well as meat animals since the meat and dairy value chains remain intricately intertwined as meat value chain is considered an extension or by product of the dairy value chain and dairy animals fetching the highest prices. At Karachi's Landhi Cattle Colony average market prices for milking buffalo in November 2012 ranged between 125,000 -150,000 PKR and that of an average cow were between 150,000-200,000 PKR. For cash strapped farmers unable to provide upfront cash to suppliers, the pekars or beoparis routinely charge Rs. 12,000 above the market price of each milking buffalo and between Rs. 18,000-20,000 above the market price for each milking cow.

The suppliers (beoparis and pekars) expect the dairy farmers to pay the principal as well as the financing charges within 5-6 months of the delivery of farm animals. The fact that the urban areas have a very huge and ever widening gap between milk demand and supply there consequently remains an ever increasing demand for working capital as well as asset financing. But clearly large infrastructure finance remains in short supply and only dairy animal finance remains a permanent feature of the informal sector owing to the 5 month payback period with huge profit margins. This clearly is one market within the fourth largest milk producing country in the world where the informal sector is quite efficiently meeting the financing needs of the dairy as well as meat value chains while the formal banking channels remain distant spectators.

Nearly 16% of farmers own herd sizes varying between 7-50 animals and it is this group that can be considered bankable as they own sufficient land as collateral besides possessing hard assets whose farm animal value alone is estimated at well between 5-10 million animals. That currently avail agriculture credit and have no issues in securing agriculture loans and are comfortable in dealing with commercial banks procedures. This group has no dependence on the informal sources of finance. While the remaining 84% = (100%-16%) of farmers owning 1-6 animals are dependent on the beoparis and arthis for their financing needs often accessing informal finances without much difficulty.

#### **c) Working Capital Finance in Production**

As mentioned earlier, the 16% of farmers possessing 1-6 large ruminants are considered bankable while only 10% of goat and sheep farmers keeping between 7-50 animals would be considered bankable. That leaves an alarming 89-90% of small ruminants farmers considered as un-bankable since they possess between 1-6 animals.

Interesting it is this 89-90% of small ruminant owners who have over the years catapulted Pakistan to the world number two in terms of goat production behind China. Correspondingly, between 85-66% of farmers possessing 1-6 cattle or buffaloes place Pakistan as world number two in buffalo production.

#### **d) Fixed Capital Finance in Production**

Just like the prevalent practice within the meat value chain, during interactions with industry players particularly the informal sources of finances it was revealed that only commercial banks were engaged in financing of fixed assets while the informal sources offered close to nothing in this arena.

**e) Unmet Opportunities for Technology & Quality Upgrades**

At the farm production and logistics arenas, unmet areas of financing identified by progressive SMEs included financing of farm sheds and machinery i.e. feed grinder, grass chopper, feed mixer and tractors besides cold chain that are often used in silage making appropriate besides animal transport systems etc.

**f) Constraints to Financing of Producers Needs**

The greatest constraints identified included financing of live farm animals as in the absence of livestock insurance commercial banks are shying away delving into this area an area where even well positioned SMEs find difficulties in financing. On the other hand, 90% of goat and sheep farmers and an overwhelming majority i.e. 86% of large ruminant farmers are considered un-bankable since they possess little or no land at all. Fixed capital financing for farm sheds does not exist from the informal sector whereas the stringent requirements of commercial banks fend off industry players from turning towards the formal sources of finance.

## **Processing**

**1. Types of Processors in Value Chain**

The fact that only 4% of the milk is processed essentially entails very limited processing capacity within the dairy value chain within the country. Nurgur is a household name in processed products like butter, cream and cheese and it lately has introduced processed milk. Whereas Dens and Adams are leading cheese manufacturers. There are only a few leading names in milk processing with Engro and Nestle running neck to neck and followed by Haleeb, Goodmilk, Nurgur and new entrant Anhaar. Nestle and Engro also sell flavored milk and ice creams. Walls and Omore are recognized brands of ice cream.

**2. Linkages of Processors with Suppliers**

Small holders deliver milk at processor owned milk collection centers or MCCs that are manned by processor representatives. Close 40% of the milk is collected from farmers selling 2- 3 liters of surplus milk per day. Similarly, processors also collect from large progressive farmers, big contractors or even doodhies. In fact, an increasingly volume of milk is sourced by processors from doodhies.

For their 3-4% share the processors set up milk collection centers (MCCs) that are manned by their representatives. Milk is delivered to the MCCs directly by farmers or collected by the MCC representatives who earn a commission of Rs. 2/litre for collecting from producers and delivery at MCCs.

**3. Utilization of Processing Capacity**

Primarily only 4% of raw milk gets processed as tetra UHT treated milk is the main product for corporate giants i.e. Engro, Nestle and others who besides processed milk also produce flavored milk and cream. While another processor, Nurgur is better known for its butter followed by processed milk.

**4. Processing Technology**

Pakistan's dairy value chain lags behind the international competitors in use of technology and a case in point is the colossal wastages of around 20% that result in nearly US\$ 2 billion lost each year in wastages of milk along the value chain. Equipment is available but high costs keep the industry underfinanced, a situation that results in huge wastages of fresh milk.

**5. Processing Throughput**

The fact that only 4% of the milk is processed in the dairy value chain essentially entails Pakistan has a long way to catch up as 96-97% of the milk produced remains unprocessed. Processing throughput ranges from anywhere between one week to up to a month since very huge volumes are involved between milk aggregation.

## Financing in Processing

### a) Working Capital Finance

Almost all finance for working capital needs of big processors comes from commercial banks as owing to the huge investment requirements the informal sector lacks the capacity to arrange necessary finances.

### b) Fixed Assets Finance

Fixed asset financing by processors are again secured from commercial banks and no room exists for the informal sector as there are no known names owing to the huge capital outlay requirements.

### c) Unmet Financing Opportunities for Technology & Quality Upgrades

Cold chain is one area where heavy financing needs exist since 20% milk is being wasted before processing. There is a huge untapped demand for truck or minivan mounted chillers and refrigeration systems for transportation. There also is need for expansion or establishment of new milk processing facilities given that demand is growing by 15% each year. Investment requirement is also high for AI services and introduction of embryo transplant technologies.

