Trucking Industry Survey Methodology

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The Nepalese truck industry is a nascent industry. Nepal's first paved road '*Tribhuvan Rajpath*' which linked Kathmandu to Hetauda was built in 1956. When Britain ruled India, Nepal did not invest in building roads and did not allow foreign tourists inside Nepal. Nepal's first modern factories were built in the early 1940s and at the time there was not a large scale need for carrying goods around the country. With the exception of Nepal's rulers, the rest of the Nepalese people consumed products that were produced inside Nepal using primitive manufacturing technologies. Transhimalayan trade was controlled by Nepalese traders but they used (and many still continue to use) mostly livestock to carry goods. After the British left India and Nepal too became democratized, the new governments begun industrialization policies in Nepal. Areas in Hetauda, Birgunj and Biratnagar and to some extent Pokhara emerged as major industrial hubs. These hubs would quickly need a transit system to carry goods to their intended market and gradually trucks begun plying the Nepalese highways.

Despite the seeming simplicity of it, the trucking industry in Nepal operates under a complex system. Major components that define the nature of its operations are (a) National Infrastructure (b) International treaties that govern the movement for foreign trucks in Nepal as well as of Nepalese trucks in foreign countries (mainly India) and the level of cross border cooperation (c) Syndicates and other organizations that affect the scheduling of the trucks (d) the finance and insurance industries (e) law and order maintenance agencies and (f) Revenue collection agencies. When credit access is difficult, the purchase of trucks becomes difficult for many of those in margin. Besides credit access, there are likely to be other barriers to entry. Syndicates, who started initially in Nepal to act as an insurance company for helping out truckers in cases of accidents, are likely to create artificial barriers for entries. Furthermore, not all routes are open to all truck entrepreneurs. Besides that, even along the route where the truck owners are allowed to do business, they may need to wait for their turn before they can carry loads. Law and order maintenances is a crucial part in truck operations, as many locals set up barriers along the highways and collect fees for the right of passage. This hinders the operations of trucks as their time to reach the destination increases. The rent seeking locals along the highways are not the only elements the trucking industry needs to deal with: revenue collection agencies can stop trucks in the pretext of checking at any place along the highway; poor infrastructure with frequent traffic jams along the major highways and the syndicates who forcefully prohibit trucks from operating in their area of influence are some of the other obstacles met by the truck operators. Additionally, the local truckers also have to compete with foreign trucks which are also permitted to supply goods under certain conditions governed by treaties between Nepal and the country of origins of these trucks. Furthermore, when demand for services of the trucks is low, the entry of foreign trucks is not taken kindly by local entrepreneurs in Nepal, who in general cannot compete with Indian trucks at the Indian market.

In Nepal, all reasons stated above have led to the formation of entities that protects the interest of the truck owners. Most of these entities are regional in nature. The first regional organizations, Narayani Yatayat Wyawasayi Sangh (Narayani Transportation Entrepreneurs Association (NTEA)) was established in 2036 Bikram Sambat (1980 AD). In those days, Nepal was ruled by the king directly (within the framework of *Panchayat System*) and starting any organization was considered against the spirit of the Panchayat System. So, NTEA was a revolutionary step not only from - a business point of view, but also from

political point of view and for various reasons, the organization remains quite influential until today. Apparently, the initial motive of the organization was, among other things, to address the lack of the insurance market in Nepal. The organization collected money from all the truck owners so that in the case of an accident, the concerned truck owner could claim a part of his loss from this organization. Today, this same provision makes truck owners attracted to this organization. Many truck owners choose the minimum legally mandated insurance, and in case of an accident, the insurance policy does not sufficiently cover to pay the victims. The NTEA helps truck owners in these situations. Nepali roads are congested and laws are prejudiced. In case of an accident, truckers are guilty by default because they are larger in size compared to a motorcycle or a car. Post-accidents, drivers face hostile mobs and the fear of being lynched. It is common to see drivers running away from the scene of an accident, while the crowd vandalizes the abandoned truck, hence causing loss to the owner. In general, truck owners feel that they will be at loss in case of an accident irrespective of being responsible or not.

