

Development of Transportation System: Case Study Dairy Development Corporation Lumbini Milk Supply Scheme

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<p>Abstract</p> <p>This is a quantitative research thesis for a commissioning company called Dairy Development Corporation Lumbini Milk Supply Scheme Nepal. The topic concerns the development of its transportation system. The main aim of this research is to improve the delivery of raw milk from the collection centre to the main plant, with attention to cost and performance.</p> <p>Transportation managed by the company itself and outsourcing were chosen as possible options to develop the transportation system. The main theories used in this research are internal management and outsourcing. The current situation of the delivery of raw milk and its supporting factors were analysed through data provided by the case company and data obtained during a field visit.</p> <p>An analysis of internal management was done on the basis of cost and performance in case the commissioning company wishes to manage the transportation system itself. For the other option, , an analysis of outsourcing on the basis of cost and performance was also done by obtaining price a quotation from one logistics service provider.</p> <p>To find the best option , a comparison of internal management versus outsourcing was done. And the result was to outsourced if there will be no any obstacles from the staffs.</p>	
<p>Keywords Transportation, Development, Performance Measurement, Internal management, Outsourcing</p>	

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1 Introduction

Transport is the main activities that are responsible for the movement of materials or goods between its points in a supply chain (Waters 2003, 404).

Commissioning company is Nepal government owned company called Dairy Development Corporation's branch Lumbini Milk Supply Scheme, which produce and sales milk and milk products. Commissioning company has decided to manage its transportation activities/system due to the largest monetary expenses in tankers and drivers. Research is based on the facts that are visible during the field visit and analysis of the secondary data provided by commissioning company.

Result of this research provides them an options or ideas to develop transportation activities. Development of the transportation are based on the two ideas internal management and outsourcing where focuses is only in the delivery of the raw milks.

1.1 Objective of Thesis

Main problems arise in the point of delivery of raw milks for the commissioning company, so main objectives of this research are in management of raw milk delivery. All the activities that involves in the raw milk deliveries are analyzed on the basis of cost and performance. Outsourcing cost is also analyzed by choosing one of the logistic provider companies for the better management.

Core result of this thesis helps case company to improve and develop its transportation with the available resources they have. In some point they will understand which is beneficial for the company either outsourcing or by own. Case company will get choice either to outsource or not.

Dairy is planning to manage the system so that they can manage with the tankers and divers they have right now. They were also thinking to take some tanker from the other company to operate for them. They want to minimize cost and increase good performance (fast and smooth operation).

1.2 Research Question and Investigative Questions

Research question for this research is How to develop/improve transportation system of Lumbini Milk supply scheme?

Investigative question for the research question are:

IQ1. What is the current situation of transportation system in Dairy?

IQ2. What are the possible options for transportation management?

IQ3. What will be the best option, either outsourcing or own or combination of both in terms of cost and performance?

In this research, mostly analyses of secondary data are done and for the outsourcing rough quotation is taken from other company that provides logistic service. Measurement questions for all above mentioned investigative questions are details shown in the Overlay matrix in Attachment 1

1.3 Demarcation

Case company is one of the largest companies and it has lot of branches all over Nepal. Research is only done in one of its branch that is in Lumbini Milk Supply Scheme.

Research is based only in transportation of raw milk (delivery of raw milk) from collection point to the main plant. Supporting factors for delivery of milk like Tanker and Staff, cost and performance is included.

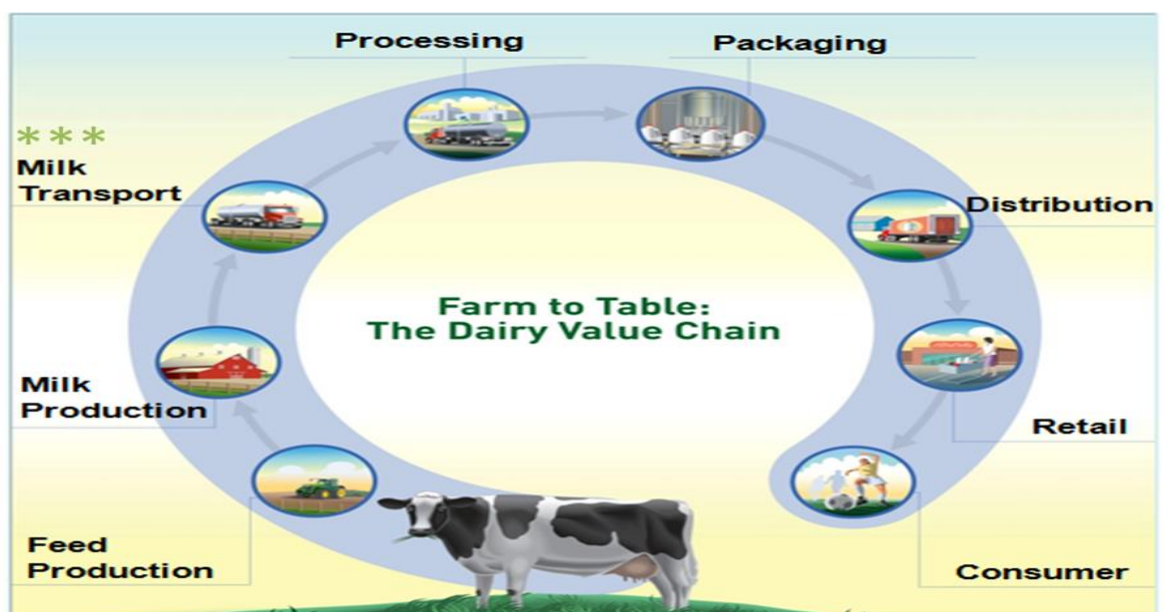


Figure1. Dairy value chain (Patel 2013-15).

In figure 1. it shows clearly the limitation of this research with green *** sign in the whole Dairy value chain.

1.4 Research Process

This thesis is based on quantitative research. All the data are used from the real source from the company and some during the field visit. Analysis and comparison is done for the recommendation for better management.

Quantitative research are based on the numerical measurement of specific phenomena that are abstracted from particular instance to seek general description or to test hypotheses and seeks measurement and analyses that are easily replicable by researcher (Thomas 2003, 2).

In this research, numerical values are used that are to be analysed so this thesis is a quantitative research. It is easy to deal and represent all the data with numerical values for the clear understanding so quantitative research is selected. Case study and field visit are the methods for the research to collect data.

During the data analysis there arise lot of problem like risk in leakage of internal confidential data and difficulties in translating data from local language to English but everything went safely and took lot of time.

Research process is represented in a research design and methods flow chart in the figure 2. And types of researches are explained in the subheading below.