### d) Constraints and Opportunities to Financing Processors Needs

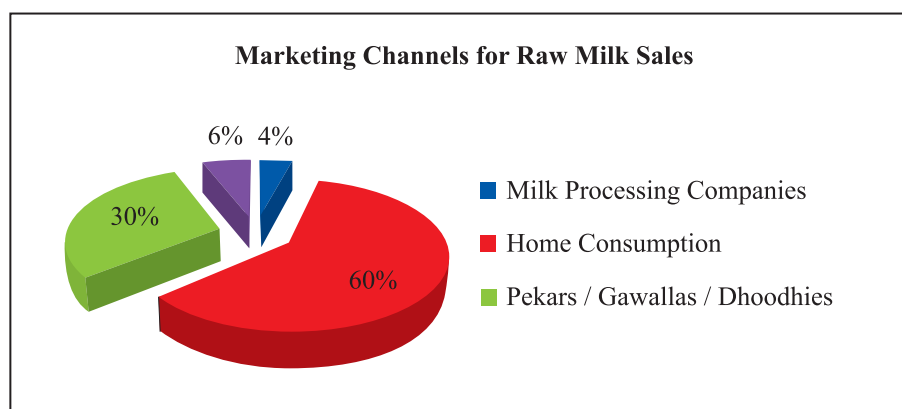
The biggest constraint is the fragmented nature of the production systems with small holders (farmers possessing 2-5 milking animals) and the fact that there are huge distances between major production clusters. Similarly, per animal yields remain slow at 3.15 liters in contrast to 28.5 liters per animal per day in the US thereby creating huge inefficiencies that result in bigger overhead costs.

## Markets

### Market Size

In 2011-12 Pakistan produced 48 million tons (48 billion liters) of raw milk with estimated 20% milk wasted owing to lack of cold chain. The country however lags far behind in term of yields per animals put at 3.15 liters per animal in contrast to 28.5 liters in the US and even higher for Israeli Holstein with 40 liters per cow per day. The 20% milk wastages translate into 9.6 million tons (9.6 billion liters) per year with an estimated lost retail value put somewhere between 169 to 172 billion rupees in 2012 alone<sup>10</sup>.

**Figure: VOLUME of PRODUCT FLOW in VARIOUS CHANNELS**



Pekars, or dhoodhies supply milk to wholesalers and retailers who in turn sell it to the urban or rural end consumers.

<sup>10</sup> Published in The Express Tribune, August 5<sup>th</sup>, 2012.



**Figure:** PICTURE of MILK WHOLESale SHOP at CLIFTON (KARACHI)



### Key Stakeholders that Determine Pricing, Timing & Quality

Municipal governments regulate milk prices meat price to ensure food security to the general public. Though, it is commonplace for wholesalers and retailers set their own prices and not strictly abide by the governments prescribed rates. List of prices of milk products in a typical Karachi milk shop is given below.

**Figure 29:** PICTURE of NIZAM MILK SHOP in CLIFTON (KARACHI) SHOWING RATES OF VARIOUS MILK PRODUCTS (15<sup>th</sup> Nov 2012)

نرخ نامہ		
74/-	فی لیٹر	کٹا زودھ
100/-	فی گلو	دبی
40/-	فی گلاس	سلی میٹھی
40/-	فی گلاس	سلی تھین
40/-	فی گلاس	پوٹن والا زودھ
92/-	فی لیٹر	گرم زودھ پیکا
100/-	فی لیٹر	گرم زودھ میٹھا
112/-	فی لیٹر	گرم زودھ میٹھا
پائے 5000/75.1000/75.500		
پائے 5000/75.1000/75.500		

### **Market Risks**

- Input costs are rising and in the summer of 2012 leading processors had to resort to powdered milk imports to contain rising costs of local collection at the detriment to local producers.
- Production of synthetic milk is a major threat to the reputation of dairy industry as it is laced with very serious health hazards to consumers. This fraud according to some estimates is put at 2 million litres produced per day or an estimated 15-20% of the market. The synthetic milk is said upon testing can easily dodge the testing regimes and passes existing tests for butter fat and solid non fat contents.
- In addition, growth hormone injections containing bovine somatotrophin (BST) and oxytocin are also administered to dairy animals in Pakistan again posing serious hazards to human health.

### **Working Capital Finance**

Beoparis, pekars, dhoodhies and major players in the feed, vaccine and medicines manufacturing provide working capital finance. Transactions are based on a relationship of trust build over years of strong relationships. Bigger farms however have access to finance from commercial banks particularly ZTBL.

### **Fixed Assets Finance**

The only financing of fixed asset in dairy value chain comes from commercial banks while the informal sector prefer to avoid fix asset financing which the financiers believe longer payback periods.

### **Unmet Financing Opportunities for Technology& Quality Upgrades**

Huge opportunities exist to finance cold chain besides financing of farm equipment and machinery. Opportunities also include for investment into AI technologies and embryo transplant.

### **Constraints and Financing Opportunities in Marketing**

Unmet opportunities exist in cold chain finance and working capital finance to cover farm management and operational costs besides technology up gradation and truck mounted chillers and refrigeration systems coupled with farm machinery.

## SWOT Analysis

	Strength	Weakness	Opportunity	Threat
<b>Profitability</b>	<ul style="list-style-type: none"> <li>• High ROIs.</li> <li>• Contractual growing, leverage through cold storage and sales in lean period, easy and cheap Availability of farm labour.</li> <li>• The domestic milk market is very big and demand is growing at 15% per annum.</li> <li>• The meat value chain is a bye product of the dairy value chain as the animals after end of their lactation period bring additional source of income for the dairy farmer.</li> </ul>	<ul style="list-style-type: none"> <li>• Rising input costs are increasingly eating into profit margins.</li> <li>• Presence of large non-descript animals serves as the single biggest hurdle is the way of yield improvements. Milk handling facilities are outdated, inadequate and un-hygienic.</li> <li>• The formal banking sector extends almost negligible credit facilities to the dairy value chain.</li> </ul>	<ul style="list-style-type: none"> <li>• Huge untapped opportunities exist for establishment of modern dairy farms.</li> <li>• Opportunities exist for cold chain investment.</li> <li>• Great promise exists in investment into high yielding dairy breeds.</li> <li>• Rising population growth is pushing demand for dairy products.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of investment into high yielding animals threatens to make local farmers inefficient.</li> <li>• Inadequate AI services results in lost Business opportunities.</li> <li>• Floods &amp; disease outbreaks negatively impact the supply chain and farming systems.</li> <li>• Long distances between markets make entire value chain price inefficient.</li> </ul>
<b>Stability</b>	<ul style="list-style-type: none"> <li>• The huge livestock numbers serve as the biggest source of stability as livestock make up 55% of Agriculture Sector of Pakistan having greater contribution than cash crops.</li> </ul>	<ul style="list-style-type: none"> <li>• Farms are fragmented as herd sizes are small i.e. 80% of farmers are small holders having 2-5 animals and possess 0-5 acres and are described as un-bankable as they possess no land of their own.</li> </ul>	<ul style="list-style-type: none"> <li>• The country's huge livestock population offers not only food security but also offers long term investment opportunities.</li> <li>• Great potential exists for tapping into the small holders (2-5) animals via gawalas, pekars and dhoothis as they account for 80% of milk produced.</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of credit &amp; financial instruments.</li> <li>• Lack of high yielding animals.</li> </ul>

