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10 July 2011

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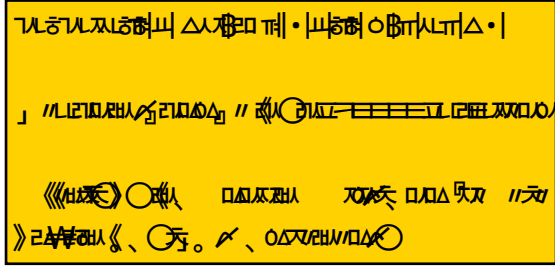
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SUSTAINMED WORKING PAPER

ON

DAIRY MARKETING SYSTEM PERFORMANCE IN EGYPT

NOEMBER, 2011

By

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DAIRY MARKETING SYSTEM PERFORMANCE IN EGYPT

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Introductory Background

The local supply of milk in Egypt represents quantities available for domestic consumption, and consists of local production and dairy imports minus exports, plus the change in inventory, which is the difference between stock in the previous year and in the this year. The dairy products include a pattern of several products for consumption, which requires analysis of the supply as raw milk equivalent. The most difficult component of the domestic supply to estimate is the production as it originates from several types of livestock, which are cattle, Buffalo, sheep and goats. Each type has its own Specific technical variables (productive and reproductive traits). Therefore, the study allocated a section for estimating production. The traditional small farmers are still the main source of milk suppliers in Egyptian market, as well as the main breeders. The other two production systems are the stall herds within the surrounding belt of major or big cities, compose mainly of milking Buffalo, and the limited number of specialized commercial farms that bred Dairy Buffalo, foreign breeds cattle, particularly "Holstein Breed" or both breeds, (Fitch and Soliman, 1983)

Methodology and Data Base

The study followed the commodity approach of marketing studies. It spreads the analysis and appraisal of the dairy marketing system to cover the marketing functions, marketing institutions, and the value chain of the marketing stages (Soliman, 2008). Therefore, this approach serves also the basic requirements of the value chain analysis (VCA).

The data sources were mainly from sample surveys that covered the production systems, the wholesale stage, and the processing stage of the marketing systems. Within these stages the village market behavior was specified as a distinguished system from the urban system. Also the processing stage included large scale modern companies as well as the small scale municipal dairy plants. The production stage included large specialized farms and small traditional farms. The later is the main breeders of cattle and the main producers of milk in Egypt (Soliman and Adul zaher, 1984). The surveys were conducted in the summer of 2011 to cover the agricultural year 2010/ 2011.

The Study conducted a sample field survey of a size 50 municipal dairy plants in five provinces (Sharkia, Dakahlia, Egypt, Giza, and Qaliubiya), as the common type of dairy plants in Egypt.

The study conducted a a purposive sample survey of 4 modern companies of large dairy plants. Two of them in rural areas established at late sixties of the last century, with an area of 1000 and 1200 square meters, respectively. The other two are located in urban areas, established in 1998 and 2000. Each one covers an area of approximately 5000 square meters.

In addition to the primary data sources from the sample surveys, the secondary data from FAO, Ministries of Agriculture and trade of Egypt were utilized. The tertiary sources from the review of literature were a useful source for policy issues.

The value chain from production stage up to consumers outlets, crossing collection stage, wholesale stage, processing stage were presented via the consumer's dollar spread. The income statements of the producer and each marketing dealer were, also, applied, in addition to the analysis of the processing costs of production.

The Value Chain

Michael Porter introduces the value chain as a tool for developing a competitive advantage. The analysis would include the following interrelationships (Porter, 1998a)

- (a) Sharing of value chain activities among business units,
- (b) Using value chain analysis to develop low-cost and differentiation strategies,
- (c) Interrelationships between value chains of different industry segments,
- (d) Applying the value chain to understand the role of technology in competitive advantage,

He concluded by considering the implications for offensive and defensive competitive strategy, including how to identify vulnerabilities and initiate an attack on the industry leader. To analyze the specific activities through which firms can create a competitive advantage, it is useful to model the firm as a chain of value-creating activities. Michael Porter identified a set of interrelated generic activities common to a wide range of firms. The resulting model is known as the **value chain** and is depicted below:

Primary Value Chain Activities



The goal of these activities is to create value that exceeds the cost of providing the product or service, thus generating a profit margin.

Where:

- **Inbound logistics** include the receiving, warehousing, and inventory control of input materials.
- **Operations** are the value-creating activities that transform the inputs into the final product.
- **Outbound logistics** are the activities required to get the finished product to the customer, including warehousing, order fulfillment, etc.
- **Marketing & Sales** are those activities associated with getting buyers to purchase the product, including channel selection, advertising, pricing, etc.
- **Service** activities are those that maintain and enhance the product's value including customer support, repair services, etc.

Any or all of these primary activities may be vital in developing a competitive advantage. For example, logistics activities are critical for a provider of distribution services, and service activities may be the key focus for a firm offering on-site maintenance contracts for office equipment. These five categories are generic and portrayed here in a general manner. Each generic activity includes specific activities that vary by industry.

Support Activities

The primary value chain activities described above are facilitated by support activities. Support activities often are viewed as "overhead", but some firms successfully have used them to develop a competitive advantage, for example, to develop a cost advantage through innovative management of

information systems. There are the following four generic categories of support activities. However, the details of which are industry-specific.

Procurement

Procurement is the function of purchasing the raw materials and other inputs used in the value-creating activities.

Technology Development

Technology development includes research and development, process automation, and other technology development used to support the value-chain activities.

Human Resource Management

The human resource management represent the activities associated with recruiting, development, and compensation of employees.

Firm Infrastructure

The firm infrastructure includes activities such as finance, legal, quality management, etc.

Value Chain Analysis

In order to understand better the activities leading to a competitive advantage, one can begin with the generic value chain and then identify the relevant firm-specific activities. Process flows can be mapped, and these flows used to isolate the individual value-creating activities. Once the discrete activities are defined, linkages between activities should be identified. A linkage exists if the performance or cost of one activity affects that of another. Competitive advantage may be obtained by optimizing and coordinating linked activities. The value chain also is useful in outsourcing decisions. Understanding the linkages between activities can lead to more optimal make-or-buy decisions that can result in either a cost advantage or a differentiation advantage (Porter, 1998b).

The Value System

The firm's value chain links to the value chains of upstream suppliers and downstream buyers, the result is a larger stream of activities known as the *value system*. The development of a competitive advantage depends not only on the firm-specific value chain, but also on the value system of which the firm is a part, (Figure 1)

Estimation of Milk production in Egypt

There are several official organizations to assess the dairy production in Egypt, including the Central Agency for public mobilization and statistics, Economic Affairs and statistics of the Ministry of agriculture, livestock production sector of the Ministry of agriculture, Food and Agriculture Organization of the United Nations (FAO). Examining the estimates of these players proved differences in the estimated amount of milk, which varies considerably, and this is due to different bases of assessment, (Soliman and Abdul Aziz, 1984). This study selected the closest estimates to the logical sector's productive relations concluded from previous studies. Table 1, shows that the main producer animals (Cattle and Buffalo). The total stock is shared equally the stock size. However, buffalo's productive and reproductive traits are higher than cattle, but the 13% of exotic cattle breeds and crossbred cattle. Even though, there is a large gap between the Egyptian cattle and buffalo productivity in comparison with the developed countries, (Soliman, 2008). This conclusion implies the potential opportunity to expand milk production in Egypt.

Dairy Foreign Trade Balance

Table (Table 2), shows the trade balance of dairy products in Egypt as liquid milk equivalent in the year 2009, where it is clear that the value of exports of dairy products surpassed the imports value, as the exports value had covered only 110% of the imports. Even though there was a physical trade deficit of milk, around 121 thousand tons. The average imports price per ton was less than the average exports price of milk equivalent. It implies tentatively that the terms of dairy foreign trade was for Egypt.

Noteworthy, there is an increasing demand for Egyptian white cheese in Arab countries markets (Saudi Arabia, Bahrain, Qatar, Iraq, Kuwait, UAE, Syria, Lebanon) as well as in some European markets (Italy, Austria, Hungary, Norway). The demand for liquid milk or the mixtures with fruit flavors are high in Libya. The American markets, usually imports a special kind of cheese (Village soured Salty cheese). It is called domestically (Old Mish Cheese).

Dairy supply structure

Table 3, and Figure 2 Show the dairy supply structure¹ in Egypt that includes all outlets a disposal of the supply. The study focused in the analysis of the supply structure of the share of each production system and the components of the marketable surplus in the following subsections.

Dairy production system in Egypt

Table 3 shows that the traditional sector is the main system of milk production in Egypt, and consists of traditional private small farms of mixed activities (crops and livestock), where cattle and Buffalo carrying capacity on clover area limits the livestock holding size (Sharaf, Soliman and Seleem, 1987) Such system contributes around 72% of total milk produced in Egypt. It is characterized by high home consumption of farm produce, where the total home consumption represented around 38% of the total supply. The market surplus for sale is in forms of liquid milk and fatless cheese "qaraish cheese", and butter. Many previous studies showed that the small farm provides the least cost system to produce 1-kg of adjusted milk (4% fat). Under this system, the rural women play a key role in the human work for livestock services and care, especially milking and on farm milk processing operations, (Soliman, 2004). Previous studies also showed that availability of marketing accessibility and price incentives, lead to the larger dairy animals holding with higher productivity on the same farm size, (Soliman, 1985b).

The estimate from the data of the Questionnaire forms of the field sample survey showed that the average number of milking cows is 1.3 head, and about 48% of households holding dairy heads depend mainly in their daily living expenses on the income generated from the sale of milk products surplus.

Milk Marketable Surplus of Traditional Farm System

Milk production season is centralized in winter and spring (65-75% of total annual production), where the green fodder (clover) is available, i.e. during the period (October-May), the proportion of Buffalo milk represents 55%, whereas cow's milk represents approximately 45%. Farm household consumes about 30 percent of home produced milk as home processed dairy products and approximately 23% of raw milk from farm production. The volume sold is approximately 27 percent as raw milk, and about 20% is sold as home

¹ The waste and processed quantities are derived from the sample survey data conducted by the authors in this study which are presented in the following sections.

processed dairy products, so the surplus catalog represents about 47% of the production of the village, which is about 1.5 tons.

As home processed dairy products are sold domestically within the village market, the surplus proportion devoted to urban market is called the effective marketable surplus, which as shown above around 27% of the production of the sample survey villages. Such proportion for urban market is called effective because it affects directly the mechanism of the market forces (supply and demand).

The questionnaire data revealed that the majority of farm households holding milking animals sell raw milk (81% of the households), but there is significant variation in terms of quantity sold. There are about 60% of households with holdings of dairy animals sell more than 40% of their production as raw milk and approximately 25% of the households sell 32 percent of their production as raw milk, and approximately 15% of the households sell around 20 percent of their production as raw milk. There are several socio-economic factors control the proportion of domestic consumption and processing of milk produced on the farm and hence reduces the proportion of surplus proportion of raw milk for sale.

Among the socio-economic major factors is the household size, which leads to increased household consumption or increased household food awareness towards dairy products, the social shame stems from the inherited traditions that considers the sale of liquid milk is flawed. In Upper southern regions of the Nile Basin, the rural communities consider milk a food for children not for adult men. They focus their investments for livestock development on farm towards fattening of animals and more meat production.

In addition, the large size farm holding with high standard of living liberates the household from being needy of the revenue from selling raw milk. Also, the existence of women of the household members with experts in home processing of dairy products of good quality orients the decision of the farmers to sell dairy products at better prices and higher value added than raw milk, particularly if the quality of the milk product is high, i.e. higher total solids with higher fat percent.

Dairy marketing system in the Egyptian village

There are four marketing channels for raw milk production of the village, (Figure 2 and Figure 3):

- (1) First from farms to the consumer direct,
- (2) From the farms, directly, to the dairy plant, if it is within the same village,
- (3) From the farms to an intermediary trader (merchant broker), who in turn delivers milk to the dairy processing plant.
- (4) The farmers sell the milk to the collection point in the village, and then the wholesaler transports it to a large Dairy plants or retail stores.

The broker dealer pattern appears in the areas far or remote from major cities and lack of transportation means and the dairy plants are located within easy reach site at short time with a light transport means, such as small pickup.

Dairy Collection Points

The pattern of dairy collection points has become common in the villages since the mid-1990s of the last century. There may be more than one collection point in one village, each point belongs to a merchant broker, who works for a wholesaler that in turn deals with several collection points to collect milk from several villages. The intermediary agent gets a charge per kg of milk supplied to the wholesale, plus an incentive for each additional supply above the quantity agreed upon. There are other dividends accrue in favor of the collection

point stems from weight differences less than a quarter kilogram. It is not counted for farms, but counted for the mediator. The merchant broker also achieves a higher return in the event of resale proportion of the collected milk to the consumers directly.

There are quite a few rural women, often from the same village manages the milk collection point. The obligations of the collection point as a mediator are limited within receiving milk, weighs the delivered quantities and registry of each farmer revenue, and pouring milk in the containers. Sometimes simple tests are conducted such as measuring the fat content or detecting the type of fraud made with milk, if any, and then deliver the quantities collected to wholesaler, whom this mediator works for, and repaying the value of milk to the clients (farmers).

Some favorite issues from the farmers' point of view characterize the collection points system. These issues are the flexibility during transaction with respect to delivered milk specifications, particularly, the fat percent, the near location of the collection point to most of the production sites (farms). Thus such system provides a higher feasible option to market the farm production than home processing. The clients get their milk revenue weekly through either coupons or registration in book accredited by farmers and mediator. Buffalo milk price is higher than cow's milk, not only because of the consumer's preference, but also because of it is also due to higher total solids of buffalo milk of higher products yield at processing stage. Usually, there is additional bonus for higher fat percent above the basic content (7% for buffalo milk and 4% for cow milk). The bonus is calculated at a rate per additional 0.5% of fat above the basic content. The price of milk in winter is always higher than its level in summer.