The lack of the insurance market provides the motivation to start an NTEA and various other regional TEAs which are formed in many regions as soon as highways reached the regions. The activities of these TEAs have evolved over time. The most noted and publicly criticized in the Nepalese media is their act of restricting services to the service seekers. Frequently, the media has reported that TEAs have opposed entry of modern trucks in their regions. Furthermore, they restrict the movement of trucks from other regions into their region and force those businessmen who are seeking transportation services to choose trucks assigned by the TEAs. In many cases, the TEAs have forced truck owners to use the trucks owned by other entrepreneurs. TEAs are also accused of fixing prices. Unofficially, in our conversation, they have admitted to restricting supply when the market demand is low (for example during the rainy season) or by instituting the Jor-Bijor (odd-even) system. The way this system works is that some days only trucks with odd number plates are allowed to operate on a particular day and then the other day trucks with even number plates.

Entrepreneurs and many other transportation analysts blame the unrestricted entries of trucks in the country. According to a report from USAID; there are 2.97 trucks per kilometre in Nepal whereas the corresponding figure in India is 0.46 (USAID Report (2011)). USAID's report does not disclose how this number is calculated. Our calculation of density of truck per kilometre on the road shows two results. Like many data in Nepal, the data of the total road is confusing. The exact length of the so-called Strategic Road Network (SRN) is 11635 (according to Umesh Shrestha, Chief Divisional Engineer department of Road). Our calculation of trucks indicates that there are about 30.000 trucks in Nepal since 2013. This adds up to 2.57 trucks per kilometre. Besides the SRN there are other roads in Nepal. According to the most recent report from the Department of Local Infrastructure Development and Agriculture Roads (DOLIDAR), there is 50943 kilometre of rural roads as of 2011/12. Out of these rural roads 16176 kilometres are neither paved nor gravelled. If these roads would be included as many previous studies have done so, (including the publications by FTTEN) there are 1.07 trucks per kilometre. This shows that there are twice as many trucks per kilometre in Nepal as there are in India which is an immediate neighbour and a much more developed country than Nepal.

When a country has a relatively weak government and cannot enforce its own laws this collusive behaviour is not uncommon. TEAs often form syndicates to restrict entry of foreign vehicles and increase fares at highways so that the truck owners can run profitably. This research is mainly focussed on identifying the impact of syndicates on the economy.

1.1 Deadweight Loss Due to the syndicates

Actions of TEAs often vary but in most cases they apply the so-called Jor-Bijor rule (odd-even rule). According to TEA officials; when demand in the market is low TEA's will impose the Jor-Bijor rule on its members. This rule could vary in the following ways:

a)   2-days Jor-Bijor (only trucks with odd number plates are allowed to load on a particular day and only trucks with even number plates are allowed to load on the next day);

b)   4-days Jor-Bijor (only trucks with odd number plates are allowed to load on the first two days and only trucks with even number plate are allowed to load on the next two days;

c)   6-days Jor-Bijor (the same as the 4-days Jor-Bijor rule but for three days).

It is likely that TEA's increase truck fares slightly but they deny significant increases of truck fares. The compliance rate seems to be very high currently although initially there used to be some members which always flouted these rules.

Diagrammatically, the market in the new system (2 days Jor-Bijor) is given as follows:
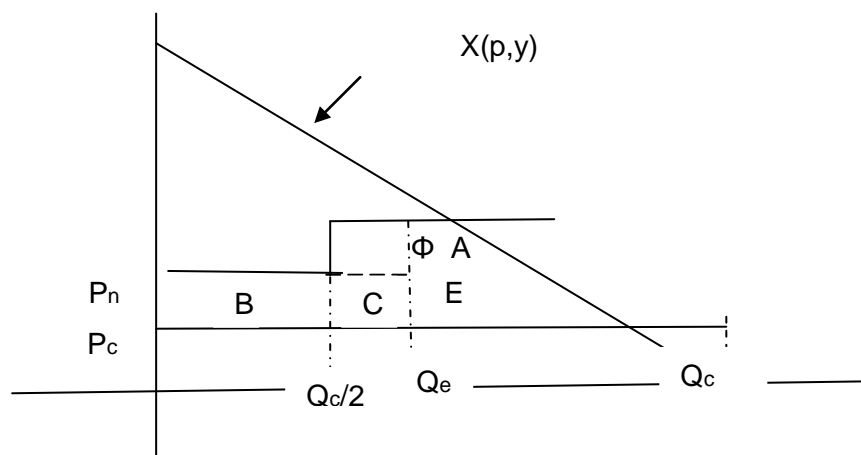
In the figure above, X(p,y) is the uncompensated demand curve of truck users facing the new system. We suppose that the truckers were acting competitively before the Jor-Bijor system was applied. Let (p_c, Q_c) be the prevailing costs and quantity at the time, which by definition is an efficient outcome. Supposedly, the TEAs decide to raise the cost to p_n while imposing the 2 days Jor-Bijor system. This system will restrict the supply to half of the trucks supplied in an efficient system (assuming that in the efficient system the market was clearing, the total supply at the time has to be Q_c). If the average waiting costs of truck users (due to the shortage of the truck) is φ and the market clearing amount of truck in the new system is Q_e, we should get the market as given above.