<b>Growth</b>	<ul style="list-style-type: none"> <li>• Huge livestock numbers offer the biggest guarantee for long term growth.</li> </ul>	<ul style="list-style-type: none"> <li>• The poor embankments in major production areas are easily breached during monsoon floods thereby threatening growth of livestock and farming systems.</li> <li>• Poor hygiene during aggregation spoils milk quality.</li> <li>• Feed quality remains poor thereby adversely impacting feed conversion ratios and farm production.</li> <li>• Shortages of green forages during May–April and June –August. .</li> </ul>	<p>Widening gap domestic demand and supply create huge opportunities for new investments.</p> <ul style="list-style-type: none"> <li>• Institutionalizing credit to the value chain's informal sector actors promises to broaden the canvass for economic growth.</li> <li>• Demand for sharia compliant financial products.</li> </ul>	<ul style="list-style-type: none"> <li>• Cumbersome procedures on part of banks fend off vast majority of agricultural enterprises from the former financial institutions</li> <li>• Absence of livestock insurance serves as a major impediment.</li> <li>• Poor animal husbandry and farm management result in low feed conversion ratios and thereby low returns to farmers.</li> </ul>
<b>Regulatory Environment</b>	<ul style="list-style-type: none"> <li>• The passage of 18<sup>th</sup> Constitutional Amendment has devolved livestock to provinces.</li> <li>• Government is playing a facilitators role and allowing the private sector to serve as a growth engine.</li> </ul>	<ul style="list-style-type: none"> <li>• The un-checked production of the hazardous synthetic milk and growth hormone injections containing bovine somatotrophin (BST) and oxytocin administered to dairy animals poses serious health risks to humans as well as animals.</li> <li>• Illegal trade (smuggling) thrives and deprives government of much needed foreign exchange besides denting tax money.</li> </ul>	<ul style="list-style-type: none"> <li>• Doing away with practice of price fixing by the govt would unleash real growth potential.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of a coherent policy on exports of live animals is hurting the entire value chain actors.</li> <li>• The Govt's role in milk price fixing serves as a disincentive &amp; eats into profit margins besides discouraging much required new investments into the industry.</li> <li>• Poor marketing infrastructure as facilities at mandis (animal markets) are in bad shape</li> </ul>

<b>Job Generation</b>	<ul style="list-style-type: none"> <li>• New investments in livestock sector promise to generate jobs for millions.</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of credit facilities to majority of SMEs by banks continues to promote growth of the informal sector and whatever growth results it comes at the cost of the formal banking sector.</li> </ul>	<ul style="list-style-type: none"> <li>• Highest number of jobs would be created in investments into high yielding exotic breeds.</li> <li>• State of the art modern dairy farms will ensure better margins and accelerate cash flow cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Rising costs of inputs threatens to create inefficiencies.</li> <li>• Rising incidences of climate change and monsoon floods put livelihoods sources i.e. livestock and their feeding systems at risk.</li> </ul>
<b>Geographic Focus</b>	<ul style="list-style-type: none"> <li>• Consolidated farms at Punjab and Sindh with large livestock numbers &amp; robust agrarian economies have comparative factor advantages.</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of requisite cold chain in rural areas continues to lead to colossal raw milk wastages of 20%</li> </ul>	<ul style="list-style-type: none"> <li>• Huge untapped prospects exist to increase credit intake by the informal sector via the middlemen (pekar, dhoochi, and arthi route as has been done in India and elsewhere.</li> </ul>	<ul style="list-style-type: none"> <li>• Continued reliance on non – descript animals and slow pace of introduction of exotic and cross bred into dairy farms threatens create greater inefficiencies at farms.</li> </ul>



## Economics of Each Actor

### Case Study of Chaudhry Nasir – A Dhoodhi

Chaudhry Nasir's family has been in the milk sales and distribution business in Multan City for generations. He has a thriving business in Bahawalpur Chowk Multan with 20 employees who collect 4000 liters of milk per day. The aggregation and distribution network works quite efficiently as milk is collected from three hundred rural and peri-urban farms twice a day at the farm gate in mornings and evenings using motor bikes. Upon reaching the central collection point the milk is stored and chilled in milk chillers to prevent spoilage.



He has three milk chillers with installed capacity of 5000 liters. After chilling, milk is distributed to four categories of end consumers including restaurants, bakeries, khoya makers and halwa makers as Multan is famous for its sohan halwa. Like the rest of the country, milk delivered through contractual agreements in Multan ensures higher returns of Rupees 2400-2600 per maund or Rs. 60-65 per liter in contrast to the low open market rates of 1600-1800 per maund or 40-45 per liter. Unlike other dhoodhies he doesn't deliver milk at homes.



He pays Rs. 35-37 at the farm gate in collection costs and incurs Rs 1-2 in milk collection and another 1-2 rupees in milk distribution costs. Chaudhry Nasir explained that milk supplies after growing consistently at 5-8% each year have fallen in 2012 owing to setting up of newer and bigger farms in recent years.

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The distribution costs rise on days when there is no CNG (compressed natural gas) as motor bikes that consume petrol take the place of Suzuki vans running on CNG.

His profit margins fluctuate between 33-37% and on 4000 liters traded daily he earns an estimated 72,000-96,000 daily. He returned from the Hajj in November 2012 and is satisfied that his business is based purely on trust. He has informal contracts with his demanding customers in Multan City and has verbal contractual arrangements with his suppliers as there is no written contract involved. He maintains a register where daily transaction details are recorded in the simplest of ways.

**Figure:** PICTURE of MILK TRANSPORTATION IN MULTAN CITY



Dhoodhies serve as financier's bankers to 80% of the small holders, Chaudhry Nasir is no exception and records all records of loan advances and deductions of the loan amount from milk sales in addition to other services and material support extended to the farmers. If need arose he even supplies to his customers on credit and ties payment to milk sales by allowing a month's grace period.

He is quite flexible with his suppliers and doesn't stop payments if a farmer was able to deliver say 3 liters instead of 5 and recovers the payments via future deductions from milk sales and over the course of time has earned the trust and continued loyalty of his suppliers thereby enjoying uninterrupted patronage on part of supplying farmers as well as of the main buyers of fresh milk. He says that his strong backward and forward linkages with farmers and clients alike ensure that the super efficient business model thrives in these challenging times.