Wholesale Stage of Milk Marketing System

The wholesaler usually collects milk from the village collection points, load it and transport it to the traditional small dairy plants, retailers or candy processing plants, located either in big cities or towns. The wholesale costs include transportation expenses, depreciation of used tools, and the charges paid for brokerage and management of collection points. Usually, the wholesaler uses pickups to transport the raw milk to the processing plants, and he keeps milk in metallic containers without cooling exposing milk to the probability of spoilage during transportation due to absence of refrigerant. Therefore, he is keen to deliver his supply to clients within Contour boundaries of diameters not more than 50 kilometers.

Wholesale price varies according to the place of delivery of milk. The higher the price level, the longer is the distance between the collection points and place of delivery. Numerous wholesale traders have dairy processing plants or even retail shops, and in this case they are able to increase the marketing efficiency by recognition of the vertical integration between the marketing stages and then enjoy higher profit margin.

Farmer transport to a Company or Retailers

This is not a common outlet. However some large modern farms prefer delivering their milk supply by themselves to either retailers in large cities markets rather than to deliver it to a large modern dairy companies, where, they bare costs of transportation, particularly that, these farms are large enough to possess their own trucks.

Rural Dairy Home Processing

The interviewers of the questionnaire cited that each kilogram of processed milk gives between 4%-7% butter and around 18%-20% fatless (qarish) cheese, depending on the type of milk, i.e. from cows or buffaloes. Figure 4, shows the proportional yield of dairy products processed from farm production at home

Obstacles Facing Village Milk Marketing System

The study concluded from the sample survey data a series of obstacles and problems, which face the dairy marketing system at village level. Such obstacles shrink the marketing efficiency and limit the opportunity to achieve milk supply with high specification and decrease the proportion of the marketable surplus and block the transmission of the market incentives from reaching the farmers, which discourage their attitudes towards increasing the production of raw milk by raising higher yield animals or holding more milking heads. The most important obstacles abstracted from the survey were:

(a) Inability to provide proper feeding plan to the animals because of the high prices of either the green fodders or concentrate feed mixes with low farmers' incomes, prompting traditional farmers to feed lower quality materials, in some cases they provide grass vegetation or crop residues on fields, especially in the summer season where fodders are scarce. Such circumstances, lead to the leakage of chemicals and pesticides residuals in the grasses to the dairy cows, consequently, Thereof, during the summer and fall seasons, most likely, there is a reduction in production and exposure of animals to slimness.

(b) The high prices of high yield dairy breeds and expected high operating costs if raised on farm constrain the farmers from holding them, despite their conviction that such breeds increase the milk production.

(c) The lack of optimum technical specifications and appropriate health conditions for the milking animals with smallholdings limit the blockbuster of the large dairy plants from receiving the supply of small farmers at suitable price.

(d) The low quantities of milk supplied separately by individual small farmers to the few available collection points or traders generates a case of an oligopoly behavior which reduces supply price received by the farmers,

(e) Following Primitive methods in processing of cheese such as using inappropriate tools and pottery vessels with lengthening the filtering period lead to low yield of cheese and then making less value-added. The result is limited demand for the home processed dairy products. In addition, due to relatively low yield, low total solids and yellowish color of cow milk produced, the farmers prefer to sell it as liquid milk or mix it with buffalo milk before processing as its price is not high,

(f) The progressive farmers face difficulty to receive suitable high price for their high quality raw milk as the mediator, often provides a uniform price for all farmers, which penalized high quality dairy producers,

(g) Delay of the collection point (or the mediator) in paying to the farmers their receivables of delivered milk, which may surpasses more than a week,

(h) There is an income foregone out of the milk revenue. This stems from uncounted value of the quarter of kilogram of milk for the farmer receivables. Such value is added to the broker's revenue,

(i) Lack of adequate equipment in the collection points such as filtering equipment, test equipments of coagulating by boiling, fat content, or sampling bottles or preservatives.

Milk Marketing System of Commercial Barns (Stall) Flocks

Such system concerns with satisfying the consumers preferences in large cities. Such consumers are willing to pay higher price than rural towns. They prefer white buffalo fresh milk with high fat content. Therefore, these farms raise milking buffaloes of high yield. They sell dairy animals when they dry and replace them with new high yield buffaloes. They are centralized within the belt surrounding the cities at distance ranges between 5 to 20

kilometers from the market. With the speed rise in milk price in recent years, there was a spread in the dairy farms that supply consumers in Cairo to a distance reaches 80 km from Cairo market, specifically, in the governorates of Qaliubiya, Sharkia and Al-Tal Al-Kabeer district in Ismailia governorate.

Due to high milk price the far relatively farms from the cities have been able to cover the cost of establishing cooling basins (4°C) in their farms to keep the evening milk yield fresh till the next day for distribution. As well as they hold pickups to transport their milk in metallic containers for longer distance. They, actually, rely upon the natural immunity of milk, particularly buffalo milk, that resists for 6 hours in clean containers covered with wetted cloth.

There is a strong eagerness of this system's producers to retain high fat content of the milk supply. Therefore, they exaggerate feeding regime to their milking buffaloes of high nutritional value, such as grains, broken legumes seeds, broken rice grains purchased from the rice mills and even bud beer and subsidized dry bread loafs. Some of them provide municipal grew sugar cane before maturity, which grow in some areas of the Nile Delta regions. Such biased feeding policy led to an average nutrients level urpasses double the recommended animal rations content, leading to high costs of milk production. Even though, high profit is retains due to the increasing high fresh buffalo milk price in the cities markets. Usually, the consumers boil the purchased milk and deliver it to their house refrigerators. However, they lose some of the milk nutrients by boiling. The buffalo Stalls milk production system is diminishing due to the development of urban consumer awareness towards healthy safe food supply.

Milk Marketing System of Specialized Commercial Farms

Specialized commercial farms are characterized by large farm size holding, often with one type of dairy breed either exotic cattle breed, crossbred cattle or buffalo. Field interview with several managers of this system were made in the villages of "Alsanta district" of Gharbia Province and "kaliob district" of Qaliubiya province. They identified three outlets for milk marketing of this system. The manager chooses either one of them according to which realizes the best return or collects milk at farm gate rather than the nearest location.

Milk marketing of specialized dairy farms achieve distinctive advantage compared with the traditional system, where they receive priority from the large milk collection centers or the large dairy plants because they are specialized in one type of milk and they provide a constant and stable large volume of milk. Therefore, they get better price along with securing price bonus for providing good quality of milk. These three available outlets are:

A collection point belongs to a large modern dairy plant

The agreement between the farm manager and the dairy company to deliver the milk supply at the expense of the manger to collection centers belong to this company in the surrounding towns. The transporting charge is per 1-kg of milk. It ranges between 0.5 to 1 cents per 1-kg of milk. Usually, the collection center, serving several collection points is located within contours' circle with a diameter of 30-50 km. The center has the logistics of longer time storage and makes some tests for assuring that the supply passes a satisfactory level of the milk safety and quality specifications.

The basic milk price is for fat content 3%. The bonus is for each additional 1% fat either cow milk or buffalo milk. The company pays 2-3 cents for an additional 1% fat above 3%. This rule secures fairness in pricing of delivered milk supply.

However, this system still has some disadvantage. The raw milk is still transferred from the production site up to the dairy company by the same primitive methods used within

the traditional village system, i.e. by pickups in metallic containers of 50-100 Kg per each without any kind of refrigeration. Surprisingly, transporting from collection centers to the modern processing plant company is by modern methods using refrigerated trucks.

A Wholesaler at the Farm Gate

The farm gate price of the milk supply increases as the distance between the farm and the main consumption market (Cairo) is less. The price bonus for fat content is also considered in this outlet type.

Commercial Dairy Processing Industry in Egypt

The commercial dairy industry in Egypt can be classified into two systems. These are the Modern large Scale system and the municipal small-scale system.

Processing techniques

They include three packages. The traditional which is followed by 64% of the sample's small scale dairy plants. The modern technique which is applied by either the modern large-scale dairy plants or about 15% of the sample's small-scale dairy plants, and the worst method which is called, commercially, the Washing machine technique, followed by nearly 23% of the sample's small-scale municipal dairy plants. Even though, the legislation imposes the pasteurization of milk before processing, only modern large-scale dairy plants and 27% of the municipal dairy plants follow the law instructions. The rest heats milk only for processing. Figure 5 shows the technical coefficients and the yield of dairy products of the commercial processing system. It is relatively much higher if compared with the small farm home processing yield (Figure 4).

Types of packaging

There are five types of packaging the dairy products used by the modern dairy plants. These are:

- (a) The Multi-layered cardboard packaging (Tetra Pack) it is suitable for soft cheese ((vita, Istanbul, and fridge white cheese). It is automated packing with Special Court lock. The raw material is imported from Turkey and Saudi Arabia. There is a trend to establish a new factory in Egypt. Package sizes are (250 grams), (500 grams) and (1 kg). The high cost of packaging is one of the important problems that constrains to the growth of the industry. This cost item may exceed the content of the package,
- (b) Stainless tin containers or painted from the inside with a layer of tin. It is suitable for soft cheese, which is stored in a salt solution but can't find competitiveness in the world market, except only the high request of the Egyptian community in the Arab Gulf countries. The length of storage may lead to varying situations, depending upon the resistance of the tin to rust. The difficulty is that the degree of rust cannot be detected at purchase. Thereof, it is difficult to compensate the consumer. However, the its low cost advantage makes the demand by low-income levels high,
- (c) The plastic bottles of various sizes from 1.5 to 12 kg, has begun gradually to replace tin cans. This package type mobilize the white cheese in saline solution has lead to shrink the loss to less than 1%. However, it still has caveats that the natural storage of the plastic package lasts only for a short time,
- (d) The packaging of Dry cheese or half dry like Turkey or Flemish cheese in packages of cardboard according to the type and size of the product after painted with a waxy layer for conservation against fungi,

- (e) Yogurt containers for large size (requirements for restaurants and hotels) with a weight of 4 kg

The Modern Large scale (Firms) Companies

Dairy industry in Egypt has evolved as a commercial scale since the establishment of the first cheese-processing plant in Damietta governorate in 1920. The first pasteurized milk company was in 1945 in Alexandria. The first milk processing plant for dry (powder) milk was in Sakha town of Kafr El-Sheikh province in 1956. It was a public sector company called Egypt dairy company and expanded to affiliate with nine plants in several provinces. After application of the economic openness policy and encouraging domestic private and foreign investments since 1974, there was a great expansion in the establishment of new firms, and the evolution of the number of such companies with developed modern scientific processing methods of advanced technology associated with development of new methods of packaging. Whereas, the number of the dairy plants registered in the records of the food-processing chamber was around 100 companies in 1998, it reached approximately more than 250 in recent years. The development was not only in the number of the registered companies under the food industry Chamber, but also there was a significant increase in production of safe dairy products in modern packaging containers and wide diversity in products types.

Currently, the wide range of diversified dairy products include pasteurized milk and UHT milk packages, in addition to traditional products of all the types of cheese, butter and ghee, yoghurt, ice cream, and food products mixed with milk (chocolate, candy and biscuits). Such expansion encouraged establishment of feeding industries such as warehouses on commercial base and firms to operate specialized transportation trucks for dairy products, and other companies for packing of powdered milk.

Markets of Raw milk for processing:

The large-scale dairy plants, usually, use raw milk as a mixture of cow and buffalo milk to utilize the higher total solids of buffalo milk than cow milk and in the same time getting benefit from less price of cow milk than buffalo milk. Skimmed powder milk is also used to compensate the deficit in fresh domestic milk supply. The type of the milk used is tied to the type of product. The full cream cheese is processed from cow milk. The Istanbul white cheese is from buffalo milk or a mixture of cow and buffalo milk. The vita cheese is the cheapest safe white cheese type and processed from either cow milk or cow milk and powder skimmed milk. The Dry cheese products are from cow milk. Generally, the skimmed milk is used to raise the content of the total non-fat solids (TNFS) of the milk mixture. The fatless (qarish) cheese is processed from a mixture of cow and buffalo milk after taking out the cream for butter. When the dairy product requires raising the fat content, natural fat or vegetable oils are added. Actually, in the market it is not easy to differentiate between dairy products by raw material source, as mixtures are often used. Product price is the only factor that orients the consumer preference and demand. Such issue requires further investigations

The raw milk is purchased from commercial specialized dairy farms or from collection points scattered in some administrative centers. The powdered milk, the materials for processing the cooked, vita and cheddar cheese and additives to adjust either the pH level, cheese, strength the cheese form or flavoring the taste are imported mainly from Australia, Ukraine, and Poland.

Transportation:

The transport of milk and processed dairy products of the large companies is usually done by modern trucks equipped with refrigeration units, and waste during

transportation is virtually non-existent unless there was a kind of shacking during the trip due to poor roads that may lead to influence product form.

Trading of Dairy Products

10% of the daily production is directed for export, while the rest (about 90%) is allocated for local market. The sale is either in cash or as a long-term credit which is done by nearly 23% of the sample's dairy plants, depending on the type of deal or contract between the company and customers, whether domestic or foreign. Often there is a down payment as insurance paid to the supply company (25-35 thousand US\$) and the rest of payments is a time-schedule. In the case of inability to pay, the insurance amount is debited. There are multiple sale outlets:

(1) Outlets at the headquarters of the company's plants, which are selling at 3-4% lower price to the public,

(2) Branches, Dealers, and Agents for distribution, nationwide,

(3) International exhibitions markets,

(4) Noteworthy, there is an increasing demand for Egyptian white cheese in Arab countries markets (Saudi Arabia, Bahrain, Qatar, Iraq, Kuwait, UAE, Syria, Lebanon) as well as in some European markets (Italy, Austria, Hungary, Norway). The demand for liquid milk or the mixtures with fruit flavors are high in Libya. The American markets, usually imports a special kind of cheese (Village soured Salty cheese). It is called domestically (Old Mish Cheese)

The Small Scale Municipal Dairy Plants

The number of municipal dairy plants was about 600 plants in 1990 increased to around 717 plants in recent years, in addition to a quite number of unlicensed plants. The geographical distribution shows that 38% are in Dakahleya province, 15% in Fayoum province, 13% in Damietta province, 10.7% in Menoufiya province, 8% in Gharbia province, and the rest in Sharkia, Cairo, Giza and Kafr El-Sheikh, provinces. Damietta serves as the focal of dairy industry in Egypt because of widespread fame in the production of cheese, because of the availability of skilled labor and long experience, Damietta governorate produces about 25 percent of total production of white cheese and Turkey Cheese, nationwide (Soliman, 1985a). The historical fame of Damietta in dairy products gives the province name to the Egyptian cheese as a brand name. The municipal plants vary in terms of space and components and laboratory capacity. Small dairy municipal plants; capacity ranges between 100 kg/day to 6 tons/day of raw milk a day.