Clearly, in this new system, the truck operators gain only B+C (assuming zero discounting rate for 1-day applied to C), while A and E will be deadweight loss to the economy. Analytically, the deadweight loss is given as

$$DWL = \int_{p_c}^{p_n+\phi} x(\tau, y)d\tau - (p_n + \phi - p_c)\frac{Q_c}{2} - (p_n - p_c)(Q_e - \frac{Q_c}{2})$$

Note that there is controversy in economics literature regarding on how to calculate "theoretically correct" DWL. *Hausman (1981)* believes that one should use the compensated demand function to estimate DWL. Going from Marshallian (uncompensated) to Hicksian (compensated) demand function is not difficult but it still requires clarification on some

technical details in the calculation. In general, one solves for an associated indirect utility function expenditure function and Hicksian demand function once an estimation of Marshallian demand curve is found (see *Hausman (1981)* for the detail). However, *Willig (1976)* has suggested that when income elasticity of demand is small, one may use the Marshallian demand function like we have done above. Furthermore, even Hausman (1981) suggests that for goods that form small part of overall budget using the Marshallian demand function to estimate deadweight loss provides a good approximation.

To quantify the magnitude of deadweight loss due to this system in a particular route, we begin by estimating the demand curve for truck services. This requires an estimation of demand curve x. The need to survey truck users is essential and we will elaborate on this later. While we may get ϕ from survey, by asking question such as "what is your estimated loss if you were to wait one additional day for the truck service"? Q_e , the new equilibrium quantity, will not be easy to derive. This is the total number of trucks that get loads under the new regime. Survey is likely to yield the results but one should probably need access to the 'smart card system' which keeps track of the total number of trucks being operated in a particular day. We are still trying to understanding this system and its database keeping. In a proposed questionnaire, we have also added the question " How frequently do you get the load when the Jor-Bijor system is in place?" with possible answers (a) less than 20% (b) 20-40% (c) 41-60% (d) 61-80% (e) 80-90% and (f) 91-100%. This should give us an idea about Q_e, the new equilibrium quantity.

1.2   Cause and Nature of delay of truck movement in Nepal

In a recent study conducted by the author, it became apparent that it takes trucks to travel from Birgunj to Kathmandu four to five times more than it takes a passengers bus to travel the same distance. These delays can partly be explained by the fact that these trucks are loaded and travel slow. They also seem to be less capable of navigating sharp turns that characterise the Nepalese highways, especially those highways leading to cities in the mountains. However, several trucks seem to be able to travel the same distance in 1/3rd of the average distance also. Clearly, delays are possible only if it is in truck owners' as well as the importers' interest to cause deliberate delay. During informal conversations with concerned parties it became apparent that deliberate delays could be of interest for the following reasons:

a)   In general, truck owners do not have business every day especially when the Aalo-Paalo (*tour de role*) system is in place. Truck owners are therefore not particularly bothered when their drivers do not travel at the maximum allowed speed limit. Importers are aware that due to landslides and other natural disasters arrival times vary. Delay in arrival time is also often caused by strikes of political parties. Importers often permit or expect delays. As importers pay on a 'per trip' basis they do not suffer monetary loss. Drivers take advantage of this by spending time at recreational spots along the highways.

b)   A recent sting operation by the Kantipur daily also provided another story. Importers in general have connections with some particular officer in the revenue inspection offices along the highways. They seem to instruct the drivers to wait on the highway until that specific officer is on duty (at inspection stations such as Nagdhunga). Since officers are often assigned to the duty randomly this implies that we should see some variation in travel time between Birgunj and Kathmandu for these trucks.

We conclude that to understand the trucking industry and its operation along the highways, the following factors seem to be crucial:

a) The nature of travel along the highways – the number of agencies and the number of groups that stop trucks and demand money from the operators etc.;
b) The nature of business assignments the truck operators receive and the way they collect the assignments;
c) The facilities along the road, for example, the support system in case of mechanical failure and other emergencies.
d) Associated factors relating to (c). For example, if truck operators perceive inadequate support systems along the highway (for example, a lack of workshops that can help in case of mechanical failures), what imperfections in the market leads to inadequacy and consequent inability by entrepreneurs (workshop mechanics or owners) to capture existing arbitrage opportunities?
e) The rules under which they look for work and the groups who formulate the rules (TEAs). The relationship between truckers and these rule makers.