**Figure: GROSS MARGINS / LITER of SELLING MILK by DHOODHI**

Gross Margins / Liter of Selling Fresh Milk by Chaudhry Nasir (Dhoodhi)					
Observed on 20 <sup>th</sup> Nov 2012					
(Milk is procured at Farm Gate & Delivered in Multan City)					
	Low	High	Daily Range		
Avg. Procurement Price/Liter Rs.	35	37	140,000 - 148,000		
Avg. Collection Expenses /Liter Rs.	1	2	4,000 - 8000		
Avg. Sale Price /Liter Rs.	55	65	220,000 - 260,000		
Avg. Sale Expenses / Liter Rs.	1	2	4,000 - 8,000		
Margin Rs. /Kg	18	24	72,000 - 96,000		
Margin %	33%	37%	Yearly Margin = 26-35 Million Rs		

Given the fast cash cycles returns on investments are high and remain steady since the fast cash flows cycles involves one week up to a month. In contrast to the rupees 100,000 given as advance money by pekars to big dairy farmers in Karachi against one maund (40 kg) of milk, Chaudhry Nasir gives Rs. 50,000 per maund as yearly advance to big farmers. The farmers keep the advance money till the duration of the informal contract normally lasting one year with the option of the farmers retaining the money as the business relationship is routinely continued.

**Figure: PICTURE of SIMPLE TRANSACTION REGISTER MAINTAINED BY DHOODHI**



Chaudhry Nasir also extends advances to small holders the 2-5 animal farmers who make up the bulk of his suppliers. The loan amount to small holders is subject to the farmers needs and may range from a few hundred rupees up to 20,000 rupees for the loyal suppliers. The advance money is for the farmer to keep in addition to weekly or monthly payments. Chaudhry Nasir.

**Table: MARGIN's OF MIDDLEMEN (Pekars / Dhoochies) SELLING TO VARIOUS CHANNELS**

	PRICE RANGE	
<b>Milk Procurement Price Rs.</b>	34.00	36.00
<b>Collection Costs Rs.</b>	2.00	3.00
<b>Delivery Price to</b>	58.00	60.00
<b>Delivery Cost to</b>	2.00	3.00
<b>Cumulative Costs</b>	38.00	42.00
<b>Margin Selling to</b>	20.00	18.00
<b>Delivery Price to Processors</b>	38.00	42.00
<b>Delivery Cost to Processors</b>	1.00	1.00
<b>Cumulative Costs</b>	37.00	40.00
<b>Margin Selling to Processors</b>	1.00	2.00
<b>Delivery Price to Hotels, Bakeries, Khoya Makers, Others</b>	62.00	64.00
<b>Delivery Cost to Hotels, Bakeries, Khoya Makers, Others</b>	3.00	4.00
<b>Cumulative Costs</b>	37.00	40.00
<b>Margin Selling to Hotels, Bakeries, Khoya Makers, Others</b>	25.00	24.00

**SOURCE: FIELD OBSERVATION OF DAIRY VALUE CHAIN ACTORS**

The middlemen earn the biggest margins by selling to commercial enterprises i.e. hotels; bakeries followed by private home delivery. Though selling margins to processors i.e. between 1-2 rupees is typically low but the money is made by delivering higher volumes required by processors on any given day.

### **Sources of Inputs and Major Buyers**

Almost all farm inputs are supplied by wholesalers and retailers who have a strong foothold in all major production clusters in rural areas as well in peri-urban centers i.e. Landhi Cattle Colony Karachi. A range of inputs including feed concentrates, green fodder, vaccines, veterinary medicines, nutritional supplements and farm equipment are available in the major production areas including farm labor. Green fodder to Lahore, Karachi and other cities is sourced from the adjoining areas. In the case of Karachi Thatta all forages are sourced from Thatta. Similarly, farms in other major cities are supplied from the adjacent rural areas.

In the case of rural areas, feed concentrates gets sourced from major city based suppliers while most of the local retailers and wholesalers undertake feed formulations by procuring raw material from the major production areas. Whereas in the rural areas green fodder is locally and other items i.e. cotton seed cake, wheat bran, rice polish, maize waste and other items are supplied at village retail shops. Total Mixed Ration (TMR) along with the raw material for the feed concentrates are primarily procured from the major cotton, rice, maize growing areas of Punjab and Sindh while cheap labor is readily available in the cities while in the rural areas 3-4 members of a family remain dedicated to manage the farm animals.