About 66% of the municipal dairy plants are in rural areas, close to the places of production of raw milk, while 34% in urbanized areas. About 10% of them were established before 1956, while approximately 27% established in the period between 1956 until 1974, with the emergence of economic liberalization policies and encourage investment increased proliferation of those municipal dairy plants, where between 1975 to 2003, approximately 53% of the plants were established, 20% of them in the 1990s.

In terms of the size of the plant, it is classified by land area into three categories. The category of small plants less than 100 m², which represents about 8% of the number of plants, the second category is medium-sized plants greater than 100 m² up to 300 m² and amounted to about 70% of the plants, large plants with more than 300 m², representing 22% of the total numbers in Egypt.

Wholesale Market of Dairy Products

There is a main wholesale market in downtown of Cairo, where two-thirds of its supply is white cheese of all quality types and brands. It is the main outlet of the small dairy plants, which produce mainly for domestic consumption. The small processing plants deliver their products and receive a down payment of 20% of its total value agreed upon with the wholesaler. The large-scale modern dairy companies deliver 10% of their products for domestic market, either through market chain large super markets or in their own exhibitions. If they deliver some of their output to the main wholesale market in Cairo, they transport of such quota voluntary at their expenses.

Retail Market of Dairy Products

The Stall (barn) dairy buffalo flocks around big cities deliver their daily supply fresh to consumers at their residence place¹. The share of this source is less than 15% of the total supply. The consumer used to boil such fresh milk. It is preferable as it is white buffalo milk of 7-9% fat. Modern large scale companies that provide UHT packages of fresh milk deliver their supply to large super markets and some group feeding outlets as hospitals, some private schools and restaurants. All supply of this source is around 8%. There are thousands shops of dairy products that sell milk and cheese to consumers in all cities. Most of them own or share with others small to medium size dairy farms. This last category is responsible for delivering more than 60% of urban milk supply. Noteworthy, the consumption of home produced milk and dairy products and the home produced dairy products sold in the village markets are significant sources of dairy products for rural people.

Spread of the Consumer's Dollar Along the Dairy Marketing Stages

The completion of the value chain analysis is achieved via this section and following sections. This one, which analyses the value added of each stage of the dairy marketing system using the consumer's dollar spread and the following sections section that diagnose the obstacles and problem of waste and specifications that face the Egyptian dairy marketing system

The cost of production of cow milk is higher than the buffalo milk production (Table 4). This issue is due to the higher efficiency of buffalo than cattle under Egyptian conditions (Soliman, 2009). It seems fair enough that the producer's (small farmer) gets 15.5% of the consumer dollar for bearing risk and the bulk of costs, while the wholesaler and the retailer gets about 6% per each as profit margin, while they almost bear the costs of transportation and short time reservation of raw milk. Even though the milk wholesalers were not satisfied with this reasonable profit margin, they have went for fraud methods, at least significant portion of them, by mixing both cow and buffalo milk at sale to retailers and sell the mixture at the higher price of buffalo milk. Accordingly, they could make 22% profit out of the consumer's dollar, (Table, 5). Some other wholesalers use the advantage of high fat percent of buffalo milk (4-9%) for their own benefit. They extract 3% of the buffalo milk and sell it separately as butter, while the sell the raw milk as full cream buffalo milk at its full relatively high price. Thereof, they can make about 26% of the consumer's dollar as a profit margin. The poor control on specifications and monopolistic behavior of the relatively few traders in each region have provided a media for such adulteration.

The small farmer as the main producer of milk in Egypt who considers the dairy revenue as a main daily cash income for hid household expenses and to finance the crop production operations (Soliman and Ragab, 1985) and (Soliman, 1985d). Therefore, he

¹ Page No. 9

(she) devotes a proportion of his milk production to the village market, even though, at less price than the urban market, but he enjoys saving the middle-agents that absorb significant proportion of the consumer's dollar. Wherefrom, he can get 55% of the consumer's dollar spent on buffalo milk as profit and 29% of the consumer's dollar spent on cow milk, (Table, 6).

The small farmer has a third option of his output that may increase the value added. It is the sale of a portion of the dairy products processed on farm. The main products are fatless cheese (Qarish cheese) or butter. The small farmer sells this proportion in the village market either by himself or, in particular, by his household's female members (mainly his wife), (Soliman, et al, 1987). As shown in Table 7, the farm household makes about 49% of the consumer's dollar spent on these products as profit from buffalo milk, due to its higher total solid content than cow milk. From cow milk, the farm household generates only 9% as profit from selling the dairy products processed on farm. Therefore, usually, the small farm system process a mix of both types of milk to get advantage of more quantity of input with relatively high total solid content.

Another main source of daily supply of fresh milk to urban market is the buffalo stalls surrounding a belt not far from big cities, particularly Cairo and Alexandria (Soliman, 1985b). This system does not care about breeding. Its objective is to keep the possible highest daily supply of milk from the milking buffalo. The producers give much attention to provide the richest nutritive feeding plan. The previous studies showed that they provide almost double the recommended nutrients requirements, assuming getting higher yield and maximum fat content, (Soliman, 1985c). Therefore, the costs of production is higher than the small farm system (Table, 4 versus Table, 8). However, they still have opportunity to get a very high profit margin that may reach 45% (Table, 8) due to several conditions of this market. First, the big cities high preference of fresh white tasty high fat content buffalo milk they get from the stall's buffalo milk every day at their door let them willing to pay 1.5 times the common price for such milk. The enterprisers of this system save the margins of wholesalers and other middle-agents, and retailers, as they sell directly to the consumer. In addition, they make extra profit from selling their culled milking buffalo when they get dry. Either they sell those animals to other small farmers to raise them for breeding or they fatten those dry buffalo and sell them for meat, (Soliman, 2008).

Some large wholesale traders establish small shops for dairy products in towns to sell mainly milk cooled at 4⁰c to consumers. The wholesalers know that the dairy plants pay extra bonus for extra 0.5% fat content of buffalo milk above 7%. They make profit margin of only 2% of the consumer's dollar if they sell it to a commercial processing plant. However, they can get higher profit if they sell this extra fat as butter or ghee to the retailers or consumers or they mix it with imported powder milk to process fresh white cheese at cheap price. Therefore, they prefer to extract the extra fat in their own shops and sell the milk at a minimum required fat content (or probably less). Table, 9, shows the evidence on such conclusion. The wholesaler delivers the raw milk with full cream to his shop, which was collected by his mediators from villages and/or his farm. The results in Table 9 show that his margin reaches more than 13% by following such way. It seems that there is no cheating, once they sell fresh milk at lower price than other outlets.

The main dairy product in Egyptian market is what is called white cheese. The two common types of white cheese are fresh white cheese and Istanbul white cheese (drier and more salty), which is more suitable for longer storage time. The two main sources of the white cheese are the small municipal plants and the large modern companies for dairy products. Table 10 and Table 11 present the spread of the consumer's dollar spent on white cheese produced by the two types of dairy plants, respectively. While the source of milk to the small dairy plants is mainly the wholesale market, the large ones receive milk from

collection points. Even though, the large processing plants bare extra costs items such as transportation costs refrigerating costs storage costs and packing costs. Therefore, the large scale dairy plants generates much less profit from the fresh white cheese than municipal plants. How about the profit of small processing plants if the traditional method for processing of fresh white cheese was followed by unregistered small processing plants? It means much higher profit for small plants, as the costs of processing would be much less and the materials used would be much cheaper¹. For Istanbul cheese cheating and fraud methods are almost nil as well as packing and storage costs could not be avoided by either small or large-scale plants. Accordingly, the efficiency of large scale provides some advantage to make higher profit margin than small-scale dairy plants. The retailer's profit is almost the same whatever the source of cheese they receive. However, the retailer has some flexibility in trading and payment agreements with small scale plants than large scale

The figures number 4 to 14 illustrate in a comprehensive presentation the comparison of the marketing costs and profit margins of each dairy marketing stage as a share in the dollar spent by the consumer in the Egyptian market.

Obstacles and Policies Facing Dairy Processing Industry in Egypt

- (1) Promulgation of laws that prohibit traditional processing (heating and direct processing), imposed to replace it by pasteurization of raw milk. However, It is expensive for small plants, consequently, it has not been applied by most of municipal small plants but with only 26% of them.
- (2) -The wholesalers and/or retailers do not pay in cash for their purchases of products from small plants at purchase time, which cause liquidity problems for those plants. Such procedure of transaction hampers the finance plan of the small plants.
- (3) Small dairy plants suffer from poor competition capability with large companies either in the quality of the products or lacking of the availability of refrigerators for conservation which contributes much to their vulnerability to price fluctuations and increases Loss ratio.
- (4) The wholesalers deal with small processing plants usually do not cool the raw milk they supply to the small plants, which in turn affects processing both the loss rate and product specifications.
- (5) -The small processing plants suffer from inability to diversify products and deficit in raw milk availability for achieving full operating capacity of the plant, especially in the summer season, leading to higher average fixed costs per 1-kg of milk processed. This in turn leads to competition between laboratories to obtain the largest amount from the limited supply of milk, which raises the milk price. Thereof it is reflected on dairy products prices.
- (6) -The shortage of supply and rising price of milk push dairy plants to use reconstituted imported powdered milk. However, such alternative did not lead to lower prices of products because the price per kilogram of reconstituted powder milk is also high. As the used imported powder milk is often skimmed milk it requires to add greasy source and additional costs due to the process of homogenizing the reconstituted milk,

¹ See Page 11, to page 13

- (7) -Except the small amount of whey that usually is added for cheese conservation during packaging the rest of the whey quantities are wasted. Disposal of most of the whey, is harm to the environment,
- (8) -Lack of skilled labor and high wages of skilled workers, if available, lead to low product quality and high costs of processing,
- (9) -Lack of honesty among some wholesalers or retailers, let them add unsafe materials to the milk. These include caustic soda in order to adjust the pH level of milk, vegetable oil to increase the proportion of fat, formaldehyde or peroxide as a spray for conservation of produced cheese, sugar and salt to raise the total solid content, and the sodium carbonate or bicarbonate to reduce the milk acidity,
- (10) -The transfer of products such as yogurt by pickups or tricycles cause shake of packages and then affects the product formation strength,
- (11) -The monetary and fiscal policies, particularly, the policy of the foreign currencies exchange rate, the custom tariff and taxes share in rising the imported powder milk price, which restrict its impact to fulfill the deficit in the domestic raw milk supply,
- (12) -The lack of domestic industry capability to manufacture the proper packages, particularly, the tetra-pack containers for retail package. The materials are almost imported, which share in rising the dairy products prices,
- (13) The primitive methods of white cheese processing, particularly, the washing machine method and the processing of non-pasteurized milk are main weaknesses of this industry result in high rate of waste and quick deterioration of the processed cheese. Modern methods are expensive and cannot be afforded by the small dairy plants.

The problem of Waste in Milk and Dairy Products Supply

The Waste in dairy products Includes *quantitative* and *qualitative* waste and its relative proportion varies according to marketing stage. Waste has negative impacts on the economics of dairy industry and food security. Waste increases the deficit in production to fulfill the demand for dairy products.

Quantum Dissipation of Dairy Products during Processing

Since white cheese is the most important dairy products in Egypt, from the sample field survey data¹, the total waste in the production of white cheese was estimated when using traditional methods in processing and preparing liquid milk in the Clogging basin and during making the commercial packaging. Aggregately, such waste lead to losses in the processing firms' total production of approximately 15.5% extended to 18% in the municipal plants. When modern methods applied in processing, the loss in production of white cheese decreases to approximately 4% only.

Measuring waste in cheese yield by enterprising type

The enterprise type was the modern companies, Large-scale plants, the small-scale plants. The processing stage composes of two sub-stages. Waste ratio was derived from another sample survey data². The losses in inputs used for processing were estimated as a total ratio of nonfat solids by calculating the difference between input and output

¹ 4 public business plants, 55 municipal laboratories in Dakahlia governorate,.

² one Cheese production plant in each province of Asyut, Giza, Cairo, Alexandria and Damietta, besides, interviewing some wholesalers and retailers

The First Processing Stage

Such stage includes the following operations: receiving milk, pasteurization, mixing, dissolving, and clogging. The losses were around 0.51%, 7%, 42% of the net inputs for the processing of the cheese in the modern companies, Large-scale plants and the small-scale plants, respectively.

The Second Stage

The total losses were estimated at the major successive cheese processing operations. These operations include mixing of the "Espetada"¹ with milk, chopping cheese, filtering the thrombus from the residual (whey), squeezing, and finally packaging. Estimates include also the unsold returned cheese quantity. Results showed that the waste in the processing capacities of white cheese were 9%, 18%, and 410% of the maximum capacity of the modern companies, Large scale plants and the small scale plants., respectively. The losses would decrease to 4.5% only if the dairy plant used the modern method.