1.3   A Closer Look at Syndicates and their behaviour

The author and his associates were provided with confidential documents during the recent trip to the NTEA office in Hetauda, including the complete membership details. The document includes the names of the truck owners (financial institute or individual), the truck operators and the date they joined the membership. It is likely that an absolute majority, if not all, of the truck operators operating in the Birgunj-Kathmandu corridor have joined the NTEA. NTEA officials promise to help by providing membership details of all TEAs in the country to us. An official of one of the Transporters Union claimed that no truck in Nepal can operate independently. Although, according to our research - reported in another attached document, shows that there are still many trucks that are not a member of any union.

Through an observation of the membership details it became apparent that most of the members were small truck holders, who own 1 or 2 trucks. The purchases of these trucks are, it seems, *skill biased*; most of the truck owners used to be truck drivers themselves. Many relied on intermediaries to provide them with business. Most strikingly, these truck owners are not increasing the numbers of trucks they own; there is no accumulation of capital as time passes by. Many of these truck owners are holding on to their old, rickety trucks.

If there is a glut of trucks on the road, if truck owners are not increasing the number of trucks owned and if many old trucks are still plying on the highways; the following could happen: (a) Syndicates, who provide opportunities irrespective of the efficiencies of the trucks are making it possible for old trucks to get business. If syndicates are led by the oldest members, which is quite possible in a gerontocratic society like Nepal, then it is possible that they are making it possible for their old trucks to get business by imposing the syndicate system. (b) truck owners themselves do not believe trucks provide better rate of returns than other forms of business opportunities available to them, including depositing in banks which can give them as much as 10% interest per year. So, if they are making money, they do not prefer to invest it in trucks or other trucking sector capital accumulation. (c) However, if most of the truck owners are former truck industry workers then they will find it hard to switch sectors and exit from this market. This is a natural outcome in economics when there is excess supply. This encourages formation and enforcement of the syndicates. They distribute profit among truckers, irrespective of their ability or quality of their trucks and they prevent a necessity to exit from the market.

There are other implications of syndicates. If people get business irrespective of the quality of their trucks or services, they are also likely to rely less on modern equipment. The use of

GPS systems to track trucks is therefore less likely to be present in these systems. In general, syndicates should lead to less modernization.

It is difficult to explain how syndicates were able to be so dominant in the first place. The primary participants of the trucking industry were foremost drivers and other trucking industry workers. If their action is detrimental to the businessmen and industrialists, why were these syndicates not opposed by these more powerful groups at the initial stage of their formation? Are these more powerful groups actually not hurt by the syndicates? If the market is composed of inelastic goods and if these groups can pass all costs to consumers without hurting their profit then it is likely that they may not choose to confront an another organization (trucking industry). Consumer rights protection groups are usually weak while groups protecting the interest of merchants and industrialists are strong and well-organized in Nepal. On the other hand, goods can be inelastic if either consumers are wealthy and a small price increase does not affect them or if goods are essential for them. When a market does not offer a lot of variety in products and if that market is often affected by shortages in goods then the market is likely to be inelastic.

To understand the actions of syndicates the following information is essential:

a)   The nature of the trucking industry ownership (how it is evolving over time in terms of the number of trucks owned by individuals, modernization of trucks etc.);
b)   Law and order situations;
c)   The level of modernization. Identification of differences (if any) in the modernization level between trucks run by individuals who own only one or two trucks and the trucks who are run by large entrepreneurs or firms;
d)   The financial market (availability of insurance);
e)   The nature of goods carried by the truckers;
f)   The relationships and sources of relative strength of transporters and industrialists;
g)   The consumers' rights situation.

The questionnaire template at the end of this paper is designed to understand these issues.

1.4   A Closer Look at Price Determination

Price determination in the trucking industry in Nepal seems to be relatively complicated. The government provides a price reference, however at least during some seasons; the market seems to be operating in its own way. During a conversation with NTEA officials they suggested that the price per trip is determined practically on a day-to-day basis. For example, during the last week in April the fare for a trip from Birgunj to Kathmandu was 5% less than the government's suggested fare. This indicates that there is competition among truckers despite the presence of collusion.