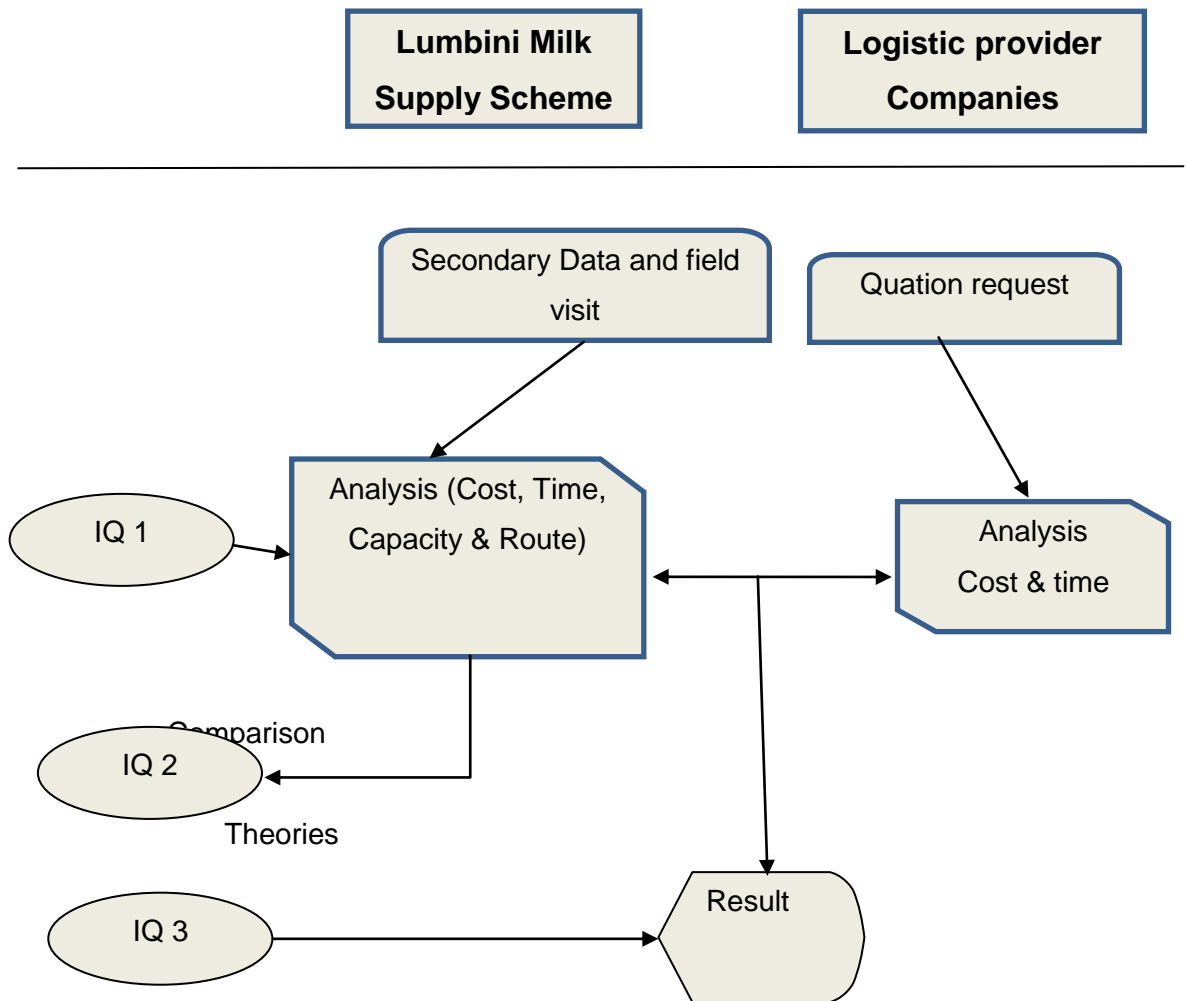


Figure 2. Research Design and Methods of research

1.4.1 Case Study

As stated by online dictionary, "case study is defined as a published report about a person, group, or situation that has been studied over time and also a situation in real life that can be looked at or studied to learn about something" (Merriam-Webster 2015).

Studies are done inside the boundaries of case company. In this case some data that are used are unpublished by the case company. Study is done directly from the company's data that are stored in the account department. No sources are explained for certain data

that are unpublished by case company. Analysis of data from case study is based on the data from year 2012- 2013. All the research is done while visiting the case company. Local currency is translated to euro for better understanding and calculation. Currency exchange rate is assumed to be fixed 1 euro is equivalent to 110 Nepali rupees because of time to time variation in exchange rate.

1.4.2 Field visit

Studies that are conducted outside the work place, library and laboratory for the collection of information /data for a particular purpose is field visit research (Wikipedia A 2015).

Field visit was conducted to collect data about the distance between the plant and collection center, time that tanker takes to reach and the time that are wasted during the delivery of milk process. Every data are taken in average so that it can be analyzed easily. Field visit was done in year 2013 and 2014, travelling in tanker and visit different collection center.

Based on the observation during field visit and the data obtained as a secondary source, all data analyzed are accurate.

1.5 Key Concepts

Transportation

Transportation is a main activity that is responsible for the movement of material or goods between its points in the supply chain (Waters 2009, 404).

There are lot of transportation mode used in the supply chain according to the demand, situation and availability. Some modes are air, road, water, rail, and others. In context to case company only road transportation is an option.

Transportation system

System that is used to provide innovative services related to the different mode of transport and its management and also providing user of transport better information for safer and smarter use of transport network (Wikipedia B 2015).

Development

The process of growing, improvement and managing by the creative knowledge and concept is known as development. In business, there are lots of words connected with it (Wikipedia C 2015).

In the case of this research development refers to the improvement and management where transportation of raw milk is managed and transportation system is improved.

Supply Chain

“An interrelated series of processes within and across an organization that produces a services or product to satisfaction customer”(Krajewski, Ritzman, Malhotra & Srivastava 2012, 4).

“It is a network of partners who collectively convert basic commodity into finished product that is valued by end customers and who manage returns at each stage” (Harrison 2011, 7).

Supply Chain Management

The synchronization of a firms processes with those of its suppliers and customers to match the flow of materials, services and information with customer demand (Krajewski, Ritzman, Malhotra & Srivastava 2012, 4).

Activities encompass the planning and controlling of all processes involved in procurement, conversion, transportation and distribution across supply chain. It also includes coordination and collaboration between partners (Harrison 2011. 7).

Logistic

“Logistic is a function responsible for all aspects of movement and storage of material on their journey from original suppliers to final customers” (Waters 2009, 4).

“Task of coordinating material flow and information flow across the supply chain to meet end customer needs” (Harrison 2011, 7).

Performance Management

Performance measurement is the achievement of performance target through the effective management of people and environment in which they operate (Chartered Quality Institute 2016).

There are lot of tool that are used for the measurement of the performance. More detail about performance is described in the heading internal management.

2 Case company

Dairy Development Corporation (DDC) established under corporation Act 1964. DDC is a fully Nepal government owned company provide milk and milk product in 34 district, initiated for the economic development of poor farming communities around the country. It has annual collection of over 60 million liters of milk from more than 75 thousand farmers through 888 milk cooperatives. They have in total of 948 permanent staff working in different field under different Milk Supply Scheme. They also have temporary staffs as well as daily wages staff.

Dairy Development Corporation has 11 cheese manufacturing plants, 7 Milk Supply Scheme and one Milk Product Supply Scheme with 63 milk chilling plants within the country. Altogether they have 54 Franchise, 1702 Milk sale booth, 10 sales Center and 13 distributors. In fiscal year 2008-2009 they have collected approximately 148,000 liters of milk per day from the farmers. Their products are mainly Milk (Fresh and Normal), Paneer, 3 varieties of Cheese (Mozzarella, Kanchan and yak Cheese), Ghee (Normal and Yak), Butter (Normal and Yak), Yogurt, Sweets, Cream and Ice-Cream.

Since few years milk production has been increased and DDC couldn't buy all milk produced by the farmer during the flush season. So they have introduced Milk holiday on certain during those period. Whereas in lean period they had to import skimmed milk powder to meet consumers demand. To manage this problem, they have initiated Skimmed Milk Powder Plant in 1991 with assistance of Danish Government and operation start since December 1994. Capacity of powder plant is 3 million tons per day.

DDC main headquarter is in Lainchour Kathmandu which is also known as Milk Product Supply Scheme. Different Supply Scheme (project) has different project manager and all of them are controlled by General Manager from Headquarter. DDC comes under Ministry of Agriculture so General Manager is appointed by them.

(Dairy Development Corporation 2015)

Case company plants and main focus plant is shown in figure 3.

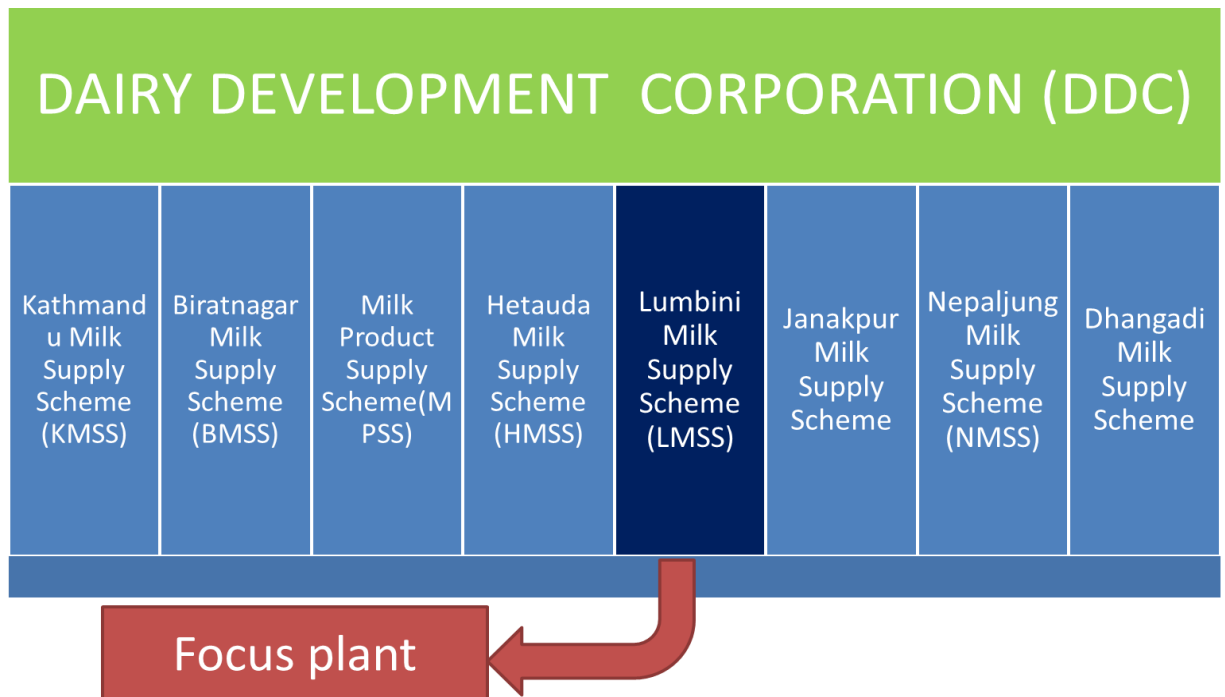


Figure 3. Case Company branches and focuses plant

Lumbini Milk Supply Scheme is one of the projects of DDC established in 2046 BS (1989 AD). Its capacity to handle milk is 1500 liters per Hour. They have 6 chilling centers and its daily Collection is about 20000 liters of milks around 10 collection centers during slow period. They have only 5 tankers with the capacity of 5000-6000 liter. There are altogether 50 permanent and some temporary and daily wages workers with different ranks working in different department.