Quantitative Loss during Trading (Wholesale and Retail) Stages

Estimated losses in wholesale and retail stage include loss in quantities during transport as well as the corrupted quantities, the dissipation during transaction and sale, and the loss because of drought when storing the dairy products. The ratio is calculated from the total amount purchased by wholesalers or retailers. The interviewers of the sample cited the existence of two types of loss. The natural or the normal waste which nearly reached 2.5% of the weight of white cheese, and about 3.3% of the weight of turkey cheese (Rummy cheese) at who. The second is called trade-in waste that reached around 3.5% of white cheese and 3.3% of turkey cheese (Rummy cheese). Such waste at retailing was around 5.6%, 6.3% of the total quantity purchased of white cheese and turkey cheese (Rummy cheese), respectively.

.Qualitative loss

There are several factors causing harmful impact on cheese quality rather than quantity, most notably is adding weak "Espetada" which lead to weakening of casein thrombus, that in turn cause waste during different stages of processing. The second factor is salt imbalance concentration in the cheeses conservation solution, which may cause dragging of the moisture from cheese to solution leading to the dryness of the cheese, and vice versa leads to a false increase in weight at the expense of the consumer. At the stage of packaging and storage if the PH has increased to five or more it would weaken the strength of the cheese texture and melt its outer surface to become disjointed, and the whey, surrounding the cheese in the pack would be as white solution due to the melting cheese components. Adding other materials, even if they are harmless food additives in order to maintain pH at (4.2-4.5) would raise the price of cheese.

Difficulties face the quantification of cheese quality losses. Generally, such measure depends upon the expected declining in cheese price due to qualitative waste in dairy products, which reduces the profit margin and increase the proportion of unsold quantities.

¹ Espetada is a material extracted from the stomach of suckling calves. It is prepared and sold either as liquid or dry. It helps in Clogging of milk casein for the cheese processing.

Foreign Trade Policy

Impact of Foreign Trade on Dairy products Market

The imported dairy products are mainly skimmed dry milk for dairy processing plants requirements or full cream powder milk for consumer use. In addition, several kinds of cheese are imported and the transaction is via the main wholesale market in Cairo.

The floating of the Egyptian pound versus the foreign currency has raised the price of such products, which shared in raising the domestically processed products that use mixture of fresh and dry milk. Diseases, particularly, cow-mad, have caused shifting the importation from Europe to New Zealand and Australia. Therefore, the Egyptian market has had suffered from high importation price due to far distance from the location of the new importation markets and losing the advantages of high subsidy that EU market practices with their dairy products to dispose the surplus

Egypt's MFN tariff schedule

The following schedule are the Egypt's MFN tariff schedule applied to all countries, except those with which Egypt has a preferential trade agreement, such as GAFTA countries, COMESA, NFTA members, European Union, Turkey, etc¹.

Milk and cream, not concentrated, nor containing added sugar or other sweetening matter:	
Of a fat content, by weight, not exceeding 1%	5%
Of a fat content, by weight,	
Exceeding 1% but not exceeding 6%	5%
Milk and cream, concentrated or containing added sugar or other sweetening matter. In powder, granules or other solid forms, of a fat content, by weight, not exceeding 1.5%	
For infant	2%
Other	5%
In powder, granules or other solid forms, of a fat content, by weight, exceeding 1.5% and not containing added sugar or other sweetening matter	
For infant "Half fat"	2%
Cream	32%
Other in packages of weight not less than 20 kg	5%
Other	12%
Milk not containing added sugar or other sweetening matter in other forms	
Blocks or powder	22%
Other	12%
Cream	32%
Yoghurt	5%
Whey and modified whey, whether or not concentrated or containing added sugar or other sweetening matter ...	5%
Butter and other fats and oils derived from milk; dairy spreads in packages of a weight less than 20 kg	12%
Dairy spreads in packages of a weight less than 20 kg	12%
Other	5%
Cheese and curd, fresh (not ripened or uncured) including whey cheese,	
In packages of weight until 20kg	22%
Other	12%
Grated or powdered cheese, of all kinds	2%
Processed cheese, not grated or powdered	12%
Blue-veined cheese	12%
Other Cheese In packages of a weight not less than 20 kg	5%

Source; Compiled from The Egyptian Ministry of Industry and Trade, 2011

Investigation of tariff rates shows that the schedule is rational from the development point of view. The minimum rate was for powder milk of infants. The common powder milk for processing, that fulfill the deficit in domestic production supply was only 5%, which is low rate, in comparison with other dairy products, that may compete the domestic production.

¹ To review the Foreign Trade agreements of Egypt with World partners' Countries, see the SUSTAINMED WP22 report of Egypt.

However, some dairy products are required for being intermediate inputs in domestic dairy industry, such as Grated or powdered cheese, of all kinds; the associated tariff rate was only 2%.

Dairy Quality and Specifications Control in Egyptian Market

Several organizations such as the Ministry of health, industrial control, and the Ministry of supply, namely conferred certificates (ISO, environment, and HACCP) make, periodically, inspection visits to dairy plants. They get samples of the dairy products for analysis to assure that they conform to standards. Thereof, they control if the dairy plants are at the obligations to specifications necessary for the production of healthy safe food.

However, this is mostly for modern large companies, but the control is weak over small plants, and almost disappears in unregistered and unlicensed dairy plants. The industry lacks of sufficient capacity of skilled human resource and technological package and suitable materials to conduct fully this marketing function.

One obstacle is the small capabilities of the responsible official institutions. The evidence is that the number inspectors, just to make control of vegetables and fruits in California in the United States about reached 55,000 in 1995, while all inspectors for the quality and specifications control for all food items in the Ministry of supply and internal trade in Egypt in 2000 were only 6,000 employees. Wherefrom, namely it is the institution entrusted the largest role in censorship in Egypt. In addition, there is a lack of seriousness among many dairy processing plants in applying the food standards as the punishment and sanctions specified in the law No.10 for health are very simple (Soliman and Mashhour, 2000).

Furthermore, the majority of dairy plants are small scale without facilities to establish a quality control unit in their own processing plants as they do in the developed markets, where these internal units in the dairy plants play a key role in oversight. However he legislations in these countries force the food processing plants to establish such quality control units. However, most of these plants in the developed countries are of a scale large enough to impliment that, economically.

Employment in Dairy Processing

The Employment of labor in commercial dairy processing sector in Egypt was estimated from the sample survey. It composes of permanent labor working as engineer, assistant Engineer (production assistant), technician, and administrative employee, as well as temporary labor. The employment rate is about 20 workers for every 4 tones of milk, i.e. at a rate of five workers per ton of raw milk. This coefficient was the same in both modern and municipal dairy plants. Despite difference in capacity and technological level, this was because the dairy industry is a raw material processing industry, rather than manufacturing industry.

The advantage of Processing the By-products of the Dairy Industry

To maximize the value added of the dairy sector in Egypt and preserve the environment and public health, require the utilization of all dairy by-products on economic base and to reduce waste and losses of the dairy marketing performance.

Currently, the main pattern of by-products processing is only the storage of Istanbul and Vita white cheese in milk whey salty solution after pasteurization, which are stored in cans. A common processed food item from dairy by-product is a salty product called domestically (Mish). It is made of skimmed milk with some residual from white cheese and probably unsold turkey dry cheese with some whey. These common known options of utilizing byproducts led to a reduction of about 8.8% and 32.5% of the volume loss in turkey

and white cheese, respectively, at the wholesalers and approximately 26.3% and 15.3% of the expected loss in the white and turkey cheese respectively, at the retail level.

However, the all mentioned above, currently practiced, utilization of byproducts are insufficient to take full advantage of economic output. Other by-products from processing of dairy products can be utilized for raising the value added of milk. Most notably are the production of some additives of poultry feeds and fermented milk products. Other types include special kinds cheese after shaking the milk for extraction of butter and/or from non-salted whey product (Ricotta cheese). Extraction of lactose during modern processing techniques is a promising processing industry. Extracted lactose can be utilized in the preparation of the bacterial cultures or entry in the manufacture of medicine pills as an outer cover which give sweet taste.

Costs Structure of Dairy Processing Industry

(Table 12) shows that the highest average fixed costs and the highest average variable costs per ton of cheese is for producing dry processed cheese, and the minimum of both is for producing soft fresh white cheese.

This table shows that permanent labor has the highest share in the fixed costs, i.e. about 40- 41 percent of total fixed costs. The equipment and depreciation fixed costs items come in the second arrangement in terms of relative importance of fixed costs, ranging on average between, 29% and 26% of the total fixed costs for dry processed cheese to for soft fresh white cheese, respectively.

The average fixed costs can be reduced by increasing the volume of operational energy until the maximum, as also decline when dairy produces more than one type of products leading to the distribution of the overall state of health costs for these products

This table shows that raw milk value is the highest variable costs item. Its share reached 91% of the total variable costs of dry processed cheese and 73% of the total variable costs of the soft fresh white cheese.

The same table shows that the price of raw milk in kilograms of cheese represents more than 90% of production costs in both fresh and dry cheese, and more than 70% of production costs of soft white cheese and vita. This because of high humidity and adding reconstituted powder milk in soft cheese and vita cheese and dissolved vegetable oils. Therefore, the raw milk price has the most important influence on the economics of white cheese industry, which is the most important dairy product in Egypt. The supply deficit to meet demand and the high price of imported milk powder with higher exchange rate of I.E. to US\$ and Euro have become the key factor in cheese price either in the domestic market or the export competitiveness or competition with the price of imported vita cheese. Such negative impacts would extend, if the speed increase in raw milk, price has being continued and dairy development efforts have stayed reluctant, (Soliman, 1997) Towards increasing the supply and reducing cost, development of this sector must take priority among animal protein production systems. This is not only because Egypt has Comparative advantage in milk production, particularly from Buffalo, (Soliman, 1994) but also because white cheese on the Egyptian table resides in almost three meals, especially in middle-income and poor population categories (87% of the Egyptian people), (Soliman and Ez Al-Deen, 1995). It is also, important for school pupils 'lunch sac (sandwiches)

Value Added and Margins of Cheese Processing

There is no doubt that overcoming the quantitative loss sources will reduce production costs, thereby reducing the potential for fraud. In addition, there must be programs to achieve horizontal and vertical integration between the dairy marketing stages,

which contributes to adopt modern techniques, and quality control units in the dairy plants. Consequently, contributes to reducing marketing costs and margins. All these target programs are supported by financial and credit policies oriented to provide incentive to the marketing firms to achieve the development objectives.

The highest profit cheese type is the dry cheese particularly turkey cheese. It recognizes about 25% profit margin, although it is of the highest costs. However, its high price compensates the high cost. It is followed by vita cheese, which achieves a profit margin of approximately 22%. The soft fresh white cheese has the minimum profit. This type is the most vulnerable to fraud by adding harmful materials to acquire soft texture¹. It unusually contains high proportion of powder skimmed milk and vegetable oils, and is often sprayed after processing with a layer of natural ghee or butter in order to acquire the desired taste of the natural soft white cheese "fridge cheese".