Understanding unit costs of transportation is also crucial to make cross country comparisons of costs. Arvis et al (2007) have also noted that unit costs are not very different between developed countries and landlocked countries. It is also important to understand the hedging behaviour of the truckers. The unreliability of trucks due to geographical difficulties and political instability, understanding how truckers and businessmen share these risks and how they hedge against these risks is important to understand the overall functioning of this industry. A better highway and an increasingly stable political situation and other favourable environments should affect the price over time.

Energy security is an important concern in Nepal. The total value of petroleum product import has exceeded the total foreign exchange revenue generated by *all* of Nepal's exports. As a result, the import is monopolized by a government agency that is quite inefficient and

often fails to adjust oil prices to international prices which leads to a deficit. Energy prices have to be ratified by the government and it often comes with political ramifications. Taxis and other public transportation fares in Kathmandu are sensitive to fuel prices and the availability of it. It is also very common to see vehicles queuing in front of gas stations. The causes of these shortages are (a) subsidized prices of fuels by 'Nepal Oil Corporation', Nepal's only oil distributor is often unable to pay its dues to the Indian oil exporters. This leads to a cut-off of the supply from Indian firms unless the government provides additional funding. (b) Demand by fuel distributors inside Nepal to increase their commission and for lax regulation regarding the inspection of adulteration (c) strikes by workers in the transportation sectors (d) political strikes and subsequent disruption in supply chains either in northern India or in Nepal. The shortage of energy contributes to the increase in unreliability regarding the delivery time.

Determining operating costs of trucks depends on the availability of energy as well as many other factors are difficult. Large and regular customers demand discounts. Costs can also vary because of additional services provided by the truck operators. They may provide integrated services (such as logistic services, loading, offloading and dealing with revenue collection inspectors) and sometimes they may not. Understanding the different types of services is as important as understanding the price charged by these trucks.

The government of Nepal defines the maximum suggested rent that a truck can charge on those routes that they have permission to operate on. This system of suggested rent was established at the request of truck operators themselves. They felt besieged because rent charges regularly appeared in the media saying that truck operators charge exorbitant prices and causing inflation in the market. The government takes the following factors into account when making its operating cost calculation:

a)   Salary and allowance of the drivers and helpers;
b)   Taxes identified as income tax, transport tax, renewal tax, permit cost, fitness tax, pollution tax and municipality tax;
c)   Insurance;
d)   Maintenance costs identified as engine overall cost, gear and differential cost and general maintenance;
e)   Battery cost;
f)   Depreciation;
g)   Interest payments of trucks;
h)   Overhead costs (parking and others);
i)   Variable costs such as fuel, diesel, tyre and lubricant.

Moreover, the government adds 15% book value as a margin for truck operators and calculates the average fair for the travel distance.

The truck operators normally agree that it is the exhaustive list of the *embodied* total cost, except for the "jaach pass" (the tax to be paid to travel for each route and every trip). However, truck operators' face also unforeseen costs and they have to operate under the constraint of dealing with customers who are heterogeneous by nature (for example large customers asking for better prices etc.).

The following factors relate to the cost structure of the trucking industry:
1.   The organization or individuals determining collusive prices (if it exists) and the way the truckers interpret those prices (whether they consider it as fixed or whether they believe it to be just a suggestion);
2.   The type of hedging behaviour against political and energy insecurity and the responsibility shared by transporters and businessmen employing them;

3.   Services offered with the cost and the source of variation in cost—including whether or not they facilitate illegal payments to the inspectors;
4.   Fixed costs and variable costs of the truck operators. These costs, as suggested by the government while fixing its suggested rate, are given above. Fixed costs may include membership fees for TEAs, salary of employees and regular maintenance costs of the vehicle. Variable costs are related to the use of vehicle; fuel and trip allowance etcetera;
5.   Truck utilization information such as average trips (in kilometres) travelled per month, load factors /information about how frequently the trucks return empty after delivering goods to a major city (reflecting trade imbalances).

1.5   Exit behaviour and second hand truck market

A casual perusal of the membership of the NTEA showed that many truck owners are single truck owners and many trucks seem to be operating for a long time. Furthermore, many of the truck owners were former truck drivers and their decision to purchase the truck appears to be a skill biased decision. Amongst other services, the TEAs provide guaranteed business to its members when it imposes systems such as the odd-even system or the queuing system. These factors suggests that (a) the second hand market for trucks may consist of few sellers and these sellers are probably the ones that were not former drivers or those whose primary skill is not related to the trucking industry (casual investors in the trucking industry) (b) second hand trucks may still cost a lot as all trucks are guaranteed profits by syndicates and (c) the price between relative older second hand trucks and newer second hand trucks may not differ that much. Truck prices include route permit prices etcetera which could be a significant amount. If profit is guaranteed the old truck owners may not have the incentive to sell them.