Altogether they have 9 Franchise, 81 Milk sale booths, 2 sales Center. Major production in this project is Standard and Full Cream Milk, Ghee, Yoghurt and sweets (Rasbari). This projects average turnover and profits per month is shown in figure.4.

(Dairy Development Corporation 2015).

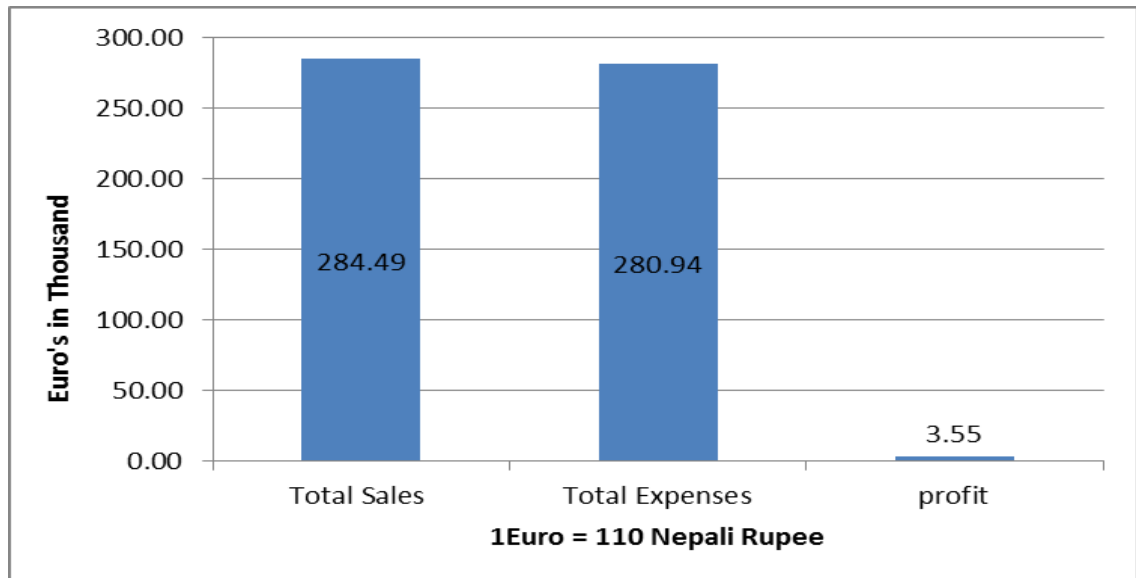


Figure 4. Average Monthly Sales, Expenses and Profit of Lumbini Milk Supply Scheme

According to data of 2013, around 285 thousand euros was total average sales whereas about 281 thousand was total average expenses. On the basis of average sales and expenses monthly profit is calculated Average profit per month was 3500 euro. (Figure 4.)

In total sales it includes all the sales of milk and dairy product produced by Lumbini Milk Supply Scheme. In expense purchasing of raw milk, collection cost, refining cost, packaging, distribution, operating cost, production cost, and management cost are included.

Lumbini Milk Supply Scheme have certain future goals for the future, they are:

- Provide a guaranteed market for milk to the rural farmers with fair price.
- Supply pasteurized milk and milk products to urban consumers.
- Develop organized milk collection system.
- Develop an organized marketing system for milk and milk products in urban areas.
- Increase sales by 20 percent
- Increase more collection Centre and increase fresh milk production
- Develop tanker management

(Dairy Development Corporation 2015).

3 Internal Management

Internal management is also known as internal control. It is a process, affected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives of effectiveness and efficiency of operation, reliability of financial reporting and compliance with applicable law and regulations.

Effectiveness and efficiency of operation includes performance and profitability goals and securing of resources whereas reliability of financial reporting is related to the preparation and publication of financial statement, and compliance with applicable law and regulation ideals with complying with those laws and regulations to which the entity is subject. Internal control as having five components:

1. Control Environment -Set: control consciousness of its people.
2. Risk Assessment : identify, analysis and management of risk
3. Information and communication system or processes: exchange of information for own people to carry out their responsibility
4. Control activity: policies and procedures that help to ensure management directives to carry out.
5. Monitoring: process used to asses quality and performance.

(Committee of Sponsoring Organizations of the Treadway Commission 2015).



Figure 5. Internal Control Process (U.S. Commodity Futures Trading commission 2012)

(Figure 5.) shows the process for internal control which are linked with each other and are narrowed down to monitoring form environment and for that, information and communica-

tion play and vital role. Manager in an organization play a vital role in the management and for that logistic strategy need to be formulated step by step and need to implement (Figure.6.)

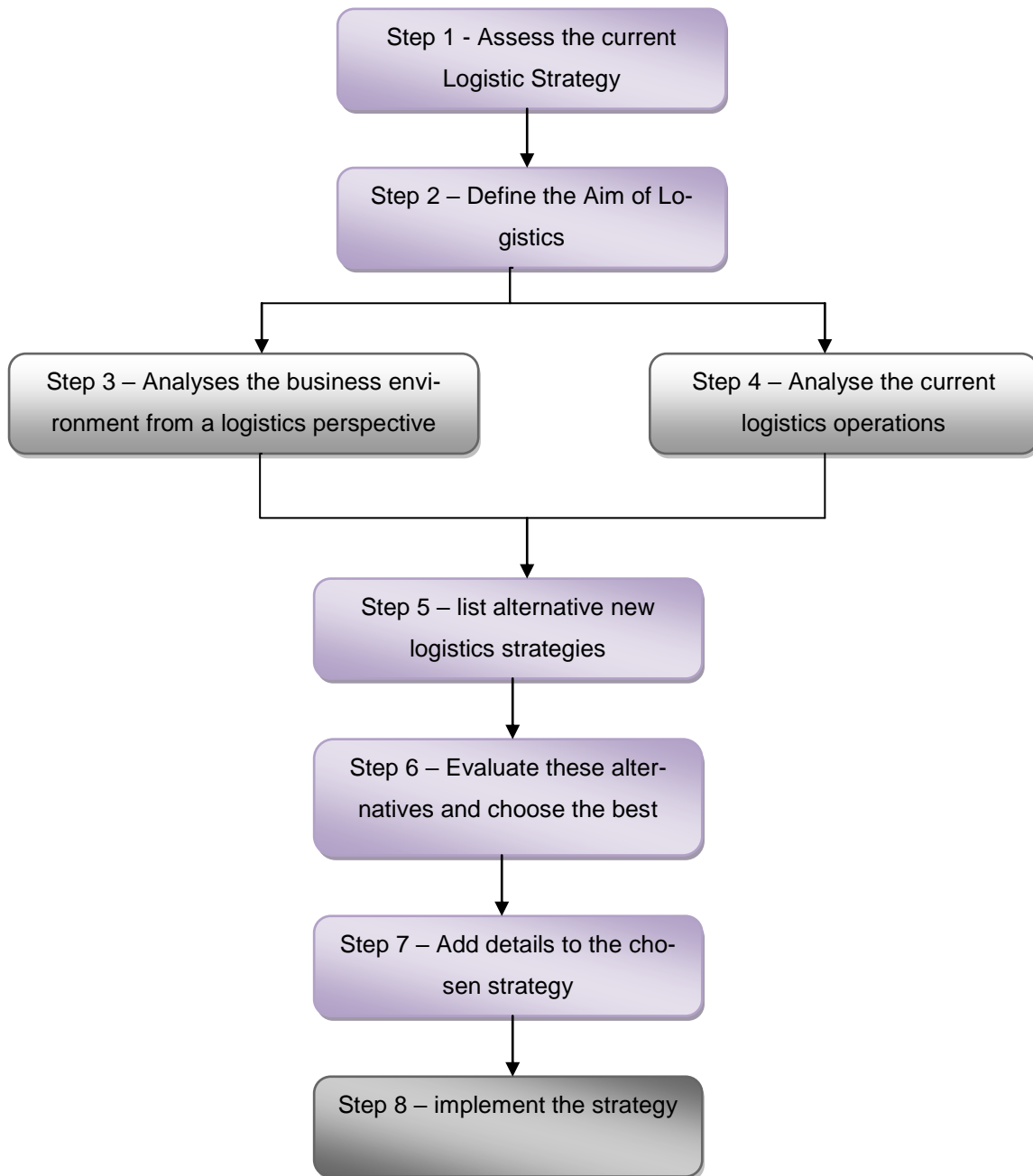


Figure 6. Steps in designing a logistic strategy (Waters 2009, 76)

As stated by Donald Waters (2009, 76), "our mission is to help the business achieve its long term goals by providing the best possible logistic support. We provide flexible, efficient, reliable and cost-effective services that satisfy the demand of our customer, both internal and external".

Under internal management or control main focus will be only on the basis of cost and performance for that cost management and performance management is important. For the better management, every firm need to focus on the direct or indirect costs that are visible or hidden in their supply chain. Logistic cost in the company are higher compare to the other cost so main focus need to be given to the logistic cost for the better management of the supply chain. Cost management and logistic performance management are explained details under below:

3.1 Internal Management on the Basis of Cost

For the internal management, there need to be focused in cost so cost management / cost control play vital role in the internal management of transportation.