¹ Processing techniques, 11

FIGURES ANNEX

Figure 1 Value Chain Analysis Model

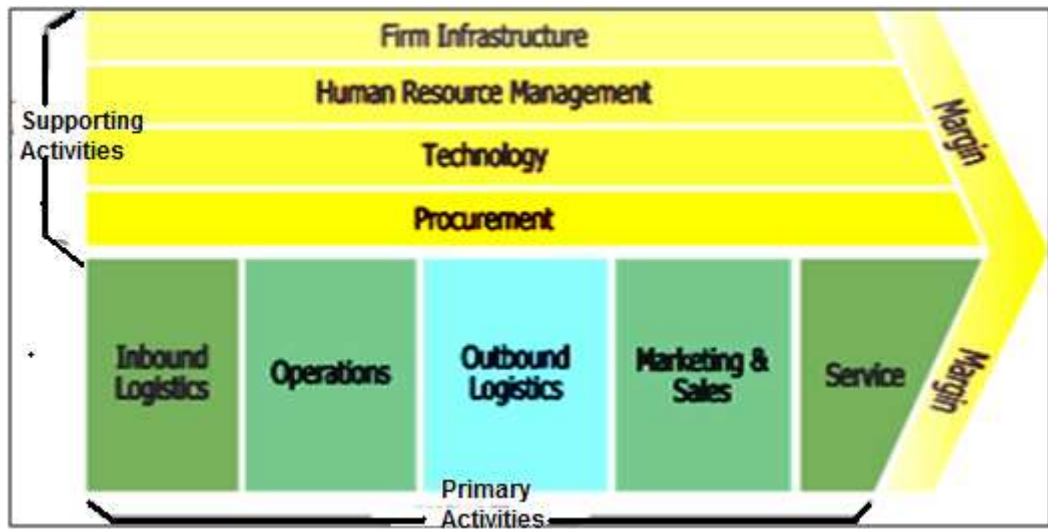
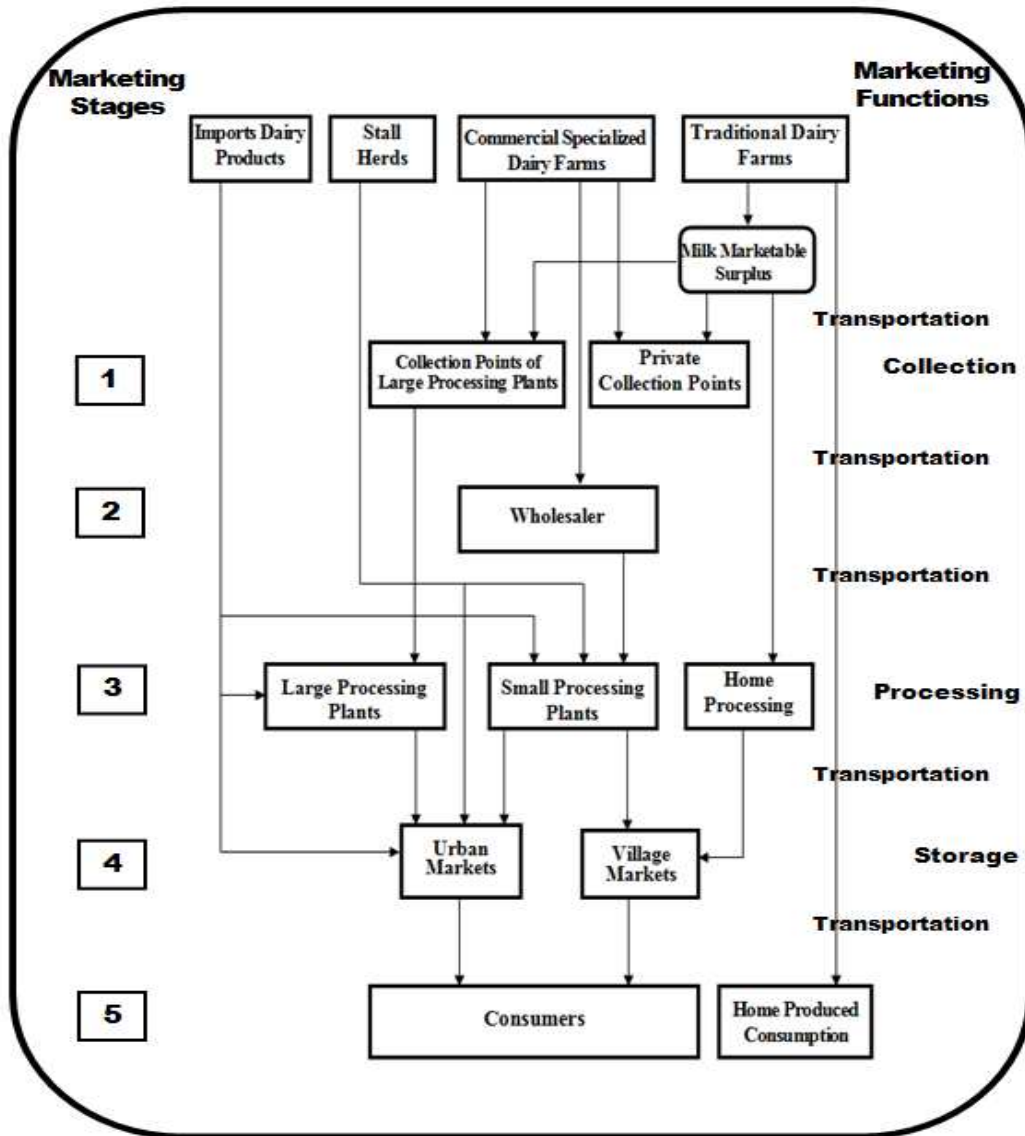
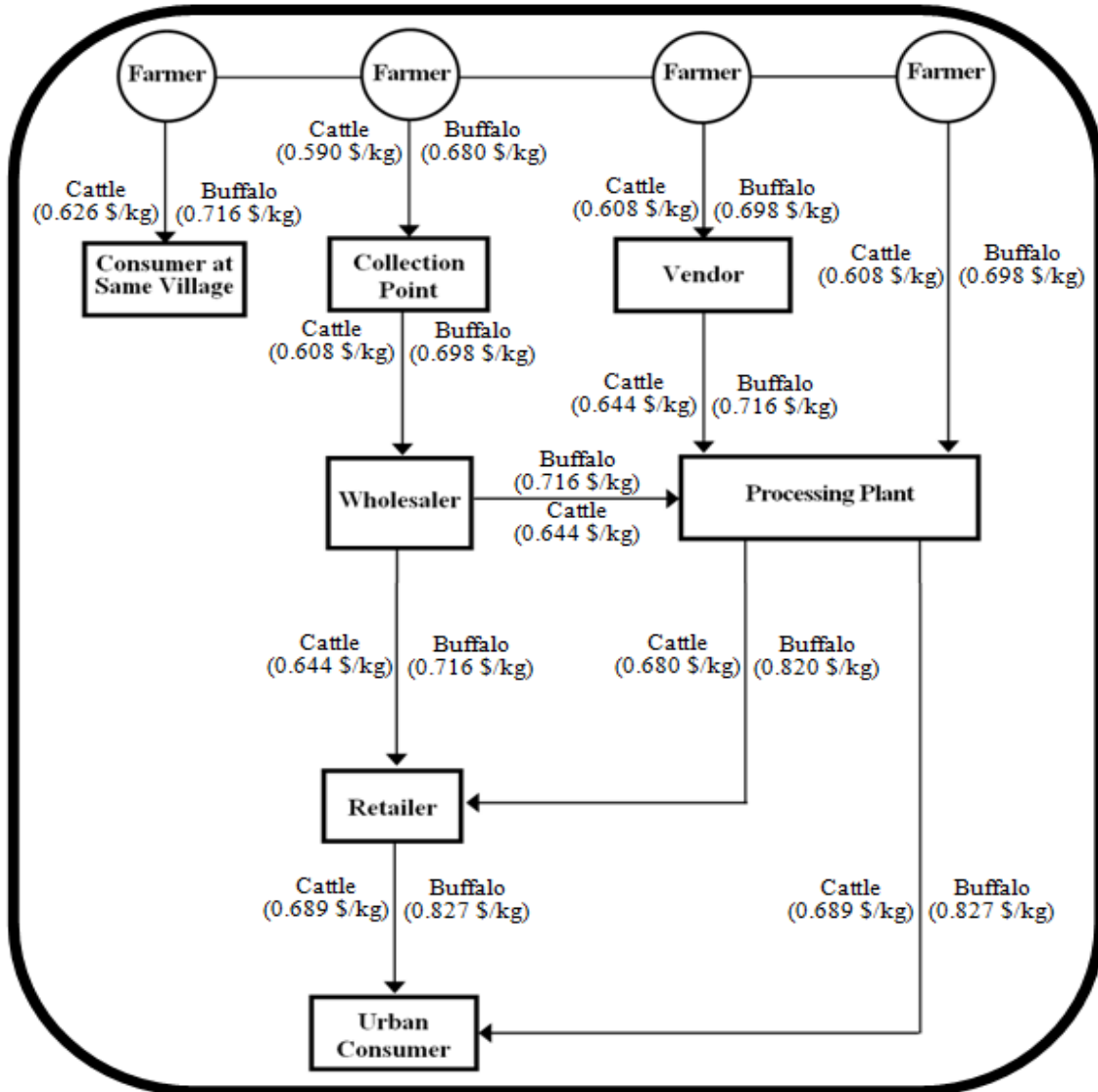


Figure 2 Egyptian Dairy Market Structure and Flow.



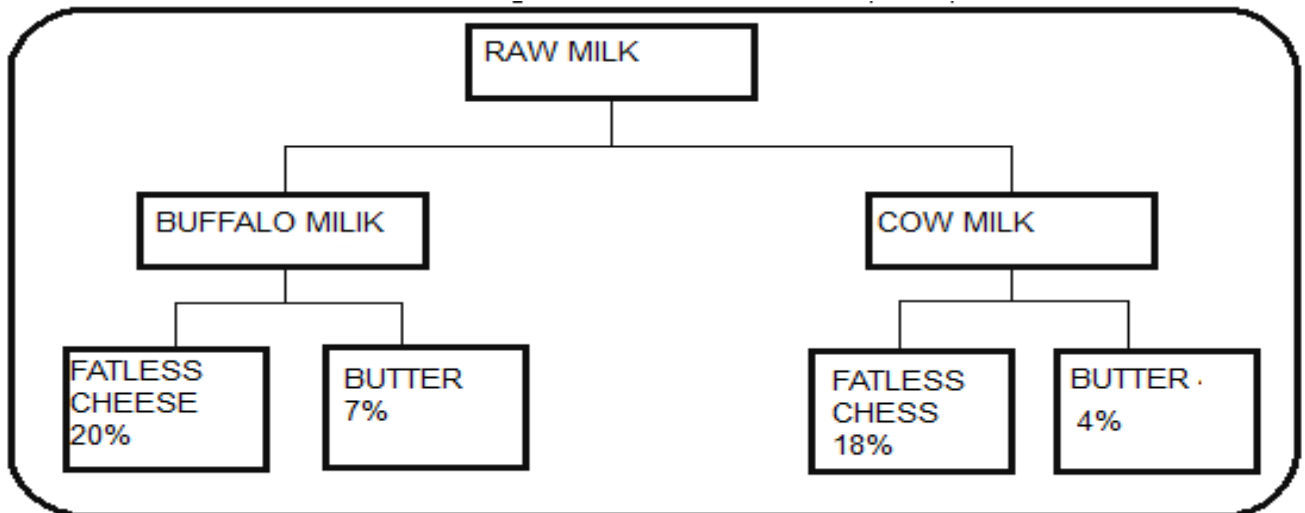
Source: Derived from the Questionnaire Survey Data in 2011 for the Agricultural year 2010/2011.

Figure 3 Price Level at Each Stage of Dairy Marketing System in Egypt



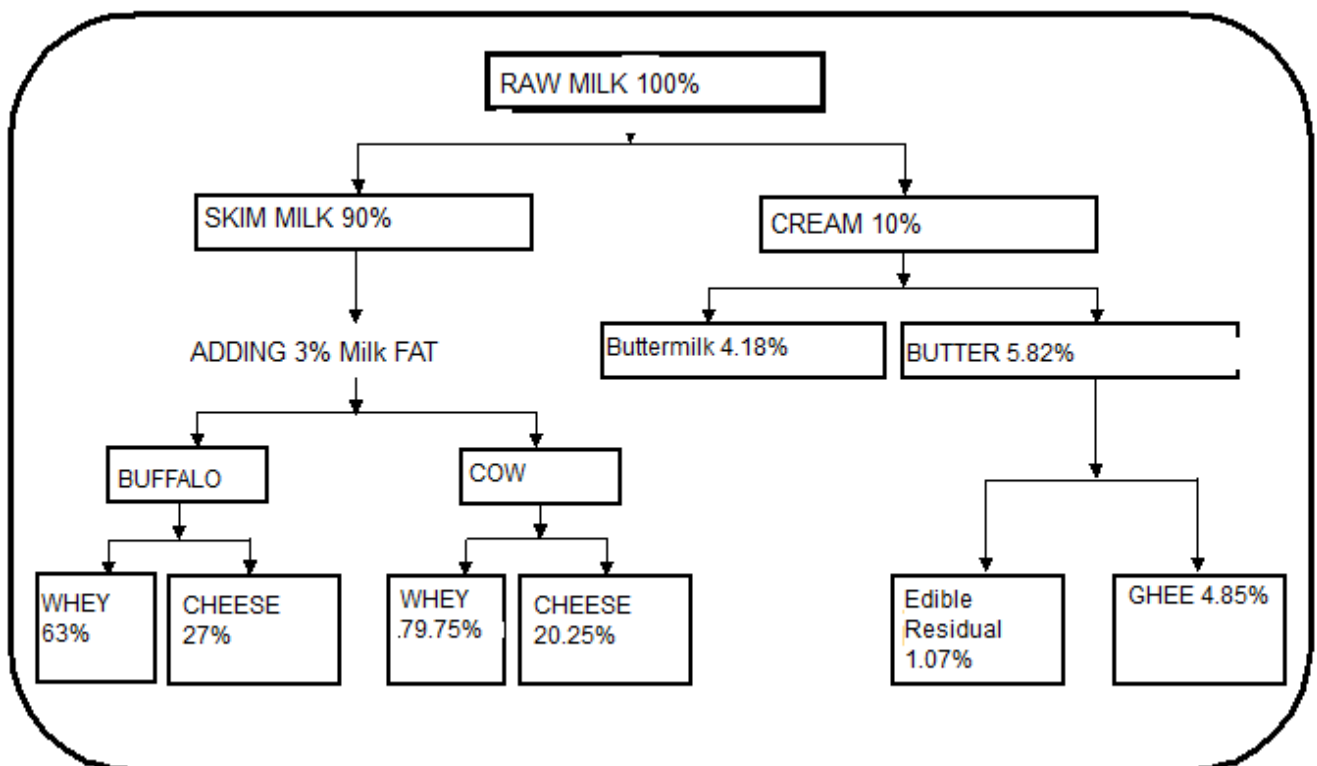
Source: Derived from the Questionnaire Survey Data in 2011 for the Agricultural year 2010/201111