Given these observations; we have designed the questionnaire to extract the following information:

a)   The nature of sellers and buyers in the second hand market;
b)   The price differences between the first and the second hand market;
c)   The frequency of the exit of truck operators - how many of those who owned only one truck sold their truck.

1.6   Employment by Trucking Industry: who are they employing?

Truck owners in general employ helpers who are uneducated, very young and come from villages. In many cases, the owners are either the drivers or travel along with the driver to collect revenue. If driving the trucks is also the source of self-employment for the owners than they are likely to be reluctant to exit the market. The self-employed truck owners are usually supporting of systems such as syndicates as they guarantee at least some amount of income.

Truck owners who employ themselves and uneducated/poor helpers, who often do not have courage to ask for salary, are factors explaining why exit behaviour is uncommon among truck owners in Nepal.

The survey questions will address the subject of employment within the trucking industry:

a)   The number of employees directly employed by the owner/firm;
b)   The nature of the remuneration provided to the workers;
c)   Education level of workers.

1.7 Other information

Apart from the questions mentioned above, it is necessary to capture information about average costs of the industry (for example: average maintenance cost and the cause of these costs), industry behaviour (overloading, load factor, average load in the return trip from Kathmandu and cost differential), types of facilitation payments and third party information about the consignee (for example: the inventory level truckers perceive the consignee to be maintaining).

The topics covered are thus:

a)   Average maintenance costs and its source (tire usage);
b)   Frequency of overloading in trucks and the nature of incentive to do so (service seekers pushing for that or rate based on weight of the goods);
c)   Backload information (% of loads available upon return from major cities such as Kathmandu, rent charged for return traffic);
d)   Types of facilitation payments and whether they are paid all seasons or in a specific season;
e)   Time sensitivity of the average delivery in their view (whether warehouse to which they deliver their goods is empty, almost empty or reasonably stuffed);

For the proposed questionnaire template please see appendix 1.

1.8 Sampling Strategy

For the sampling strategy please see the diagram below which provides an illustration of the sampling strategy, the explanations are written below the illustration.

From TEAs					From Non TEAs

Cluster	Narayani	Bagmati	Gandaki	Koshi	Lumbini	Same regions as "from TEAs"

Locally Operating TEAs	Narayani TEA Terai TEA ... **(See appendix 2 for full list)**	Bhaktapur TEA Manohara Local Truck and Minitruck Entrepreneur Association Nepal Truck and Container Entrepreneur Association (Lokanthali)	Gandaki TEA Paschima nchal TEA Gandaki Midsize TEA	Biratnagar TEA Koshi TEA	Lumbini TEA Banganga TEA Nepal India Transportation Entrepreneur TEA	**Districts selected should cover the whole country (see explanation below)**

Trucks affiliated to TEAs, with full options for insurance	###	###	###	###	###	**1st Strata**

Trucks affiliated to TEAs, but not fully insured	###	###	###	###	###	**2nd Strata**

Trucks not affiliated to any TEA	###	###	###			**3rd Strata**

Total sample (in a range between 1000 and 1500)
1. Truckers affiliated to at least one TEA, and taking insurance as their membership option
2. Truckers affiliated to TEAs , but not taking insurance as their option
3. Truckers not affiliated to any TEAs

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Please note:### indicates numerical values that still have to be calculated based on the overall survey population and the share of sampled trucks in each of the strata.

Explanation: we propose the following sampling strategy.

First, the stratum that partitions the overall truck population is made as follows; the first strata contains trucks that are affiliated with at least one of the Transportation Entrepreneur Associations (TEAs) as full members and have taken the option with full insurance coverage. Insurance options were the primary draw of the Narayani Transportation Entrepreneur Association (NTEA), presently the most dominant TEA in the country, when it was first established circa 1980s. The reason for TEA's to start offering these services was because the insurance market at the time was not as developed as it is now in Nepal. Currently, the most dominant TEAs offer this service as we already explained in the introduction (please see table 3 below). Members who are fully insured are covered by the TEAs in case of an accident: TEAs will help to negotiate with the aggrieved party and will help with the TEAs insurance policy. Also they will pay the agreed compensation to the victims including medical costs. They will help to retrieve the impounded truck from the governments' administrative offices. These services are highly valued by the truck operators. Nowadays, most of the truck operators take a minimum mandated insurance (Rs 500K for third party death and Rs 8000K for third party damage) and then take a TEA membership. The process of claiming insurance money from insurance companies is complicated and hence this service is highly valued by the truck operators.