As stated by U.S. Department of Transportation Federal Highway Administration (2012), “Cost management is the effective, overarching control of an organization's finances across multiple stages”.

Cost management gives a clear picture of cost benefit relationship of various activities of an organization. Cost management includes four stages as cost management system that needs to be focused step by step. (Figure.7.)



Figure 7. Cost Management system (U.S. Department of Transportation Federal Highway Administration 2012)

It is like a closed loop, all these four stage are interdependent and decision made in any of this stage will affect the whole system. These four stages are: initial planning of costs,

continues through cost tracking and analysis of the information collected, and includes evaluations and decisions based on information from the previous stages.

- Cost Planning : That includes cost Estimating , forecasting and budgeting
- Cost Tracking : That includes discrete coding of activities and their related cost like personnel time sheet , expenses and use of financial system
- Cost Analysis: that includes reporting on the cost and analysis of that cost
- Evaluation and Decision: That includes evaluation of cost with process implemented, consideration of shifting funding sources and options, assessment of current asset management and resource utilization, and decision making regarding cost recovery

Cost planning is done before hand whereas cost tracking is backward looking for discrete coding of activities that is tracking time and expenses related to specific activities which includes methods such as time collection and expense accumulation. Cost tracing is a most critical stage of cost management system because inaccurate data will lead to the poor decision and poor planning.

(U.S. Department of Transportation Federal Highway Administration 2012.)

Cost analysis helps to identify the problems where there is high cost by analysing the cost that is tracked. After that it is easy to evaluate and make a proper decision to overcome that cost.

3.2 Internal Management on the Basis of Performance

According to Business dictionary performance is the accomplishment of a given task measured against pre-set known standards of accuracy, completeness, cost, and speed.

Performance plays a vital role in an internal management /control. Measurement of performance is essentials in an organization, for that there are different indicators that are used according to the organizational structure and function. Measure of performance shows when operations need to be improved and for that manager need to analyse the details of operations.

Without the measure of logistic performance manager have no idea how well operation is going on, either they meet objectives or not, how they compare with their competitors and

how performance has changed over time. There are two types of measure for the logistic performance; they are general measures and specific measures.

General measures are:

- Financial measures: concerns with the measures of finances performance such as return of assets, payback period or contribution to profits. Financial measure also assumes that firm know their logistic cost.
- Capacity and Utilisation: maximum amount that can be moved through it in a specified time is capacity. Utilisation shows proportion of designed capacity that is actually used.
- Productivity: It is an amount of work done by each persons or resources. Broad picture comes from total productivity, which relates throughput of the supply chain to the amount of resources used.

Specific measures which are related to the measures of transport and warehouse performance and they are:

- Product availability and Reliability of delivery
- Total travel time and distance
- Delivery cost, Prices and discount offered
- Information available
- Order location and tracking
- Orders received on time
- Mistakes in delivery
- Customers satisfaction
- Loss and damage
- Size and capacity of vehicles and Time to load and unload
- Total weight moved and area covered

For the clear view of the logistic, all of these measures must be:

- Relate to the objectives and be objective
- Focused on significant factors
- Be measurable
- Look at current performance, not history
- Allow comparison over time
- Understandable by everyone

- Be difficult to manipulate , avoiding false values
- Be useful in analyses'

For a broad view of performance related to the delivery are:

1. Vehicle Fill – giving the utilization of vehicles capacity , measured by weight , pallet numbers and average pallet height .the majority of loads are unitised on pallets or in roll cage and in some case volume, in so utilisation is the ratio of actual number of units carried to the number that could have been carried
2. Empty running – the distance vehicle travelled empty excluding the return movement of empty packaging or handling equipment where this prevented the collection of a backload
3. Vehicle time utilisation – record of the hourly view of the dominant activity, classified as running on the road , stationary during the drivers rest period, loading and unloading and awaiting departure, delayed , undergoing maintenance or repair and empty and stationary
4. Deviation from schedule – recording significant delays due to any reasons like problems in the collection point , problem at delivery point, company actions, traffic congestion, equipment break down, or lack of driver or vehicles.
5. Fuel consumption – giving fuel efficiency in terms of per kilometres.

For the procedure improvement, management need to focus in plan-do-check-act cycle. Plan refers as looking at existing logistic, collecting information; discuss alternatives and suggestion for improvement. Do refers to the plan is implemented and data is collected on performance. Check refers to the analyses the performance data and check expected improvement actually appeared. Act refers to the real improvement that is visible and new procedures are made permanent. If no improvement then new procedure are not adopted.

(Waters 2009, 436-468.)

4 Outsourcing

Outsourcing is defined as a transfer of activities that were previously conducted in-house to the third parties for the exchange of assets, knowledge, and employees in order to maintain long term relationship with experience in cost and risk for both parties. (Weele 2006, 119.)

Outsourcing involves the sourcing of goods or services previously produced internally within the sourcing organization from external suppliers. It can involve transfers of entire business function. (Ronan 2005, 7.)

Outsourcing may lead to the transfer of only some activities where as others are kept in-house. It also involves the transfer of both people and physical assets to the suppliers. Many companies have always hired second or third parties for particular types of work, or to level-off peaks and troughs in their workload, and have formed long-term relationships with them. According to “Van Weele (2006, 120)” outsourcing are done in the three different forms which contain labor, mixed and complete. In outsourcing of labor or employee only employee are taken from the third parties firm to do the work in the main company to complete a certain or long term project. In the mixed there will be the outsourcing of some of the followings: employees, materials, process and system, technology and equipment, facilities and management or supervision. Whereas in Complete outsourcing all of those in the mixed are completely outsourced. (Figure 8.)

	<i>Labor outsourcing</i>	<i>Mixed outsourcing</i>	<i>Complete outsourcing</i>
Contractor provides...	<ul style="list-style-type: none"> Some employees 	Some or all of the following: <ul style="list-style-type: none"> Employees Materials Process and Systems Technology and Equipment Facilities Management/Supervision 	<ul style="list-style-type: none"> Employees Materials Process and Systems Technology and Equipment Facilities Management/Supervision
Host firm provides...	<ul style="list-style-type: none"> Some employees Materials Process and Systems Technology and Equipment Facilities Management/Supervision 	Some or all of the following: <ul style="list-style-type: none"> Employees Materials Process and Systems Technology and Equipment Facilities Management/Supervision 	<ul style="list-style-type: none"> Program management

Figure 8. Forms of Outsourcing Services (Weele 2006, 120)

Types of outsourcing

Mainly there are 2 types of outsourcing:

- Partial Outsourcing: only a part of an integrated function is outsourced
- Turnkey outsourcing: applies when the responsibility for the execution of the entire function (or activities) lies with the external provider

Due to the development and trends of outsourcing as a business strategy, organizations have options for outsourcing on the basis of the advantage and disadvantages of its types. Advantages and disadvantages of Partial and Turnkey outsourcing are explained. (Figure 9.)

	Advantages	Disadvantages
Turnkey outsourcing	<p>Buyer has minimal responsibility for outsourced processes</p> <p>Buyer doesn't need to have experience with similar projects</p> <p>The project generally goes smooth for the buyer</p>	<p>The buyer has limited influence on the determination of the price and little insight in cost structure of provider</p> <p>Buyer has limited influence on the staff, technology and materials used and their quality</p> <p>Large dependence of buyer on provider resulting in high commercial, technical and performance risks</p>
Partial outsourcing	<p>The buyer has more influence on prices, rates and costs</p> <p>The buyer has more influence on the staff, technology and materials used and their quality</p> <p>Specific advantages can result in cost reductions</p>	<p>Buyer is required to have knowledge of the separate parts of the outsourced function/ activities</p> <p>The buyer is required to have the organizational capabilities to coordinate and integrate the outsourced function / activities</p> <p>Communication and coordination problems between parties involved can be a cause of delay and disappointment</p>

Figure 9. Partial versus Turnkey Outsourcing (Weele 2006, 121)

Nowadays many firms do outsourcing of their internal and external activities due to the tactical and strategic reason. Both of these reason comes under the one objective to improve overall performance of organizational activities. These strategic and tactical reasons behind outsourcing are:

1. Improve company focus on their strategies
2. Gain access to world class capabilities
3. Get access to resources that are not available internally
4. Accelerate reengineering benefits
5. Improve customer satisfaction
6. Increase flexibility
7. Sharing risks
8. Reduce control costs and operating costs

9. Free up internal resources for other activities
10. Receive an important cash infusion
11. Improve performance
12. Ability to manage functions that are out of control

First 7 reasons come under strategic where as other in tactical reasons behind the outsourcing. With the help of all these reasons organization can improve their activities either in cost or in performance. Every action has certain advantages as well as disadvantages, so before taking action organization need to know that advantages and disadvantages of outsourcing.