Figure 4 Home Produced Milk Processed on Farm



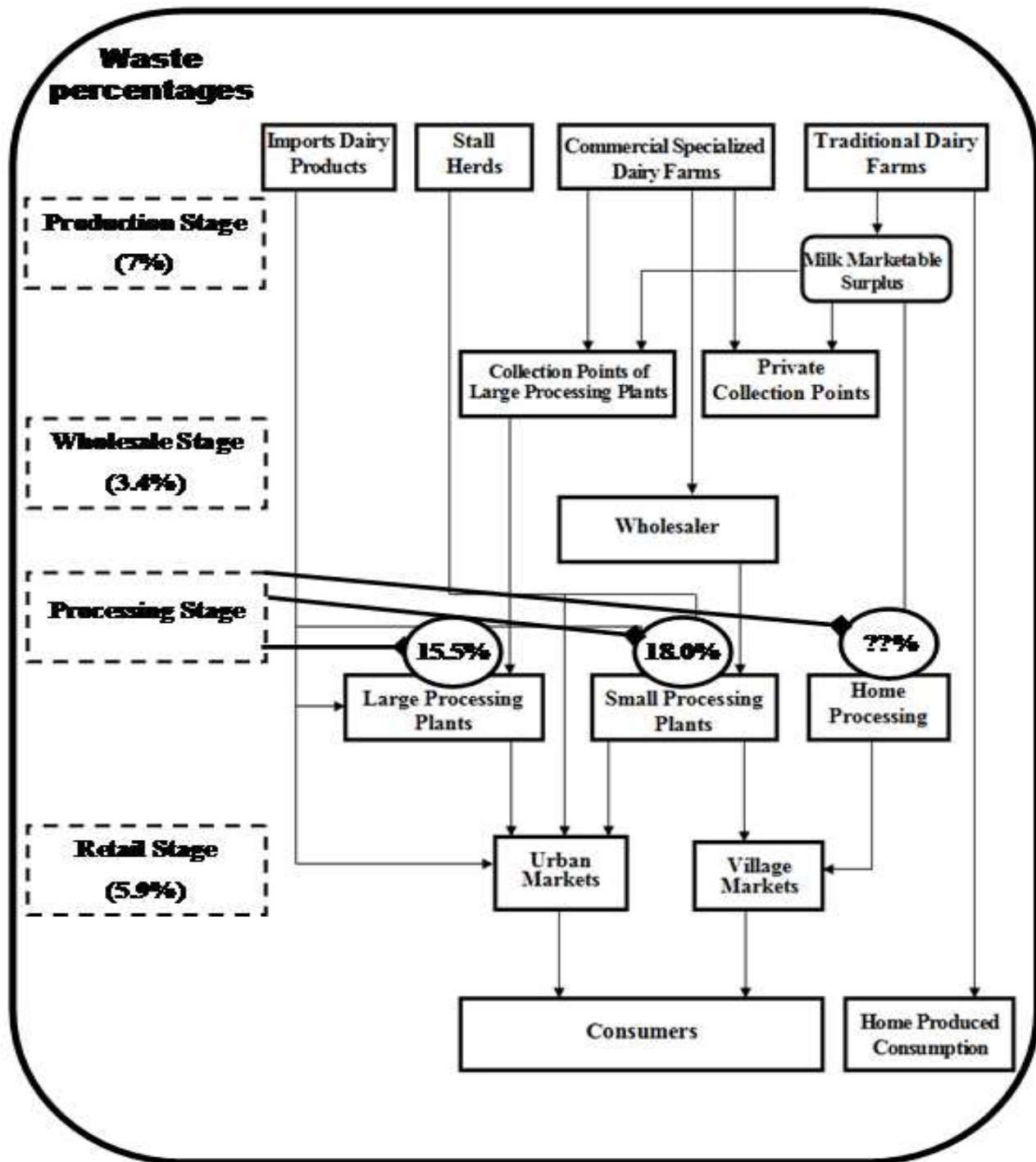
Source; Derived from the Questionnaire Survey Data in 2011

Figure 5 Commercial Processing of Dairy Products



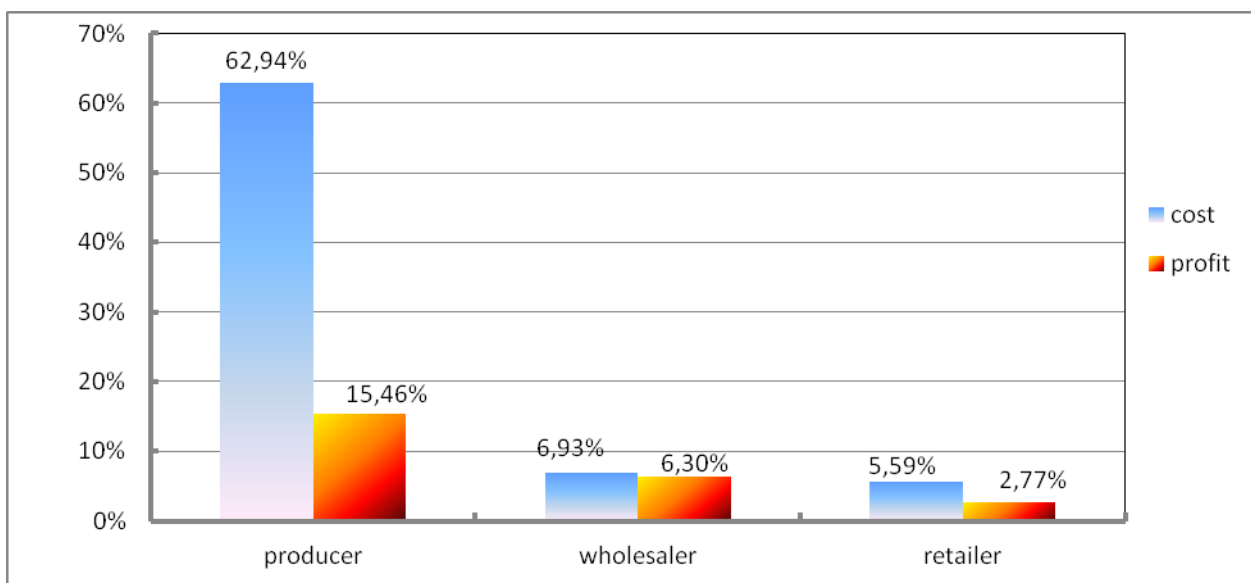
Source: Derived from the Questionnaire Survey Data in 2011

Figure 6 Waste Percent Along The stages of Dairy Marketing System



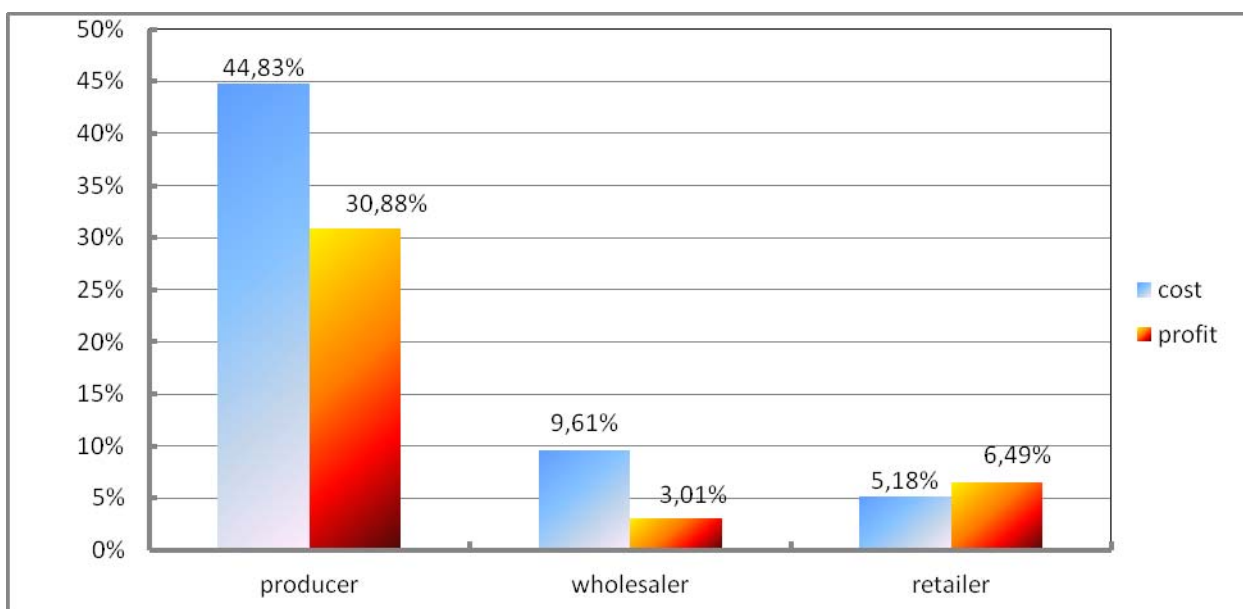
Source: Derived from the Field sample Survey conducted in 2011

Figure 7 Marketing Margins of Traditional System Cow Milk Sold in Urban Market



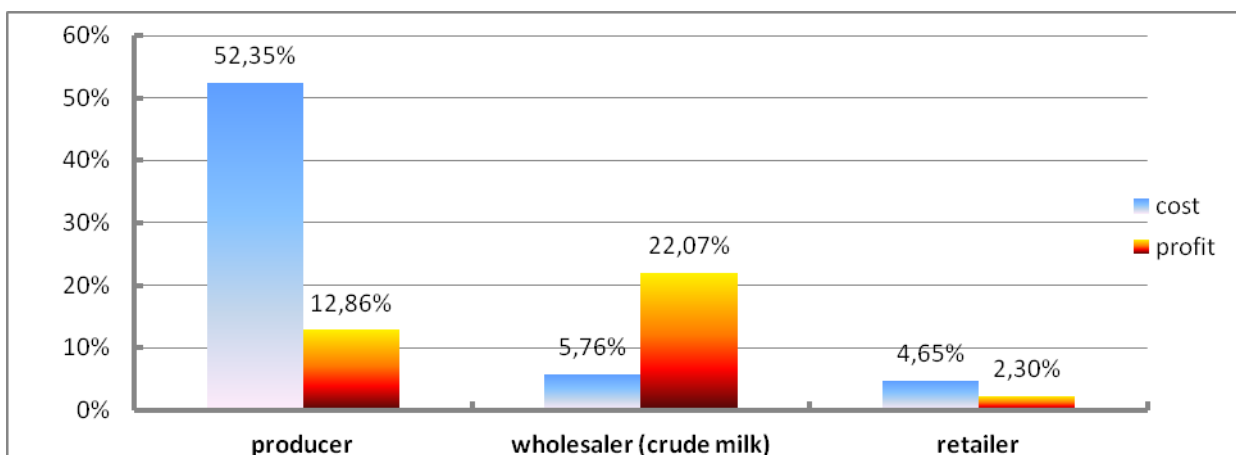
Source: Drawn from (Table)

Figure 8 Marketing Margins of Traditional System Buffalo Milk Sold in Urban Market



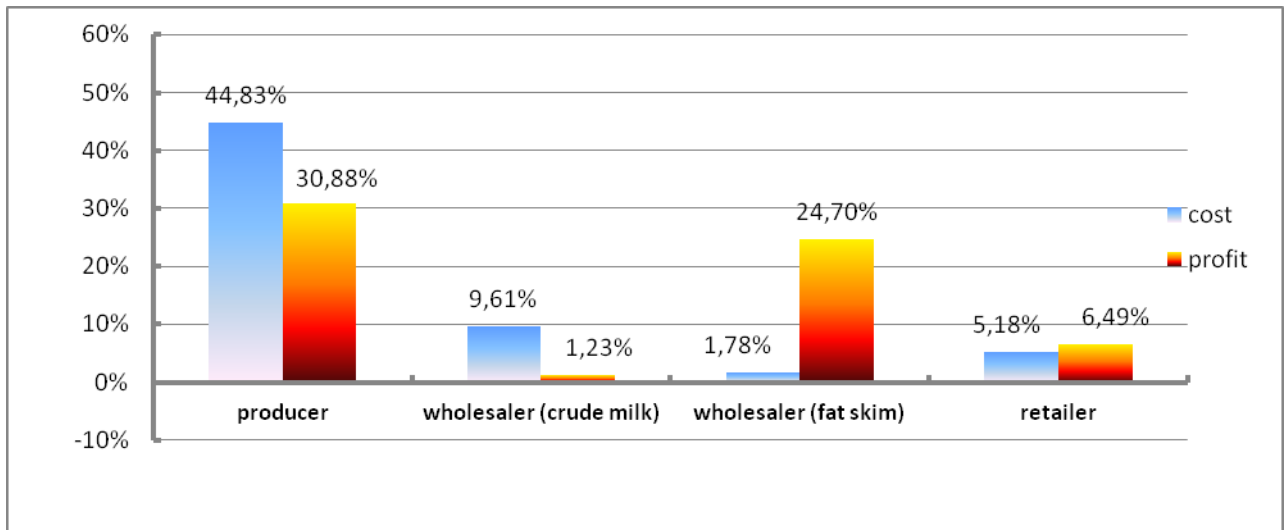
Source: (Table 4

Figure 9 Marketing Margins of Traditional System Milk mixture (Cow + Buffalo) Sold in Urban Market



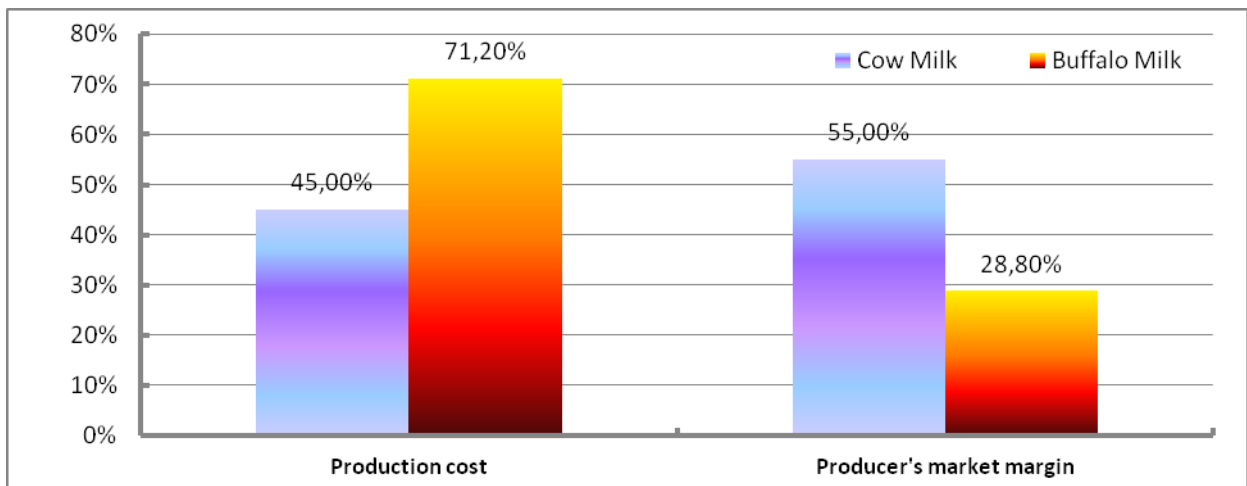
Source: (Table)

Figure 10 Marketing Margins of Traditional System Milk Sold in Urban Market after Skimming 3% of Buffalo milk fat