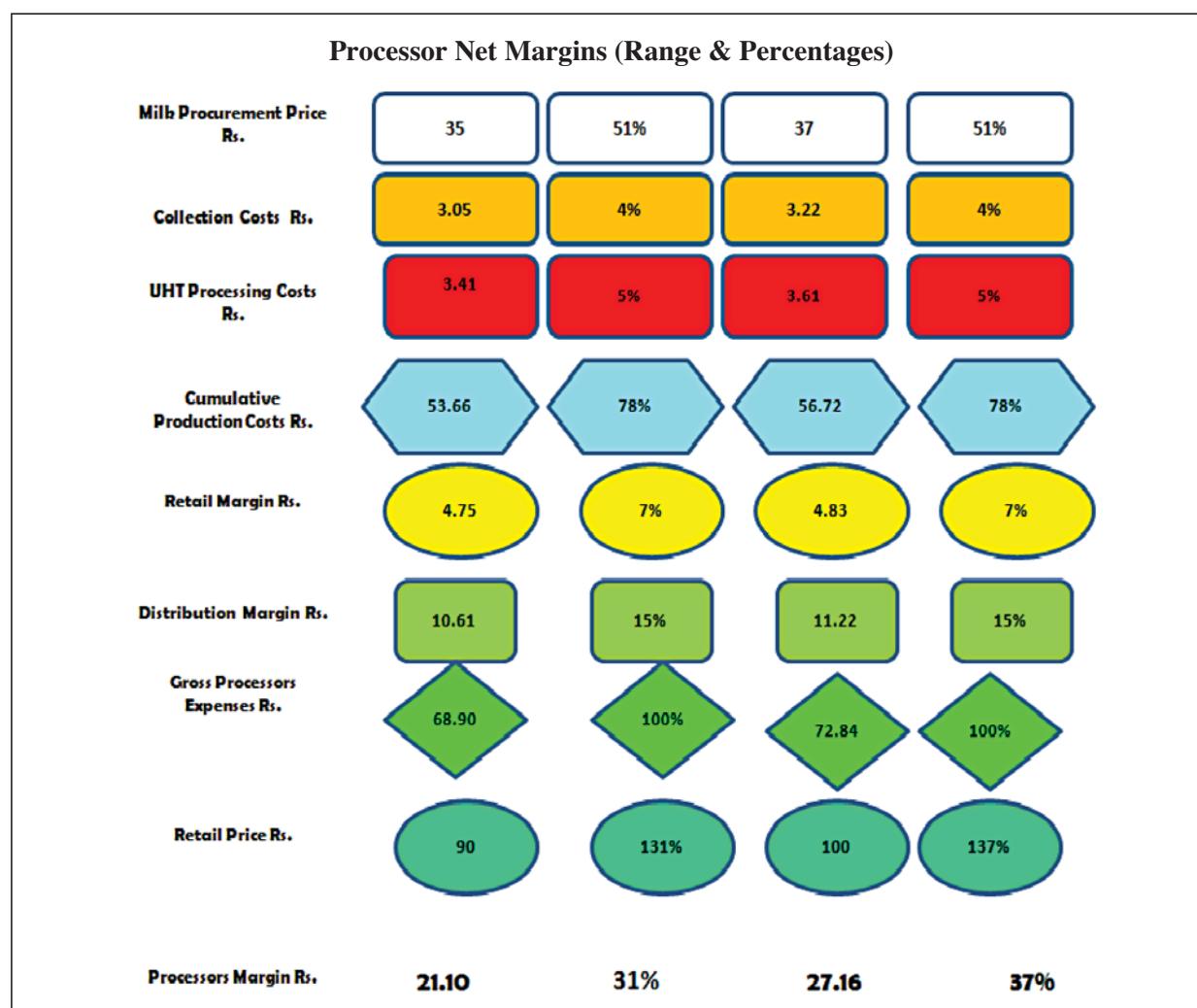
## Cash Conversion Cycle

The cash conversion cycle is between one week for informal value chain actors who account for 15-20% of the milk marketed with volumes varying during flush and lean seasons. The fact that within the informal sector particularly in the peri-urban markets such as Karachi's Landhi Cattle Colony, dairy farmers are not only extended advances by pekars (big informal sector milk aggregators) at rupees 100,000 per maund (or 40 kilograms) but in addition they also are reimbursed for sales within a month. On the other hand processors reimburse both the farmers their milk collection representatives who at times could be a dhoodhi within a week of the sales.

## Processors Costs

A reflection of the costs can be seen in the Net Profit Margins section that follows. Milk procurement costs the processors between 30-37 rupees or 51% of the total costs. Collection costs are between 3.05 - 3.22 and up to 4% of gross processor expenses. Earning 10.61 -11.22 rupees per liters distributor margins are around 15% of total costs. See greater details in gross sales value /revenue section that follows.

**Figure: NET MARGINS FOR PROCESSORS**



SOURCE: FIELD OBSERVATION OF DAIRY VALUE CHAIN ACTORS



### Net Margins

For processed milk, stated to be between 31% and 37% the net margins are highest for big processors but on the down side they account for a meagre 4% of the total milk produced in the county. Retailers selling processed milk earn 7% net margins or 4.75 rupees. Whereas, the pekars and dhoochies have the luxury of serving a bigger and less demanding market and the fact that adulteration takes place unchecked as water gets added to milk, the margins are said to be even higher as no testing of milk takes place.

**Table: NET MARGIN'S for BIG CONTRACTORS SELLING TO VARIOUS CHANNELS**  
(Including Processors & Others)

PARTICULARS	Price Range	
Milk Procurement Price Rs.	35.00	36.00
Procurement Costs Rs.	2.00	3.00
Total	37.00	39.00
Delivery Price to Processors	40	42
Delivery Cost to Processors	1	2
Cumulative Costs	38.00	41.00
Margin	2.00	1.00
Delivery Price to Hotels, Bakeries, Khoya Makers, Others	55	65
Delivery Cost to Hotels, Bakeries, Khoya Makers, Others	5	6
Cumulative Costs	42.00	45.00
Margin	13.00	20.00

**SOURCE:** FIELD OBSERVATION OF DAIRY VALUE CHAIN ACTORS

Likewise the margins for big contractors' ranges between 13% and 20% depending upon the type of market channel served.

**Table: NET MARGINS for WHOLESALERS**

Particulars	Price Range	
Milk Procurement Price	50.00	52.00
Procurement Costs Rs.	3.00	4.00
Total	53.00	56.00
Wholesale Price	60.00	65.00
Wholesaler's OH Costs	3.00	4.00
Cumulative Costs	56.00	60.00
Margin	4.00	5.00

**SOURCE:** FIELD OBSERVATION of DAIRY VALUE CHAIN ACTORS

Margins for milk wholesalers on the other hand is anywhere between 4-5% as wholesalers make most money on large volumes as on a given day a few hundred to thousands of liters are traded on a routine basis by milk wholesalers. Similarly, retailers' margins are between 9-12% as they enjoy better margins being closer to the customers.

**Table: NET MARGINS FOR RETAILERS from SALE OF FRESH MILK**

PARTICULARS	Price Range (Rs.)	
<b>Milk Procurement Price</b>	55.00	60.00
<b>Procurement Costs</b>	3.00	4.00
<b>Total</b>	58.00	64.00
<b>Retailer's Price</b>	70.00	80.00
<b>Retailers' OH Costs</b>	3.00	4.00
<b>Cumulative Costs</b>	61.00	68.00
<b>Margin</b>	9.00	12.00

**SOURCE:** FIELD OBSERVATION OF DAIRY VALUE CHAIN ACTORS

### **Financial Sources**

Industry sources particularly SMEs contacted in rural as well as urban areas showed a general preference for the informal finance sources for its ease of availability and hassle free environment since no paperwork was required. Being the dominant player and by dint of their having greater supplier penetration with the farm gate collection system services the pekars or dhoochies also extended finances to the producers. In essence Dhoochies act as the financiers of the small holders extending between Rs. 5000 up to Rs. 20,000 rupees cash advances that are recovered through deductions of milk sales.

The dhoochi also extends a host of other services ranging from grocery shopping, providing easy load to cell phones of farmers and participation in farmers' social occasions i.e. weddings and funerals since they are part of the social systems in rural setups.

ZTBL and a few other banks also extend finances within the dairy value chain but on a limited scale and they generally lend to financially sound parties.

### **Sources of Debt Financing**

The informal sector is quite efficiently meeting the financing needs of dairy sector with products that are generally thought to be several times more expensive than the banking sector. Informal debt finance is extended by pekars, and dhoochies as well as other actors i.e. wholesalers and retailers in cases that involve shorter payment durations. However, for larger projects commercial banks remain the ultimate sources.