Advantages of outsourcing:

- Investment can be concentrated only on core activities by freeing up cash.
- Optimal use and sharing of experiences of knowledge, equipment with third parties.
- Work load can be easily absorbed
- Help in focusing primary processes
- Reduces upcoming risk or sharing of risk

Disadvantages of outsourcing:

- Increase dependency
- Increase in follow-up and monitoring of their activities
- Risk of communication and organizational problem
- Risk in leakage of confidential information
- Loss in essential strategic knowledge

Even though there are Some plus and minus points in the outsourcing decision, successful outsourcing depends on; having the right strategic reason to outsource, selecting right function or activities to be outsourced and selecting the right supplies to outsource to.

For the outsourcing activities, organization need to know what activities to outsourced.

There are three phases for the outsourcing process. These phases are:

1. Strategic phase: in this phase motives for outsourcing, Which activities or functions are outsourced and Qualifications of the supplier are analysed on the basis of core competences, cost efficiency/effectiveness, services, cost and Technical and managerial qualities to achieve demanded level of performance.

2. Transition phase: this phase includes Contract negotiation and Project execution and transfer. Contract makes a legal relationship depending on the characteristics of outsourced activity. There are different types of contract and contract type has a great impact on the success of the joint operation. In some case testing is done for the outsourcing.

3. Operational phase: in this phase outsourcing will deliver its expected result. Successful outsourcing depends heavily on close cooperation with the supplier in sharing goals and objectives, Mutual dependence, Open lines for communication, Concern for the other's profitability, Mutual commitment to customer satisfaction and Trust

Contract negotiation in transition phase is much more important. In outsourcing function there are different types of contract that are used to bind both parties for their operations. Different types of outsourcing contract are explained in figure 16. Contracts should include following terms in outsourcing agreement; the scope of the service, Terms of agreement, Rates, fees, incentives, Termination plan, Conflict resolution, Communication, Management and control and others like Warranty and confidentiality and many more depend on contract.

Lump sum turnkey	Contract is based upon a fixed price (per period) for executing the project or a certain activity
Reimbursable turnkey	The provider is compensated for all costs that he incurs for executing the project or a certain activity
Semi lump sum turnkey	Part of the work is compensated on a fixed price basis; the other part is compensated on a reimbursable basis
Lump sum fixed price	The supplier agrees to complete the work against a fixed price based upon a predefined, detailed scope of work. Everything that is not included in the scope of work is settled between parties on an ad-hoc basis
Cost reimbursable	The supplier agrees to complete the work on open book, open cost basis based upon a general scope of work. There is no sharing of savings
Guaranteed maximum contract	The same as a cost reimbursable contract, only the outsourcer pays to a certain agreed maximum. The extra costs are for the supplier
Share the savings / loss (target price contract)	The services are paid for on a reimbursable basis. When the contract costs are higher or lower than the original budget (target price), the difference is shared between parties on a pre-agreed basis
Unit rate	Rates are agreed for regular, routine activities, the size of which cannot be anticipated. Rates are defined per m2 of paint, meter of cable to be installed, etc. Payments are made based upon actual use.

Figure 10. Different Types of Outsourcing Contract (Weele 2006, 130)

Above mentioned types of contract in figure 10 also have some risks are:

- Technical risks: related to the extent to which the supplier is able to provide the desired functionality and performance.
- Commercial risk: related to the uncertainty with regard to the price we will pay and the costs that we will incur when having outsourced our activities to the supplier.
- Contractual risks: does the contract in sufficient detail describe the performance that is expected from the supplier.
- Performance risks: related to the chance that the supplier is not capable of doing the job he was hired for.

Good Contract, trust and relationship can overcome all the risks that may occur in outsourcing activities. The outsourcing strategy should be in line with the overall corporate strategy for the successful outsourcing.

(Weele 2006, 118 – 136.)

5 Analysis

Under this topic, analysis of current situation, analysis for internal management and analysis for outsourcing is described.

5.1 Analysis of Current Situation

Here current situation of case company on the basis of field visit and internal data analysis, like production of its different collection centre and number of tanker staff, number of tanker and total expenses are graphically represented to understand the area where arise higher cost and lower performance.

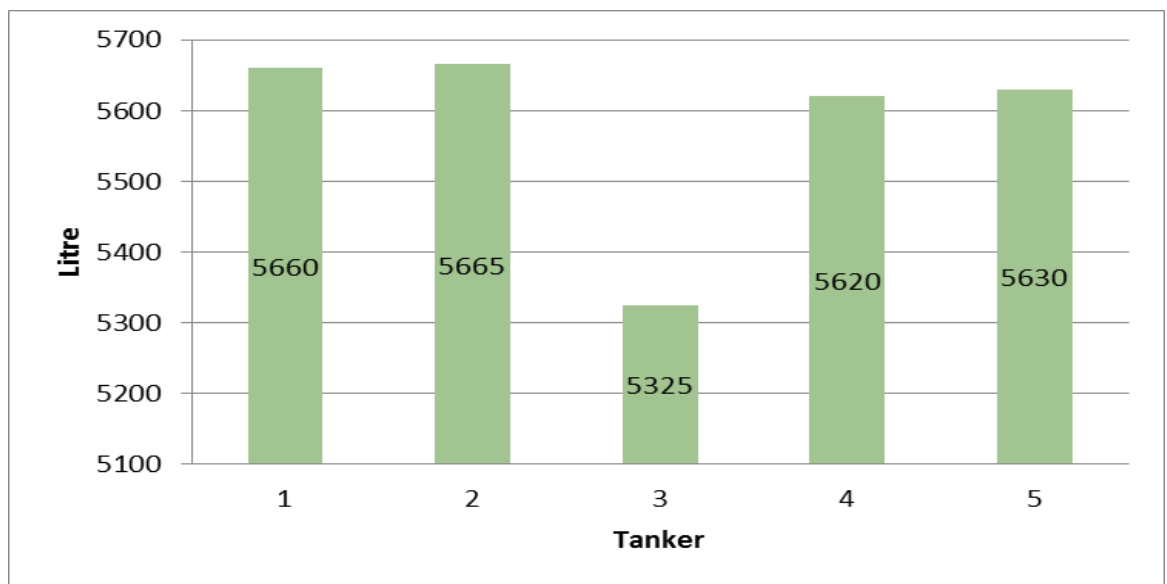


Figure 11. Tankers with their capacity

(Figure 11.) shows capacity of different tankers. Highest capacity is 5665 litre whereas lowest is 5325 litre. Average capacity is 5580 litre of milk. Details of tanker capacity according to the tanker number and its chambers capacity are shown in Attachment 2.

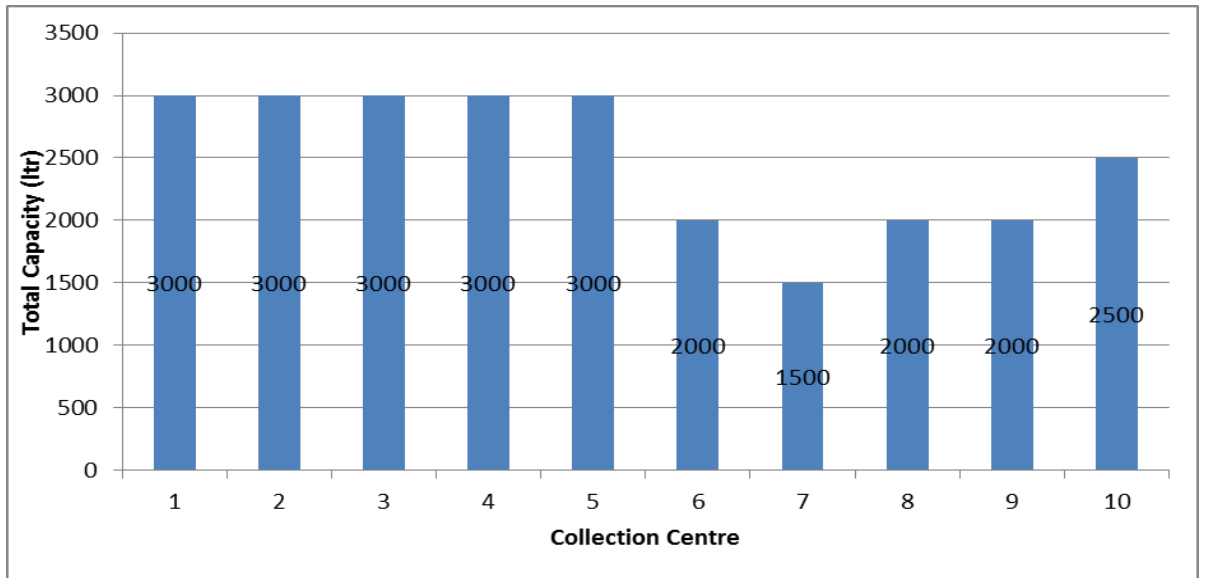


Figure 12. Collection Centre with their Capacity

(Figure 12.) Shows the name of the collection centre are not mentioned but in figure 7 there mentioned name of all collection point serially in anti-clock wise like 1 represent Chanauta, 2 represent Lumbini. In total of 10 collection centres they have average capacity of 2500 litre of milk collection daily. Most of the collection centre can collect maximum of 3000 litre of milk daily whereas lowest collection is 1500 litre of milk daily.