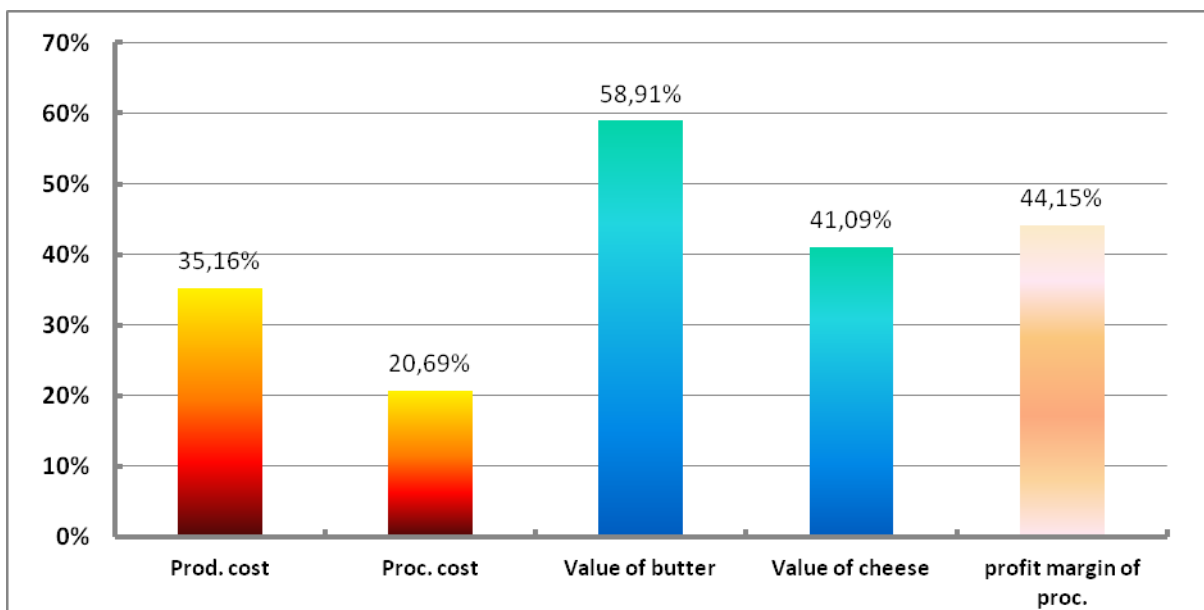
Source: (Table 5)

Figure 11 Marketing Margins of Traditional System Milk Produced Sold in Village Market



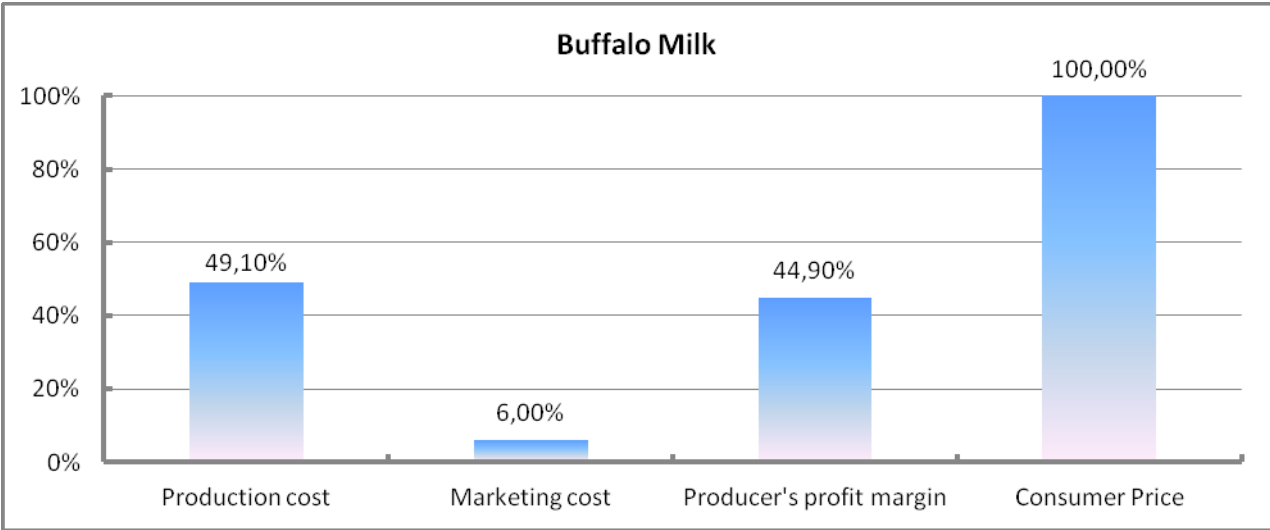
Source: (Table 6)

Figure 12 Marketing Margins of Home Produced Dairy Products Sold in Village Market



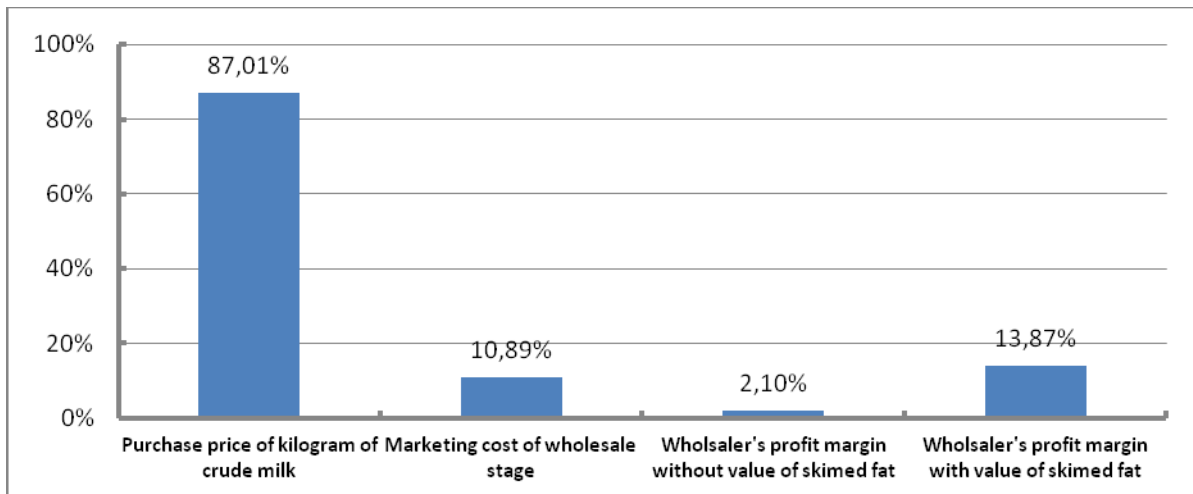
Source: (Table 7)

Figure 13 Marketing Margins of Stalls System Buffalo Milk Sold in Cities Market



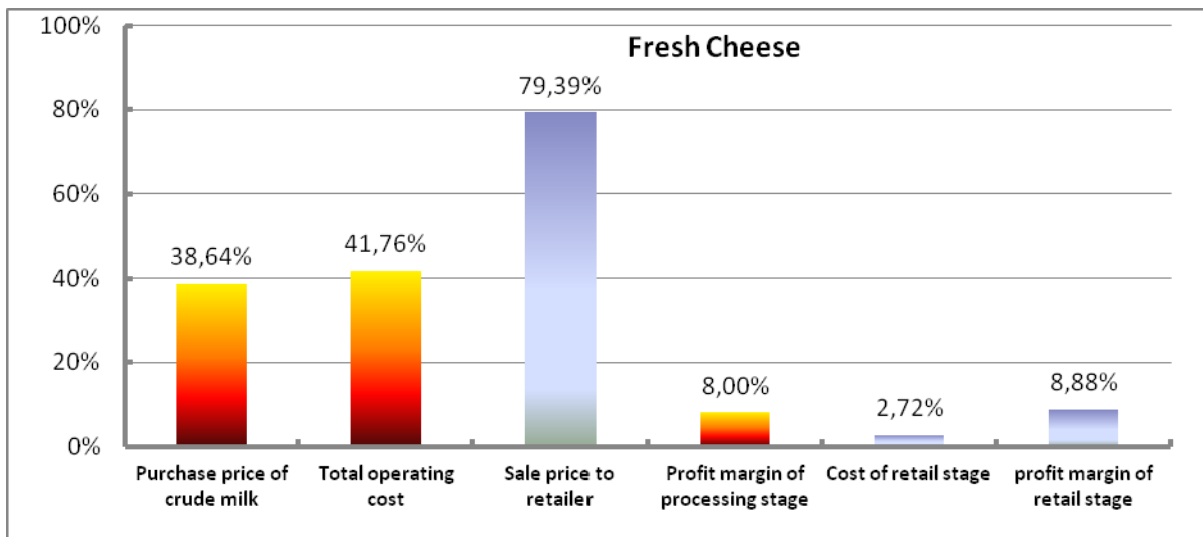
Source: (Table)

Figure 14 Marketing Margins of the Wholesaler Sold Milk to Processing plants



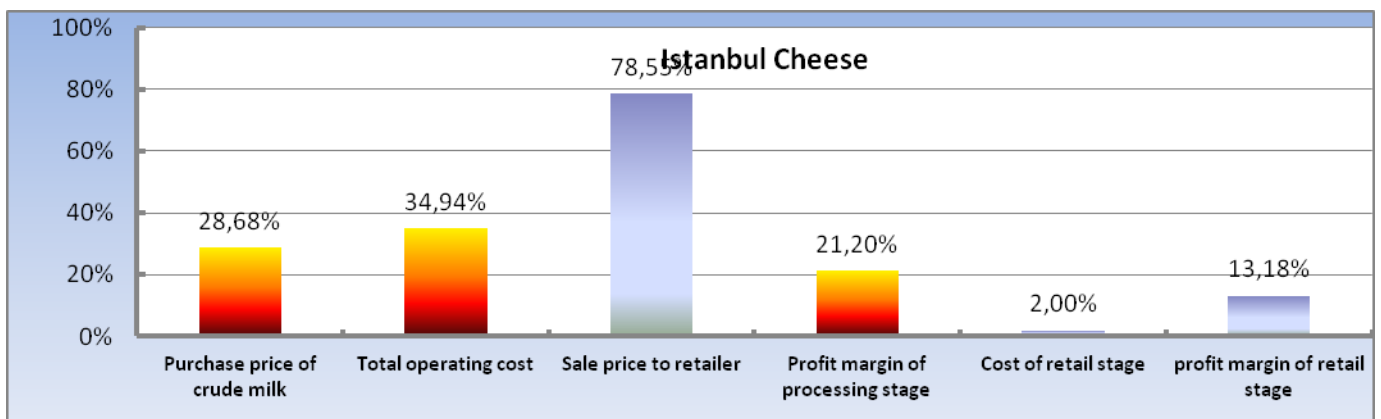
Source: (Table 9)

Figure 15 Marketing Margins of Fresh White Cheese Processed in Small Dairy Plants



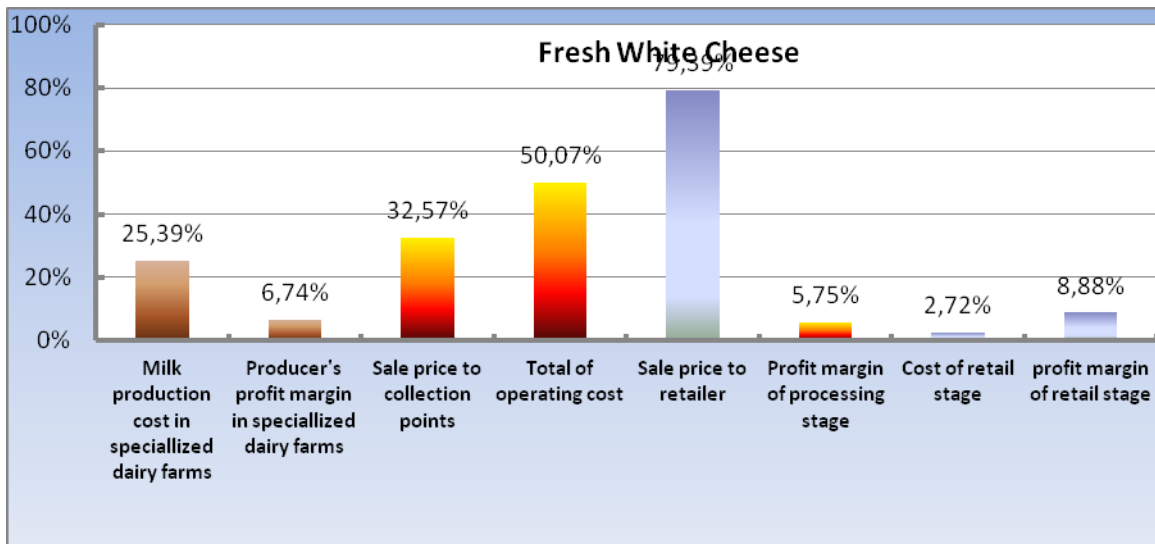
Source: (Table 10)

Figure 16 Marketing Margins of Istanbul White Cheese Processed in Small Dairy Plants