A Typical pekar serving the peri urban Cattle Colony Karachi extends Rs. 100,000 per maund. Therefore an 800 animal dairy farmer at Landhi with production capacity of 160 maunds or 6400 liters / day received Rs. 10.6 million yearly advances. Besides, the informal sources of finance may come from other value chain actors' i.e. Live animal beoparis, retailers, wholesalers, inputs suppliers and arthis with somewhat similar terms and conditions.

Processors also have a well established mechanism of extending finances to farmers who possess small holders (2-5 animals) as well as 7-50 animals and above. The cash advances extended include between Rs. 30,000 up to Rs. 50,000 loans with installment repayment tied to deductions of milk sales.

## **Access to Finance**

### **Financing of Input Supply (working capital)**

Live animal beoparis, pekars, retailers, wholesalers and inputs suppliers of veterinary medicines, feed concentrates and other dairy farm inputs dominate the informal sources of finance. The fact that 6% of all farm animals get replaced each month in the peri – urban markets in addition to regular input supplies that constitute nearly 70% of the farm operational costs bring forth that huge financing requirements within this vital value chain. The informal sector's aggregators i.e. dhoothies and pekars involved in the largest bulking activity comprising nearly 26-33% of the milk collected are the biggest distributors of raw milk and resultantly are also the biggest sources of finance. Conversely, processors collecting around 4% of the raw milk extend finances to their core group of suppliers in return for continued fresh milk suppliers.

The cash flow cycle in the dairy value chain is fast since the market requires fresh milk and is willing to pay cash advances in addition to the payments deducted for milk sales.

Huge numbers of animals are traded on a daily basis all across the country moving from Northern, Southern and Central Punjab as well as Northern, Interior and Southern Sindh to the rest of the country and even into export markets of neighbouring Iran and Afghanistan who also import or smuggle live dairy animals.

Major inputs i.e. feed concentrates; nutritional supplements and green fodder are sourced from input suppliers that include small farm equipment and utensils. Feed and related items constitute approximately 70% of the farm expenses and require continual cash outlays which the cash strapped farmers prefer to buy on monthly credit which is marginally more expensive than cash payments. The input supply finances normally have payback periods of one week to a month and the retailers and wholesalers of the concerned inputs collect his principal plus additional charges from the farmers. In case of supplies of animals for dairy farms, live animal beoparis procure live animal at credit or cash from the supplying agents and supply live animals to the dairy farms.

### **Terms of Finance**

Business transactions between value chain actors are based on trust and have no written contract. The paperless transactions involving no formal contract or written documents are a norm with the informal sector. Cash cycles range from a week to a month for informal while for the formal bank financing terms vary between participating banks. The terms of finance specify an agreed date for payback normally involving from a month for small inputs up to 5-6 months when live dairy farm animal finance is involved.

**Table: FLOW OF FUNDS WITHIN DAIRY VALUE CHAIN**

PARTICULAR	INFORMAL SOURCES	FORMAL SOURCES
<b>Input Supply</b> (Green fodder, roughages, feed concentrates, nutritional supplements, fodder seeds, veterinary medicine, fertilizers, chemicals etc).	Big holders (farmers) growing their own fodder either self finance or get loans from commercial banks. Alternately, peri-urban & in some cases rural farmers get their green fodder, roughages & feed concentrates & veterinary medicine etc from wholesalers & retailers near their farm localities on cash or credit. Since more than 90% production is based in rural areas between <b>5-10%</b> farmers get their green fodder supplies from retailers & wholesalers and amongst them less than <b>5%</b> get it on credit to be usually repaid by end of 1 <sup>st</sup> week or month.	ZTBL others Commercial Banks & MFI's including Khushali Bank, First Micro Finance Bank, NRSP, Kashf, Islamic Aid & Others.
<b>Live Animal Supply</b> (buffaloes, cows, calves)	In Karachi pekars finance the animal supply followed by beoparis and arthis who together account for nearly 95-99% of live animal trade within the value chain. All activities from animal procurement at rural mandis, semi wholesaling & wholesaling, transportation to urban cattle mandis is financed by the informal sources.	None of the value chain Actors approached were meeting their live animal financing needs through commercial banks.
<b>Transport</b>	For domestic consumption <b>more than 90-%</b> of transport is paid for by informal sources i.e. beoparis, pekars and arthis. Between 2-3% of transport charges for fresh milk delivery is paid for by milk processors	Transportation costs for are borne by the pekars and dhoochies.
<b>Milk Processing</b>	<p>In 2011-12 Pakistan produced 38,690 thousand tons (38.69 billion liters) of raw milk with estimated 20% milk wasted owing to lack of cold chain. Approx 96-97% milk is unprocessed.</p> <p>In the peri-urban markets such as Karachi's Landhi Cattle Colony, dairy farmers are not only extended advances by pekars (big informal sector milk aggregators) at Rs. 100,000 per maund (or 40 kilograms) but in addition they also are reimbursed for sales within a month.</p> <p>Dhoochies / Gawalas Offer the following incentives:</p> <ul style="list-style-type: none"> <li>• Cash Advances up to Rs. 30,000</li> <li>• Input Supplies on Credit</li> <li>• Social Bondage / Long term Relationship</li> <li>• Cultural Acceptance / Soft Corner</li> <li>• No quality check at time of milk purchase</li> <li>• Gifts – Clothes / Vegetables</li> <li>• Grocery on credit</li> <li>• Backward Integration :Animals on Sharing</li> </ul>	Only 3-4% milk is Processed. Loans from bank are available at <b>15-22%</b> . Alternately, milk processors offer various incentives i.e. timely & reliable payments, farm inputs on credit, training on good animal husbandry practices, and practical demonstrations to farmers at farm gate, extension services with reference to supplying preventative medications and vaccinations, establishment of VMC where no cold chain is present, delivery of inputs supplies at subsidized rates

	basis <ul style="list-style-type: none"> <li>• Provision of feed concentrate linked to milk sales</li> <li>• Mobile cards / easy load</li> </ul>	(concentrates, veterinary medicines, and other concentrates). Charges for in-put supplies are deducted from future milk payments within periods of <b>one week up to a month.</b>
<b>Fixed Assets (including animal sheds, plant &amp; property)</b>	No informal sources of finance available for fixed assets since this area requires long term commitments with cash flows spread over at least 2-3 years. The financing needs run into billions of rupees and could not be determined from public or industry sources. No livestock insurance exists.	Term loan available from Banks. Commercial Banks do provide loans for cold chain & establishment of buildings and commercial property. Interest rates vary between 15-22% for banks.
<b>Primary Production</b>	No informal sources of finance available for fixed assets since this area requires long term commitments with cash flows spread over at least 2-3 years. The financing needs run into billions of rupees and could not be determined from public or industry sources.	No livestock insurance exists.