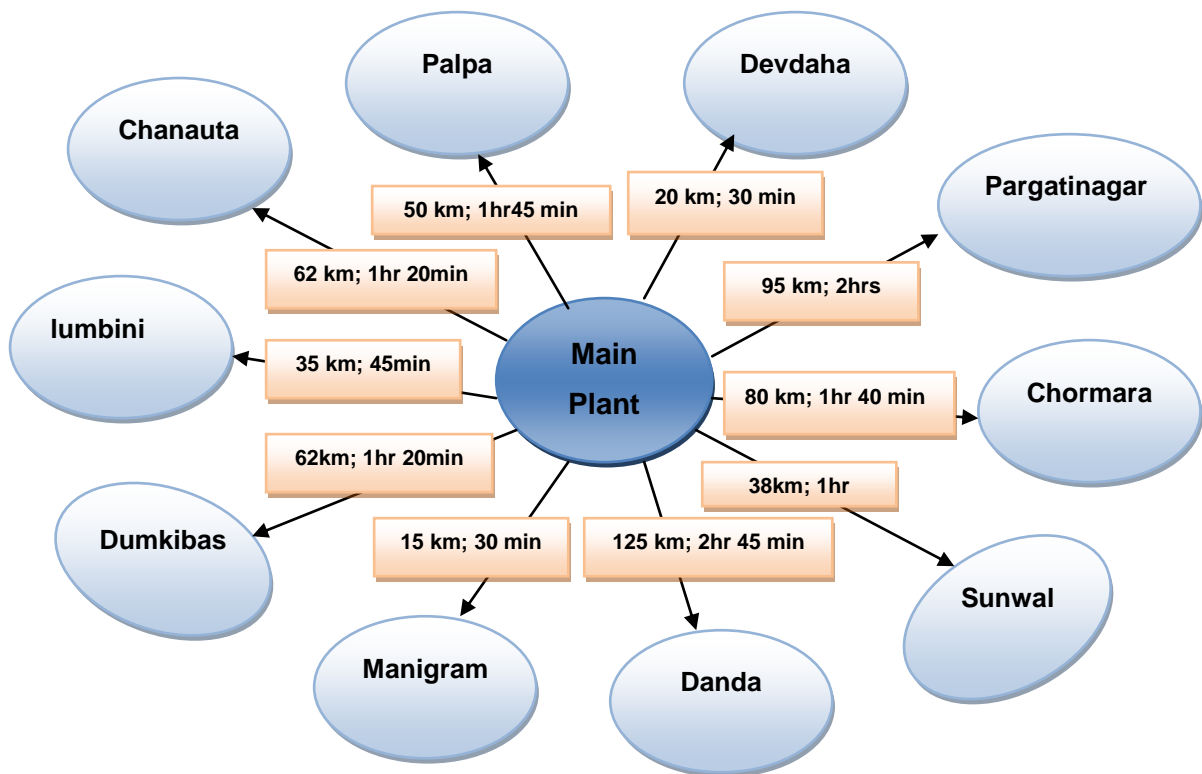


Figure 13. Distance and one way travelling time for different Collection centre to main plant

With the references to the appendices attachment 3, Figure 13 is represented and time to travel is taken during the field visit. Longest distance is 125 kilometres which Take 2 hours 45 minute to reach from main plant to collection centre. Only to reach there I take 2.75 hrs and same for return back so almost one driver and helper time spend there. Loading and unloading time is different. In most of the collection there is lot of free time for driver and helper because there is late in collection of milk from farmer.

In most of the collection centre, at least 20-35 minute is loading time because they are not ready to load milk from the container till they have collected all milk from all organization and farmer. Main communication is by phone so, Collection centre officer estimate total collection of milk and call main plant to send tanker for delivery.

During the field visit it was noticed that, all driver and helper have at least 1 -2 hours free time in the collection centre which is useless. For the shortest route they can do 2 trips a day only if everything goes perfectly in time. Most of the case they do 2 trips with overtime pay for short route.

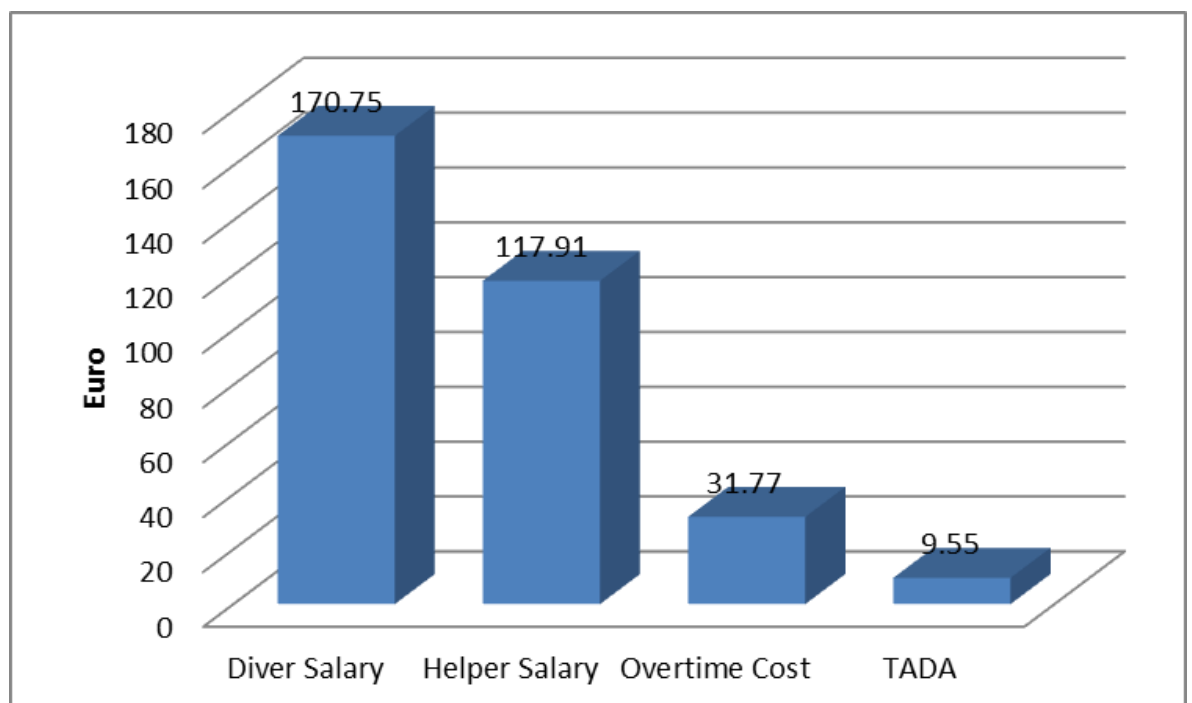


Figure14. Average Monthly per Tanker Staff Expenses

(Figure 14.) explains about the average monthly per tanker staff expenses on the basis of data taken from company account section. Details about basic monthly money they re-

ceives excluding subsidies they get from company and Travelling money (TADA) are show in the Appendices attachment 4. Most of the drivers have same basic salary of 67.91 euro per month but they received more money as grade money and overtime money. Grade money depends on the post of the driver they are in the company. Grading of staff in the government office is starting from office boy, 1, 2 to 13. Most of the drivers in Lumbini Milk Supply Scheme are in 5 to 6 rank position. All the drivers are permanent government staff so they get other benefit like daily litre of milk and monthly ghee which make their salary more. Total monthly money company invest per driver = monthly money received + daily litre of milk + monthly ghee

This is equal to $(120.75 + 1.5 * 30 + 5)$ 170.75 euro per month in average.

Average salary of helper on the basis of basic salary is 61.85 Euro per month excluding daily milk and monthly ghee received by them and overtime money. New driver and helper get less travelling money because they are only hired by the company to work in that branch only. That means that they are daily wages staff not a government staff.

In the same way as driver, calculation of total monthly money company invest per helper is 117.91 euro.

On the basis of 3 month data, Average TADA (travelling) is about 9.95 euro per month, whereas overtime money is 31.77 euro per month. TADA and overtime pay is almost same for both driver and helper.