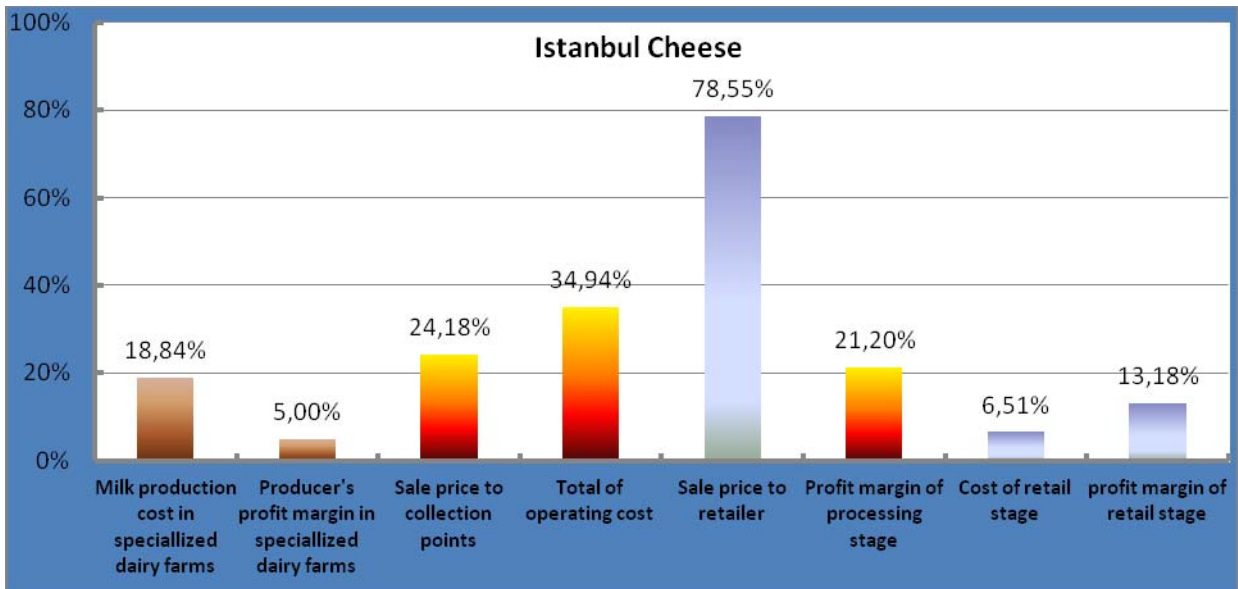
Source: (Table)

Figure 17 Marketing Margins of Fresh White Cheese Processed in Large Modern Dairy Plants



Source: (Table 11)

Figure 18 Marketing Margins of Istanbul White Cheese Processed in Modern Dairy Plants



Source: (Table 11

TABLE ANNEX

Table 1 Performance variables of Livestock for Milk Production in Egypt

Type	% of cattle and Buffalo breed	% milking Heads in total herd	yield/ Milking head/year (Kg)	% of Bulls in total herd	% Replacement heifers in total herd
Domestic Cattle	36%	38.90%	600	0.50%	15.90%
Exotic Breeds	2%	41.00%	4500	1.10%	16.00%
Cross Bred	11%	39.20%	2100	0.50%	15.30%
Total Cattle	49%	39.20%	1084.3	0.50%	15.80%
Buffalo	51%	44.10%	1340	0.50%	14.00%
Total(cattle and Buffalo)	100%	41.70%	1743.8	0.50%	14.90%
Sheep	57%	42.70%	50	6.20%	15.10%
Goats	43%	36.10%	12.5	9.80%	16.30%
Total (Sheep and Goats)	100%	39.90%	34	7.70%	15.60%

Source: Calculated from:

Ministry of agriculture and land reclamation (2010) Central Administration economic affairs sector of the agricultural economy, "statistics of livestock and poultry and fish"

.The food and Agriculture Organization of the United Nations (2011) The statistical database, agriculture, production, primary agricultural products.

Table 2 Milk Equivalent of Dairy Foreign Trade

Imports	(tons)	662,624
	US\$	429,196,000
	\$/ton	648
Exports	(tons)	541,484
	US\$	472,523,000
	\$/ton	873
Trade Balance	\$1000	43,327,000
	% (Exports Value/ Imports Value)	110%

Source: Compiled and Calculated from:

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Table 3 Milk Supply Structure in Egypt, 2009

Milk Supply source	Tons of Liquid Milk	%
Goat milk Production	16,107	0.24%
Sheep milk	107,886	1.61%
Stall (Barns) Buffalo Flocks	767,385	11.47%
Commercial Specialized farms (Buffalo + Cow)	354,178	5.29%
Traditional System Production from Buffalo	2,629,769	39.31%
Traditional System Production from Cows	2,151,629	32.16%
Traditional System Production from cows and buffaloes	4,781,398	71.48%
Total Production	6,026,953	90.09%
Total Imports (1)	662,624	9.91%
Total Supply	6,689,577	100.00%
Total Exports (1)	541,484	8.09%
Milk for Rearing (2)	1,265,061	18.91%
Net Milk Production for food Consumption	4,883,032	72.99%
Farm household dairy products consumption from home production	1,434,419	21.44%
Farm household liquid milk consumption from home production	1,099,721	16.44%
The home processed dairy products sold	956,280	14.30%
The Waste from Production up to Processing Stage	413,207	6.18%
The Liquid Milk sold commercially	342,792	5.12%
Waste During Processing	88,489	1.32%
Produced Cheese Commercially	548,124	8.19%

1) Imports and exports are in the form of liquid milk equivalent.

(2) Estimated by Ministry of Agriculture of Egypt, Livestock Sector for animal Production. All goats and sheep milk is for suckling except 5000 tons are devoted for mutton cheese processing

(3) The waste here is the FAO estimates which is a larger proportion than 7% as shown from the panel survey

(4) The quantity available for human food consumption, after deduction of other usages above

(5) It is derived from the estimated cheese supply of 940,154 tons by multiplying by technical coefficients

(6) derived from estimates of (2)

Source: Compiled and calculated from:

Table

FAOSTAT | © FAO Statistics Division 2011 | 26 October 2011

Ministry of Agriculture of Egypt, (2011), Records of the Livestock Sector for animal Production

Central agency for public Mobilization and statistics (CAPMAS) (2011), "Bulletin of Animal Wealth Statistics", Soliman, Ibrahim, Mashhour, A. and Gaber, M. (2007) "Final Report of the Research Project: Livestock Marketing systems in Egypt",

Central agency for public Mobilization and statistics (CAPMAS) (2011), Annual bulletin of Trade Statistics of Egypt, National Academy of Scientific Research and Technology, The 3 years research program (2004=2007), Cairo, Egypt. 550 Pages.

Table 4 Spread of the Consumer's dollar spent on Fresh Milk to Urban Market

Marketing Costs and Profit Margins	Cow Milk		Buffalo Milk	
	\$ / Kg	%	\$ / Kg	%
Production Costs	0.433	62.94	0.371	44.83
Producer's Market Margin	0.106	15.46	0.255	30.88
Village Trader's Marketing Cost	0.048	6.93	0.079	9.61
Village Trader's Profit Margin	0.043	6.30	0.025	3.01
Retailers Marketing cost	0.038	5.59	0.043	5.18
Retailer's Profit Margin	0.019	2.77	0.054	6.49
Consumer Price	0.688	100.00	0.827	100.00

The applied exchange rate was 1-US\$ = L. E.5.59, Egyptian Central Bank in July, 2011

Source: Calculated from The Sample survey Data conducted in 2010 for the agricultural Year 2010/2011

Table 5 Spread of the Consumer's dollar spent on Milk Adulterated by the Wholesaler

Marketing costs and Profit Margin	Cheating by mixing Cow with Buffalo Milk		The fraud of Buffalo milk by skimming 3% Fat	
	\$/Kg	%	\$/Kg	%
The costs of production	0.433	52.35	0.371	44.83
Producer's profit margin	0.106	12.86	0.255	30.88
Village Trader Marketing costs	0.048	5.76	0.079	9.61
Additional cost of extracting 3% fat	0.0	0.0	0.015	1.78
Wholesaler's profit margin from raw milk	0.183	22.07	0.010	1.23
Wholesaler's profit margin from 3% fat	0.0	0.0	0.204	24.70
Retailer's marketing costs	0.038	4.65	0.043	5.18
Retailer's profit margin	0.019	2.30	0.054	6.49
Consumer's Price	0.827	100.00	0.827	100.00

Source: Calculated from The Sample survey Data conducted in 2010 for the agricultural Year 2010/2011

Table 6 Spread of the Consumer's dollar spent on Fresh Milk Sold to Village Market

Marketing Costs and Profit Margins	Cow Milk		Buffalo Milk	
	\$/ Kg	%	\$/ Kg	%
Production cost	0.446	71.20	0.322	45.00
Producer's market margin	0.180	28.80	0.394	55.00
Consumer Price	0.626	100.00	0.716	100.00

Source: Calculated from The Sample survey Data conducted in 2010 for the agricultural Year 2010/2011

Table 7 Spread of the Consumer's dollar spent on Dairy Products Processed on Farm and sold in Village Market*

Marketing Costs and Profit Margins	Buffalo Milk				Cow Milk	
	Traditional technique		By using separator		By using separator	
	\$/ Kg	%	\$/ Kg	%	\$/ Kg	%
Production cost	0.291	35.43	0.287	35.16	0.337	10.87
Processing cost	0.128	15.58	0.169	20.69	0.167	5.39
Value of butter produced	0.406	49.42	0.481	58.91	0.205	37.06
Value of cheese produced	0.416	50.58	0.335	41.09	0.349	62.94
profit margin of processing	0.403	48.99	0.360	44.15	0.050	9.08
Total value of processed products	0.822	100.00	0.816	100.00	0.554	100.00

Source: Calculated from The Sample survey Data conducted in 2011 for the agricultural Year 2010/2011

*It does not mean that some of these products are delivered to urban market

Table 8 Spread of the Consumer's dollar spent on Buffalo Milk from Stall System

Marketing Costs and profit Margins	\$/ Kg	%
Production cost	0.524	49.10
Marketing cost	0.064	6.00
Producer's profit margin	0.480	44.90
Consumer Price	1.068	100.00

Source: Calculated from The Sample survey Data conducted in 2010 for the agricultural Year 2010/2011

Table 9 Spread of the dollars acquired by the spent on Milk Sold by Wholesalers to Dairy Plants

Marketing Costs and Profit Margins	\$ / Kg	%
Purchase price of kilogram of crude milk ⁽¹⁾	0.635	87.01
Marketing cost of wholesale stage	0.079	10.89
Sale value of skimmed fat from buffalo milk ⁽²⁾	0.086	11.76
Wholesaler's profit margin without value of skimmed fat	0.015	2.10
Wholesaler's profit margin with value of skimmed fat	0.101	13.87
Consumer Price at plant gate	0.730	100.00

1) Milk is mixture of: $(0.5 \text{ cow milk} \times 0.590 \text{ US\$}) + (0.5 \text{ buffalo milk} \times 0.680 \text{ US\$}) = 0.635 \text{ \$ / kg}$

(2) Value of 3% fat skimmed from buffalo milk = $0.5 \text{ buffalo milk} \times 0.03 \times 5.72 \text{ US\$} = 0.08588 \text{ US\$}$

Source: Calculated from The Sample survey Data conducted in 2011 for the agricultural Year 2010/2011

Table 10 Spread of the Consumer's dollar spent on Milk Processed in Small dairy Plant

Marketing Costs and Profits	Fresh Cheese		Istanbul Cheese	
	\$ / Kg	%	\$ / Kg	%
Purchase price of kilogram of crude milk	0.665	38.64	0.665	28.68
Processing cost	0.526	30.54	0.225	9.71
Packaging cost	0.193	11.22	0.166	7.17
Transportation cost for refrigerators	0.00	0.00	0.077	3.31
Cost of storage	0.00	0.00	0.342	14.74
Total of operating cost	0.719	41.76	0.811	34.94
Sale price to retailer	1.367	79.39	1.823	78.55
Profit margin of processing stage	0.138	8.00	0.492	21.20
Cost of retail stage	0.047	2.72	0.047	2.00
profit margin of retail stage	0.153	8.88	0.306	13.18
Consumer Price	1.722	100.00	2.321	100.00

Source: Calculated from The Sample survey Data conducted in 2011

Table 11 Spread of the Consumer's dollar spent on Dairy Products of Modern Dairy Plant

Marketing Costs and Profit Margins	Fresh Cheese		Istanbul Cheese	
	\$ / Kg	%	\$ / Kg	%
Milk production cost in specialized dairy farms	0.437	25.39	0.437	18.84
Transportation cost to collection points	0.008	0.45	0.008	0.33
Producer's profit margin in specialized dairy farms	0.116	6.74	0.116	5.00
Sale price to collection points	0.561	32.57	0.561	24.18
Collecting cost and transportation to Processing plant	0.104	6.07	0.104	4.50
Purchase cost of kilogram of crude milk	0.665	38.64	0.665	28.68
Processing cost	0.526	30.54	0.225	9.71
Packaging cost	0.336	19.53	0.166	7.17
Transportation cost for refrigerators	0.000	0.000	0.077	3.31
Cost of storage	0.000	0.000	0.342	14.74
Total of operating cost	0.862	50.07	0.811	34.94
Sale price to retailer	1.367	79.39	1.823	78.55
Profit margin of processing stage	0.099	5.75	0.492	21.20
Cost of retail stage	0.047	2.72	0.151	6.51
profit margin of retail stage	0.153	8.88	0.306	13.18
Consumer Price	1.722	100.00	2.321	100.00

Source: Calculated from The Sample survey Data conducted in 2011

Table 12 Cost Structure of Processing of Common Cheese Types in Egypt

Type of cheese	Vita	Fresh White cheese	WHITE STORAGE	PROCESSED	ISTANBUL CHEESE
Cost Item	%	%	%	%	%
Permanent Labor	33.79	40.29	38.51	38.72	41.34
Depreciation of equipment	30.24	26.18	25.79	27.01	29.39
Depreciation of Buildings	5.22	5.99	5.81	8.09	5.77
Taxes	5.32	8.2	12.83	7.96	6.99
Rent	9.22	9.59	9.15	3.61	3.68
Water Use	5.18	1.81	1.41	9.8	8.1
Electricity	8.36	6.3	4.47	2.65	2.9
Maintenance	2.66	1.64	2.03	2.15	1.82
Total Fixed Costs	100	100	100	100	100
Raw Milk	69.57	72.93	76.87	95.94	91.69
Packaging	14.40	19.32	13.28	0.00	0.00
Temporary employment	1.19	0.79	0.53	1.2	1.79
Storage	0.00	0.00	2.18	0.00	3.13
Using Warehouses	0.00	0.00	0.00	0.00	0.64
Others	14.84	6.96	7.14	2.86	2.75
Total variable costs	100	100	100	100	100

Source; Calculated from the sample survey of 2011

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