The second stratum includes trucks that are members of the TEAs but have not opted for the full insurance package. These members pay significantly less than members with a fully covered membership fee (see table 3 below). TEAs normally lobby for them, help them with conducting bargaining with the administration as well as with complainants when accidents occur. However, these trucks handle the financial transactions, including claims from the insurance companies, themselves.

The third stratum includes trucks that are not affiliated with any TEAs. This is quite rare and occurs mostly in regions that are just getting road networks. This may also occur in regions with active TEA's but perhaps the trucks do not drive far from their base and are confident that they are not likely to have any administrative issues. Perhaps the membership fee is too high for some individuals.

We have selected five dominant regions as our clusters - Narayani zone, Bagmati and Vicinity, Koshi and Vicinity, Lumbini and Vicinity and Gandaki and Vicinity. The clusters have the names of the zones but are not limited to the zones named. According to the government's Transportation Management Divisions these zones have seen the highest number of vehicle registrations in recent years (See figure 1). Appendix 2 provides a full list of TEAs in the clusters. For this survey TEAs from the unions in the clusters with a high population will be chosen. From each of these clusters, we will sample the three strata suggested above.

To calculate the total sample size and size of each stratum the method of Gilbert (1987) will be used. The total sample size for each cluster is given as follows:

$$n = z^2_{1-\frac{\alpha}{2}} \frac{\sum_h W_h S^2_h}{d^2}$$, where z is standard normal distribution, α is desired significance level, d

is pre-specified margin of error (PMOE) between true mean of population and calculated mean using the sampling strategy, W_h is weight given to a particular stratum, and S^2_h is within stratum variance. Once n is determined, the sample size for each stratum, when total number of proposed strata is K, is given as follows:

$$n_h = \frac{n W_h S_h}{\sum_h^K W_h S_h} \,.$$

Since sample variance for each stratum (S_h) is not known a priori, we calculate that using preliminary data.

The total number of samples to be collected will be sum of n calculated for all clusters.

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Appendix 1 Questionnaire Template

Project: Trucking Industry Survey in Nepal

1.	GENERAL INFORMATION *(TO BE FILLED OUT BEFORE THE INTERVIEW)*		
1.0 Date: / /	Start Time:	END TIME:	
1.1 Surveyor Name (1)		1.2 Surveyor Name (2)	
1.3 Interviewee Name		1.4 Name of Business	
1.5 Title		1.6 City	
1.7 Phone number		1.7 Business Address	
1.8 Business registered at: Narayani…….1; Lumbini…….2; Others……3;			
1.9a Do you have an office at a border crossing: Yes…………………………………………………………………1 No……………………………………………………………….2 2 → 1.11			
1.9.b Which border crossing do you have offices Border Crossing 1: Specify_____ Border Crossing 2: Specify_____ Border Crossing 3: Specify_____			

1.9c   Phone number of office at border crossing 1:
1.10d   Phone number of office at border crossing 2:
1.10e   Phone number of office at border crossing 3:
1.11   The name of the owner of your firm?
1.12   Would it be ok to set up an additional meeting to discuss operations with him/her? Yes…………………………………………………………………1 No…………………………………………………………………..2
1.12   What is the phone number and/or email address of him? _____
INTERVIEWER TALKING POINTS: Discuss the purpose of the project • Don't talk about controversial issues that the interviewee may not like • Talk to him about the issues faced by landlocked countries around the world • Let him or her know about the existing bottlenecks including regulatory impediments and infrastructure In Nepal and the way they affect trade • Let him know that the findings will be shared with the World Bank and Nepalese government. • Tell him that the survey is anonymous. • Make interviewee comfortable; think of something interesting to begin conversation. • If he/she is in rush, don't interview him/her

2.Business Basics (Structure of Firm)