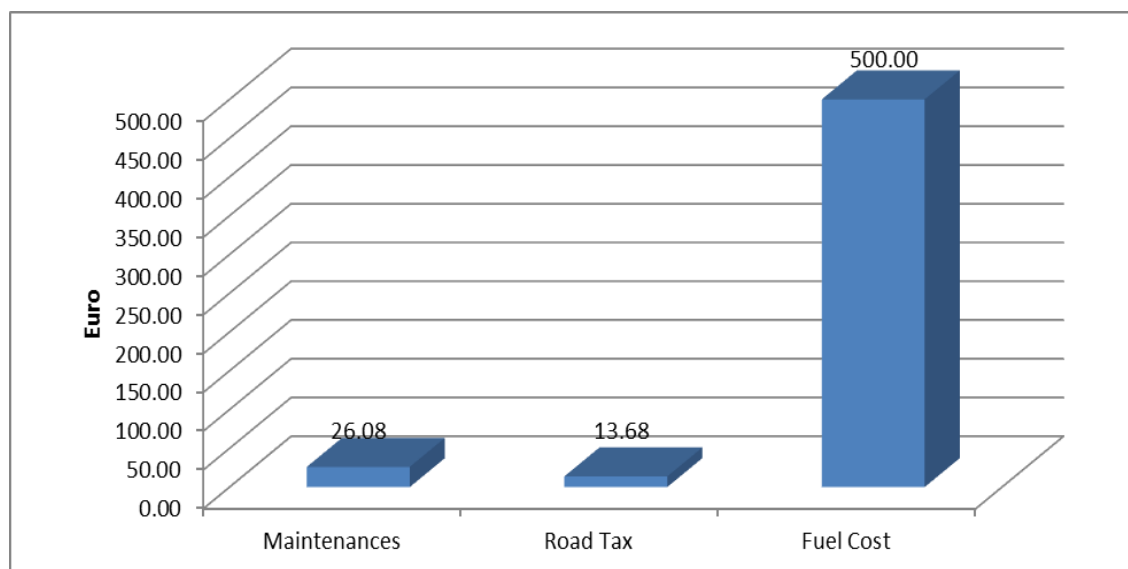


Figure 15. Average per Tanker Monthly Expenses

For the daily operation of tanker, they need fuel and road tax as well as maintenance. An average fuel expense per tanker is 500 euro per month and maintenances cost is 26.08 euro per month. It has been calculated from the total maintenance expenses which are divided to all Tankers they have. Fuel cost is calculate by taking average distance from main plant to collection centre divided by the average mileage given by tanker (6 km/ltr) times cost of diesel (rounded 0.90 euro per ltr) times 30 days. All data are from 2012-2013, only of 10 month record. (Figure 15.)

Road tax is the tax that is paid for the road services. Road tax is paid in different area in different route. It has to be paid per trip or per day depending on the rule of different road tax collection point. Average monthly road tax paid per tanker is 13.68 euro.

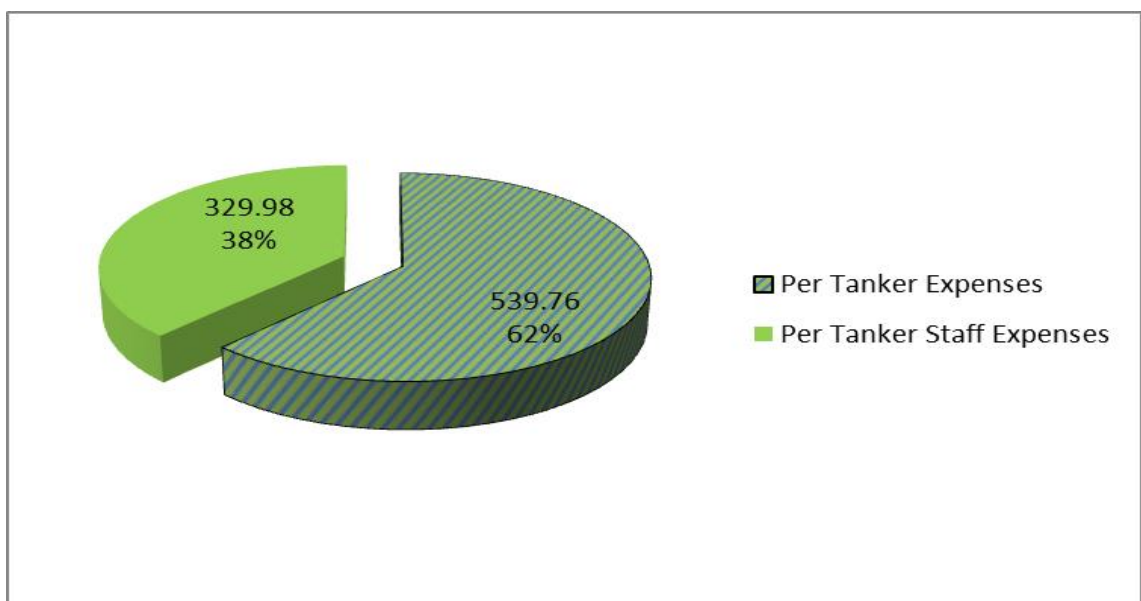


Figure 16.Total Monthly Expenses per Tanker Operation

Total per tanker expenses including Fuel cost, Maintenance cost and road tax is 539.76 euro per month, whereas staff per tanker expenses is 329.98 euro which includes driver and helper total salary, overtime pay and travelling money for driver and helper. (Figure 16.)

Total cost in per tanker for delivery of raw milk on the basis of 3 month data is 869.74 euro per month. In total expenses only 38 percentages of expenses is for the staffs whereas 62 percentages is for per tanker expenses. Staff expenses are higher due to the overtime payment.

5.2 Analysis for Internal Management

Under this heading analysis of cost and performance is explained for the case company for their own management.

5.2.1 Cost Basis

In the case of commissioning company, high cost arise in the overtime payment and tanker cost. Basic salary of tanker staff is constant every month, but the benefit that received is higher which need to be reduced. Overtime pay arises due to the driver's layoff time they have during the loading and unloading of the raw milk. Weaker decision by the management related to the staff working hours and poor scheduling increases the cost.

Based on the theories of internal management on the basis of cost, following changes need to be managed by the management:

- Route planning and tracking need to be done for tankers
- Effective flow of information by the collection centre officer related to the total milk collected and at what time they will be ready to deliver it every day so that tanker management officer can make better schedule for every tanker.
- Layoff time can be used for something productive like loading milk from the nearest collection point.
- Optimal use of drivers working hours by planning daily schedule.
- Day to day inspection of tanker so that It won't get damage at once.
- Staff in tanker (helper) can be cut off so that helper cost can be reduced. And staff in collection point and main plant and driver can load and unload milk.
- Replacement of tankers if need and using fuel efficient tanker to reduce fuel cost.
- Maximum utilization of resources (using tanker according to the drivers working hours)
- Use of new technology for check in and check out of tanker and staff.
- Reporting of followings, for cost analysis, evaluation and for future planning and decision:
 - Total operating cost per month
 - Cost per hours
 - Cost per mileage
 - Cost per day operated
 - Cost per vehicle
- Risk assessment to avoid upcoming risk and its management

5.2.2 Performance Basis

In the case of Commission Company, management can develop/manage their transportation system on the performance basis if they are ready to measure their performance. After measurement they have to analysis it and apply new procedure or ideas for daily operation. Based on the theories of internal management on the basis of performances, following performance measure needs to be done: Vehicle time utilisation, deviation from schedule, fuel consumption and drivers working hours. After all these measure company need to implement new procedure like new route plan and new scheduling of tanker, maximum use of resources (staff and tanker), time management, use of technology for communication and tracking .

From the research it have been noticed that problems related to the performance are in vehicle time utilization where staffs spend lots of their time in one collection point because of delay in collecting milk from farmer to collection point. Loading and unloading take more time due to old technology and utilize 2 staffs so use of new technology can reduce time and one staff cost. Layoff time can be used for contacting other collection point for delivery of milk if tanker has tracking system and good communication system.

5.3 Analysis for Outsourcing

For the outsourcing analysis, normal price quotation of tanker for delivery of raw milk is requested from one of the logistic provided company. In Nepal the concept of outsourcing is not used but contracting or leasing and renting is used and contract is also done on that. There is also less logistic provider companies so only personal tanker owner takes such kind of contract from the company.

Siraha Enterprise is one of the local tankers leasing company which provide tanker services for Dairy, Oil and Water companies. This company was contacted during research and ask for the price quotation.

They have different types of leasing agreement on the basis of use of tanker like hourly, daily and monthly, including/excluding driver and per kilometre drives.

5.3.1 Cost Basis

According to the information of price given by Siraha Enterprise, The cost for the out-sourced tanker for case company is based on the daily usages including driver and also addition of per kilometre cost. Detail of cost is stated in table1.

Daily per Tanker Price (€)	Staff Cost	Minimum pay per day (€)	Fuel, Maintenance and Road Tax	Per kilometre Cost (€)	Minimum Agreements
16.77	Siraha	16.77	Siraha	0.29	1 year

Table 1. Cost of Siraha Enterprise

All the expenses rather than above mentioned in table 1 are all taken by Siraha Enterprise. So for the case company it's only daily per tanker cost and per kilometre cost. At least agreement should be for a year and if in case Siraha cannot provide tanker services then they have to pay compensation for immediate renting of tanker from other tanker renting companies.

If in case of emergency, Siraha Enterprise and its staff can take extra money from the case company as an advance to solve the problem.

5.3.2 Performance Basis

According to Siraha Enterprise, there is no any cost rather than mentioned in the Table1. Within that cost, case company can run tanker as long as they can with the cost of 16.77 euro per day but only they need to pay per kilometre 0.29 euro extra. There is no worry in the driver and helper cost, fuel, maintenance cost and road tax. Tanker can be run more trips so no more overtime cost for driver and helper.

Delivery of milk will be smoother and faster because outsourced company get per kilometre price so they want to run as much as they can to get more money. No more worries for case company for the planning and routing as outsourced company do it themselves in order to deliver more and more milk from different collection points to make more money within short time.

No need to worry for the damage of tanker because outsourced company have backup tanker with them. Own resources are used for other purposed so delivery will be in just in time.