**SOURCE:** INTERVIEWS WITH VALUE CHAIN ACTORS

### Constraints in Using Existing Financing Products

Businesses prefer informal finance sources in spite of it being costlier than formal commercial bank finance for its ease of use and high level of trust developed within the sector. A major hindrance cited by many value chain actors was the tough conditionality of commercial banks coupled with the fact that a sizable number of people are also averse to interest based financing and instead would be readily amenable to sharia compliant financial products. Another reason cited was the collateral requirement before a business was considered credit worthy.

### Role of Arthis in Value Chain Finance

Arthis, beoparis are pekars remain the financiers of the value chain actors both vertically and horizontally within the value chain. However, the informal sector extends working capital and livestock financing where credit cycles varying from one week to as much as two to three months subject to trade volumes involved. Beoparis are further broken down into livestock beoparis as well as meat beoparis. There are no formal contracts signed for business transactions as relationships are based on trust. However, the informal financiers expect customers' loyalty and continued patronage i.e. continued supplies in return for all the cash and non cash services delivered (greater details on terms and conditions are given in earlier chapters dealing with value chain financing).

### Financing of Fixed Capital

Fixed capital finance within the value chain has predominantly remained the province of commercial banks since the informal sector is disinterested in financing fixed immovable property and prefers to steer clear of long term commitments required in fixed capital financing.



### **Opportunities for Value Chain Development Finance**

Following the financing needs for establishment of dairy farms, the biggest opportunities in dairy value chain finance exist in the cold chain i.e. milk chillers and milk transport vehicles fully equipped with milk tanks. Live animal beoparis, pekars, dhoochies and arthis sitting at major nodes can be a great source to route dairy value chain finance as this promises to expand finances and serve a bigger canvas of clients who are currently considered un-bankable. There is a genuine need to seriously explore instrument where these major market intermediaries can play a major role in not only boosting value chain finance to the untapped segments of the value chain constituting nearly 80% of farmers with 2-5 animals.

### **External Factors That Could Increase Lending Risk**

Floods, crop failures, extended droughts and major disease outbreaks are factors that could disrupt the smooth functioning of the markets and in the process increase risk of financing. In the summer of 2012 imports of powdered milk by big processors resulted in losses to farmers which big processors used to leverage their bargaining chip collection of raw milk. On the other hand processors cited rising cost of inputs that had jacked up price of raw milk at the farm gate.

## **Enabling Environment**

Through their extension departments, provincial government provide services where veterinary hospitals, diagnostic labs, vaccine manufacturers exist in selected areas within each district. Capacity building and farm management support is barely available to small farmers while large farmers have well trained workforce. Overall, an elaborate transport network exists in Pakistan but rural roads remain in dire need of repair and extension to bring a wider area under the distribution network. The devastating monsoon floods between 2010 and 2012 had taken a heavy toll on entire farming systems including livestock, standing crops and more importantly standing crops and feeding systems and rural road infrastructure. On the positive side the communication revolution has widened scale of availability of cellular services created an efficient communication infrastructure where a farmer has updated access latest information on prices.

In the post 18th Constitutional Amendment period livestock is now a completely devolved subject. Punjab is taking the lead in introducing necessary legislation to promote growth of the Livestock Sector. Between 16-20% farmers have their own land and the remaining 60% remain by and large un-bankable. Absence of livestock insurance puts investments at high risk as during transportation animals prone to high accidental risks. The Quarantine Department of the Federal Ministry of Food Security & Research provides certification for imports and exports.

Notable government organizations comprise National Agriculture Research Council (NARC), Pakistan Standards and Quality Control Authority (PSQCA), University of Veterinary & Animal Science Lahore and Faisalabad Agriculture University. It also has Buffalo Research Institute at Bahawalnagar and Fodder Research Institutes at Sargodha besides from many other supportive public institutions. The massive monsoon floods between July 2010-2012 had had a devastating effect on the farming systems in Sindh and Punjab where broken embankments inundated entire districts and in the process lead to massive losses to crops, livestock and farm to market road infrastructure.

The biggest challenge in financing of dairy farms is the absence of land by 80% livestock farmers and with no collateral they cannot avail formal banking finance and are left to depend upon the informal sources. In addition to the provincial livestock departments in all four provinces, the Punjab Livestock and Dairy Development Board (PLDDB) and Federal Ministry of Food Security & Research are key regulatory bodies at the government level.

According to the Punjab Agriculture and Meat Company (PAMCO) an estimated 8 million calves die or are slaughtered each year because the farmer prefer to retain fresh milk rather than feeding the calves. This mass slaughter or mortality of the calf translates into massive losses to the national economy given the fact that an average farmer earns 40% of income from livestock which also accounts for 11% of the national GDP.

## Services

**Breeding Services:** Pakistan has a few recognized dairy breeds particularly, Neeli Ravi and Kundi buffaloes besides Sahiwal, Red Sindhi and a few other names. There are very few dedicated breeding facilities in the public sector while progressive farmers keep breeding bulls within their farms and at times extend the facility to local farmers at charges. Breeding facilities including AI services are commonplace for cows. While owing to the silent heat issue of buffaloes providing these services requires lots of expertise. Besides, male buffaloes are slaughtered within weeks of their birth thereby creating an unhealthy balance of males required to maintain desired herd sizes. The government makes available breeding bulls to farmers via its line extension departments. However, huge gaps exist between demand and supply.

**Provincial Government Livestock Extension Services:** Provincial Livestock Extension Departments provide preventive and curative extension services to farmers at the Tehsil and Union Council levels. However the outreach and quality of the government extension arms is limited and doesn't encompass the whole ambit of requirements within the livestock sector. Government departments also provide AI services but again the outreach is limited creating wide gaps in service provision that is filled by the private sector. The Punjab Livestock & Dairy Development Board (PLDDB) is at the forefront followed by Sindh while the KPK and Baluchistan remain far behind. Private practitioners play a key role in meeting the overall needs of the sector as at times they provide services at doorsteps.

**Marketing of Products:** Milk marketing is dominated by the informal sector comprising primarily of pekars, gawalas and contractors who represent 10-15% of the total milk produced. An estimated 60-65% of milk is consumed at farmers home while nearly 20% of milk produced is wasted owing to absence of cold chain facilities. The share of each marketing channel i.e. informal sector, wastages and farmers consuming milk fluctuates during flush and lean seasons. While the formal sector accounting for around 4% of total milk produced is dominated by 8-10 leading processing with Engro and Nestle each being market leaders of processed milk followed by others.