6 Comparisons (Internal Management vs. Outsourcing)

In this topic comparison between the internal management and outsourcing is done. Analysed data from Case company current situation, as an internal management and outsourcing and compared.

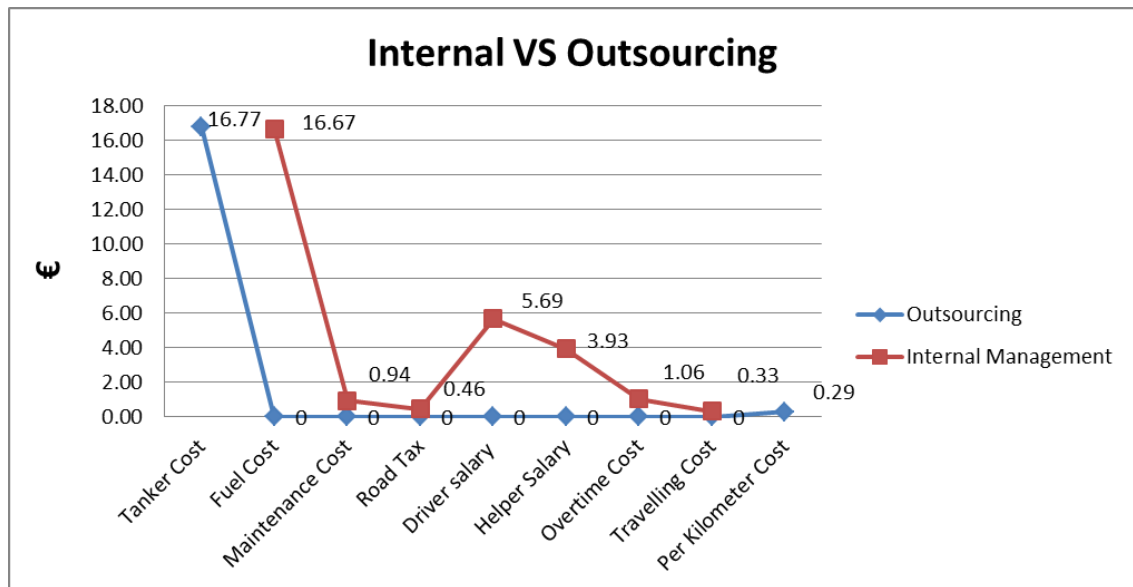


Figure17. Internal Management VS Outsourcing on Cost Basis

(Figure 17.) shows the comparison of internal management and outsourcing on the basis of cost in different topics. In case of outsourcing only cost that arises is tanker cost that is renting cost per tanker per day and another cost is per kilometre cost that tanker drive. Whereas in internal management there occur many titles cost like fuel, maintenance, road tax, driver and helper salary and travelling cost.

Some of the data are on the basis of 3 month time so there is not so much difference in comparison of internal management and outsourcing on cost. Per kilometre cost can increase the cost in outsourcing but in other hand it increase performance. The more they drive the more and faster delivery of milk will be reached which is profitable for the case company.

In comparison, fuel cost in internal management is equivalent to the tanker renting cost and other salary cost is fixed and goes for long run for internal but in outsourcing no worries of all additional cost of staff and tankers.

7 Result and Recommendation

As a result of current situation of transportation system after analysis, following are key findings:

- Average capacity of tanker is 5580 litre
- Average capacity of collection centre is 2500 litre of milk daily
- Longest distance is 125 km which take 2.75 hours and shortest distance is 15 km which takes 30 minute to reach from main plant.
- Average loading time for raw milk is 20-35 minute and layoff time for staff is 1-2 hours
- Average monthly salary of driver is 170.75 euro and helper is 117.91 euro
- Average tanker expenses is about 540 euro per month
- Per Tanker expense is 62% whereas per tanker staff expenses is 38% of total expenses

Internal management and outsourcing on the basis of cost and performance, found to be the possible options for the case company for transportation management. Outsourcing the transportation system was found to be the best options after the comparison of internal management and outsourcing.

As a researcher of this thesis, recommendation for the case company is to outsourced transportation system, if there are no any obstacles from the tankers staffs. After outsourcing there need to be lot of staff cut-off which might lead to strike by the workers.

8 Conclusion

The main purpose of this thesis was Development of Transportation System of Dairy Development Corporation in Lumbini Milk Supply Scheme. Role of transportation is important for the case company for the delivery of raw milk. High cost and low performance in the delivery of raw milk was the main problem.

During the planning of this thesis, making new route planning for case company was also included but latter on it was removed due to the difficulties in planning without implementing new technology in case company. For the future research if new technologies are used then new route planning for case company could be the topic.

According the research about the current situation of transportation system in the case company, it was somehow difficult to analyse data and it has been noticed that tanker expenses is higher than the tanker staff expenses. Staffs get lot of extra money as a grade money and overtime pay. In every tanker there is two staffs which is useless. All collection point are not so far from the main plant but also tanker staff could delivery milk from only one or two collection centre in a day. For other place they got overtime. Lack of good communication system, old technology and weaker management makes late in the delivery of milk.

As a possible option to manage transportation system for this thesis was internal management and outsourcing on the basis of cost and performance. On the basis of the internal management and outsourcing literature analysis was done separately.

New Route planning, optimal use of resources, time management, new scheduling, use of new technology and reporting for future planning; total operating cost per month, cost per hour/per day and cost per vehicle as a tool for internal management of transportation system can be used for the improvement of performance and reduction of cost.

Analysis for outsourcing was done, in which only cost per day and cost per kilometre for at least one year as an option was in the outsourcing of transportation system for the case company offered by the Siraha Enterprise. Faster and smoother operation in order to earn more money by Siraha Enterprise runs tanker more and more which lead faster delivery of milk for case company.

For the best option to choose for the development of transportation system for case company, either to outsource or own or combination of both, comparison between internal

management and outsourcing was done. As a result, outsourcing was found to be the cheapest and effective option for the case company on the basis of cost and performance.

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Appendices

Attachment 1. Overlay matrix for Research

Research Question	Investigative Questions	Measurement Questions	Theories/literature
How to develop/improve transportation system?	IQ1. What is the current situation of transportation system (Case Company)?	a) How many tankers are operating and needed daily? b) What is the capacity of tanker? c) How much milk is collected in each collection center? d) What is a cost per tanker and staffs monthly? e) What are the routes and distance from main plant? f) What are the normal working hours for staffs and how many trip tankers does in a day?	
	IQ2 What are the possible options for transportation management?	a) How far is one collection from another and from main plant? b) How much time it take to reach from one to another? And some similar types of questions from IQ1.	<ul style="list-style-type: none"> • Internal management • Outsourcing
	IQ3. What will be the best option, either	a) How much they charge per day/month/year?	<ul style="list-style-type: none"> • Outsourcing and its types

	outsourcing or own or combination of both in terms of cost and performance?	b) How is there performance?(if they have provided some services to other companies)	
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Attachment 2. Tankers capacity

Tanker	Tanker Number	Front Chamber (ltr)	Back Chamber (ltr)	Total (ltr)
1	544	3140	2520	5660
2	45	2310	3355	5665
3	359	3095	2230	5325
4	44	3120	2500	5620
5	38	3100	2530	5630

Attachment 3. Collection Points Capacity and Distance from Main Plant

Collection Point	Collection Capacity Total (ltr)	Distance form Main Plant (one-way)
Chanauta	3000	62 km
Lumbini	3000	35 km
Dumkibas	3000	62 km
Manigram	3000	15 km
Danda	3000	125 km
Sunwal	2000	38 km
Chormara	1500	80 km
Pargatinagar	2000	95 km
Devdaha	2000	20 km
Palpa	2500	50 km

Attachment 4. Monthly Salary of Tanker Staff (Driver and Helper)

110 NRs = 1 Euro

	Tanker Driver Monthly Salary (NRs)			Tanker Driver Monthly Salary (€)		
No.	Basic Salary	Monthly received money	TADA	Basic Salary	Monthly received money	TADA
1	7470.00	13282.00	170.00	67.91	120.75	1.55
2	7470.00	13282.00	324.00	67.91	120.75	2.95
3	7470.00	13072.00	324.00	67.91	120.75	2.95
4	7470.00	13072.00	324.00	67.91	120.75	2.95
5	6250.00	11963.00	324.00	56.82	108.75	2.95
6	6250.00	11963.00	324.00	56.82	108.75	2.95
7	7470.00	13072.00	324.00	67.91	120.75	2.95
	Tanker Helper Monthly Salary (NRs)			Tanker Helper Monthly Salary (€)		
No.	Basic Salary	Monthly received money	TADA	Basic Salary	Monthly received money	TADA
1	5896.00	7470.10	150.00	53.60	67.91	1.36
2	5896.00	7470.10	150.00	53.60	67.91	1.36
3	5896.00	7470.10	150.00	53.60	67.91	1.36
4	9394.00	10968.10	300.00	85.40	99.71	2.73
5	7216.00	8790.10	300.00	65.60	79.91	2.73
6	7216.00	8790.10	300.00	65.60	79.91	2.73
7	6105.00	7679.10	100.00	55.50	69.81	0.91