**Financial Services:** The informal sector accounts for the major portion of finances within the livestock sector. Zarai Tariqati Bank Limited (ZTBL) is at the forefront followed by a few notable banks in extending financial services to the farming sector to big landowners and well connected people.

**Business Development Services:** A few private firms provide such services in addition to Small & Medium Enterprise Development Authority (SMEDA).

## Conclusions and Recommendations

**Table: FINANCING NEEDS & CORRESPONDING OPPORTUNITIES IN DAIRY VALUE CHAIN**

Particulars	Need /Purpose	Type of Finance
<b>Input Supply</b>	Working Capital including credit to Large Peri- Urban & Urban Dairy Farmers	<ul style="list-style-type: none"> <li>• Overdraft</li> <li>• Revolving credit line / Running Finance / Sharia Compliant Int. Free Loans</li> <li>• Asset based finance factoring accounts receivable, inventories etc.</li> </ul>
<b>Fixed Assets</b>	Fixed Assets, including sheds, milk processing plant & property	<ul style="list-style-type: none"> <li>• Term loan</li> <li>• Livestock Insurance</li> </ul>
	Other Assets including dairy animals, credit line to value chain actors	<ul style="list-style-type: none"> <li>• Revolving Credit Line for Monthly Replacement of Dairy Farm Animals</li> <li>• Running Finance</li> </ul>
<b>Primary Production</b>	Inputs / Land preparation for fodder  (Financing of dedicated breeding farms for improved genetics & high yielding progenies)	<ul style="list-style-type: none"> <li>• Short term Dairy Farming Loans / Running Finance</li> <li>• Revolving Credit Line / Sharia Compliant Interest Free Loans</li> <li>• Supplier Credit (from input industry)</li> <li>• Advance Payments (from processors / aggregators)</li> <li>• Livestock Insurance</li> </ul>
	Operating Expenses	<ul style="list-style-type: none"> <li>• Short Term Farm Production Loans /Running Finance</li> <li>• Revolving Credit Line / Sharia Compliant Interest Free Loans</li> <li>• Supplier Credit</li> <li>• Advance Payments</li> </ul>
	Farm Equipment: Tractors, grass choppers, feed grinders, water trough, feed trough, tube well	<ul style="list-style-type: none"> <li>• Term loan</li> <li>• Vehicle &amp; Asset Finance, (leasing, rentals &amp; installment sales)</li> </ul>
<b>Milk Aggregation &amp; Processing</b>	Working Capital (including advance payments to suppliers)	<ul style="list-style-type: none"> <li>• Overdraft</li> <li>• Revolving Credit Line / Sharia Compliant Interest Free Loans</li> <li>• Assets Based Finance- factoring accounts receivables / inventories etc.</li> </ul>
	Fixed Assets (plant, property)	<ul style="list-style-type: none"> <li>• Assets finance /</li> <li>• Commercial Property Finance (MCCs, warehouse, factories, etc).</li> </ul>
	Equipment	<ul style="list-style-type: none"> <li>• Machinery / Capital Equipment</li> </ul>
<b>Wholesale Retailing &amp; Marketing</b>	Working Capital	<ul style="list-style-type: none"> <li>• Overdraft / Financing of Milk Chillers &amp; Storage Tanks Revolving Credit Line / Sharia Compliant Interest Free Loans for Livestock Purchases besides Offering Livestock Insurance</li> </ul>
	Fixed Assets including wholesale warehouses , transport vehicles i.e. mini vans and trucks)	<ul style="list-style-type: none"> <li>• Term loan</li> <li>• Commercial Property Finance</li> <li>• Vehicles and Asset Finance</li> </ul>

<b>Cold Chain</b>	Working Capital: Milk Chillers, Storage Facilities, Mini Vans, Transport Trucks	<ul style="list-style-type: none"> <li>• Overdraft</li> <li>• Revolving Credit Line / Sharia Compliant Interest Free Loans Asset based finance (factoring accounts receivable, inventories etc)</li> </ul>
	Fixed Assets	<ul style="list-style-type: none"> <li>• Commercial Property Loan / Refrigerated Tankers &amp; Mini Van Transport</li> <li>• Term Loan</li> </ul>
<b>Trading</b>	Working Capital	<ul style="list-style-type: none"> <li>• Overdraft</li> <li>• Revolving Credit Line / Running Finance / Working Capital</li> </ul>

### Recommendations for effective contract farming (out-grower) financing schemes

Financing of dairy farms having varying animal sizes of between 50-100 and 201 -500 animals in rural areas where farmers have sufficient land to grow their own fodder (since the feed component accounts for close to 70% of dairy farming costs). While financing of bigger farms having 500-1000 animals in peri-urban areas.

There is a genuine need for financing of cold chain (i.e. milk chillers and refrigerated tankers for transportation of fresh milk besides bigger storage facilities to mitigate the 9.6 billion litres of milk wastages that is the cause of lost retail value estimated at between 169 to 172 billion rupees in 2012 alone!<sup>11</sup>

With innovative approaches financial instruments need to be developed to route finances to 80% of milk producers via the middlemen (bankers of the small holders i.e. pekars, beoparis, dhoochies and arthis). Through the middlemen 80% of producers (small holders) can be reached since (small holders possess 2-5 animals and in turn account for 80% of milk production. The stakes of indefinitely ignoring the majority of producers will reduce Pakistan's competitive position at the global stage.

Neighbouring India through its Dairy Cooperatives has quite successfully used intermediaries (aggregators i.e. arthis and other middlemen) to extend their much needed input supply and other services. It is a fact that for the foreseeable future the formal sector won't grow beyond the current 4% to reach 10%. Therefore policy makers and the State Bank of Pakistan need to devise ways of reaching the 80% producers via the middlemen to ensure greater efficiencies and continued economic growth.

Development of Sharia compliant financial instruments for the dairy value chain needs to be seriously considered since a vast majority of value chain actors approached showed preference for Islamic financial products.

<sup>11</sup> Published in The Express Tribune, August 5<sup>th</sup>, 2012.

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Logistics	9.	Super Peshawar Karachi Goods Transport Company	Riaz Ali Shah	Owner	National Highway Opposit Magsi Kanta Babar Lo More Sukkhur	0243-558367 0300-373-3240	
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Aggregator	18.	Rozaana Mal Mandi Mowaishian	Saeed Khan / Asghar Khan	Proprietor	Near GT Road Overhead Bridge, Hidayat Khan Ghari Ring Road Opposite PSO Petrol Pump Peshawar	091-2263199 0321-900-1795 0321-900-1795 0321-904-1095	
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