QUESTIONS	ANSWERS	SKIP FUNCTION
2.1a Do you own or partially own the truck or the firm that owns this truck?	Yes …………………………………………1 No…………………………………………...2	
2.1b If you answered yes to the previous question, was your previous profession..	Related to transporation Industry……………………..……………1 Not Related to Transportation Industry…………………………………...2 Specify [_____]	
2.1c What is the average age of your truck?	Please specify the age here ……………………..	
2.1d What is the average mileage of your trucks?	Please specify the mileage here. ……………………	
2.2a How many full-time permanent employees does your firm have?	Number [ ] [ ] [ ] [ ] Blank…………….…………………….....997 Don't know…………….……………………….999	
2.2b Categorization of firm size by employees (to be circled by interviewer based on previous result, but not asked to general manager)	Small (4 or less employees)…………….……………..……1 Medium (5-20 employees)………….…………………...2 Large (more than 20 employees)………….........................3 Blank…………….…………………….....997 Don't know…………….……………..…………999	
2.3a How many trucks does your firm own?	Number [ ] [ ] [ ] [ ]	

QUESTIONS	ANSWERS	SKIP FUNCTION
	Blank………………………………....997 Don't know………………..…………………999	
2.3b Categorization of firm by trucks owned (to be circled by interviewer based on previous result, but not asked to general manager)	Small (2 or less trucks)…………………………………..…1 Medium (3 to 10 trucks)…..…………..………………...2 Large (more than 10 trucks)………..………................................3 Blank…………………………………...997 Don't know……………………………………999	
2.4c Do you consider yourself primarily as a truck operator or an entrepreneur with frequent transportation need?	Truck Operator…………………………………….1 Non Truck Operator……………..............2	
2.4 d In 2.2c, if you consider yourself as a Non Truck Operator, what is your primary business?	Manufacturing …………………………..……1 Farming…………………………………………2 Trading………………………………..………3 Others……………………………………....4 If Others, write [ ]	
2.5a Do you ever hire trucks beyond what you have in your fleet?	Yes………………………………………….1 No…………………………………………...2 Blank…………………………………….997 Don't know………………………………999	
2.5b How many times do you hire trucks per year?	Number [ ] [ ] [ ] [ ] Blank……………………………….…....997	

QUESTIONS	ANSWERS	SKIP FUNCTION
	Don't know……………………………….999	
2.6 Are you a member of a road transportation entrepreneur association (TEA)?	Yes…………………………………………….1 List Association name(s): _____ No……………………………...…………..2 Blank……………………………….....997 Don't know…………………………..…….999	
2.7 Do you pay a membership fee?	Yes…………………………………………..1 No……………………………...…………..2 Blank……………………………………...997 Don't know…………………………………999	
2.7a If you answered yes in 2.7, please state the monthly membership fee.	…………………(Monthly Membership Fee)	
2.8 Do you plan to continue your membership?	Yes…………………………………..…...1 No……………………………………..…2 Blank…………………………..……..997 Don't know…………………………………999	
2.9 For which reasons did you join the association? (multiple responses)	For getting business…………….…………..1 To insure against accidents……………...2 Because I couldn't operate without being part of one TEA………………………….3	

QUESTIONS	ANSWERS	SKIP FUNCTION
	Other……………………………………….4 Specify: _____ Blank…………………………………...997 Don't know…………………………….999	

3. Modernization Level

QUESTIONS	ANSWERS	SKIP FUNCTION
3.1a Do you use the following communication systems? (Multiple Answers)	Mobile phone…………….………………………1 GPS transmitter……………………………2 Other…………….……………………3 Specify: _____ Blank……………………………………...997 Don't know………………………………999	

4 Utilization Level

QUESTIONS	ANSWERS	SKIP FUNCTION
3.3 On average, how many days per year do you operate your trucks?	[ ] [ ] [ ]	
3.4 How many customers do you have?	[ ] [ ] [ ]	
3.5 In the last five years how would you describe the change in the number of your major customers?	Increased…………….……………………1 Remained the same……………………..2 Decreased………………………………3 Blank…………………………..……...997 Don't know…………………..…………999	
3.6 What percentage of your total sales came	Less than 5%...1	

QUESTIONS	ANSWERS	SKIP FUNCTION
from your most important client?	5% - 10%..2 11%-25%..3 26%-50%..4 51%-99%..5 100%...6 Blank…………………………………997 Don't know……………………………999	
3.7 What percentage of the volume of your freight business is the transport of goods produced by other firms?	[ ] [ ] [ ]%	
3.8 What percentage of the volume of your freight business is subcontracted formally from another transport firm?	[ ] [ ] [ ]%	
3.9a In general, how frequently you get the load on your return trip from the destination city?	0-20% time………………………………………....1 20-40% of the times…….………………....2 40-60% of the times……….…..………...3 60-80% of the times………….………………4 More than 80% of the times…………..…….5	
3.9b On average, what % of the total load capacity of your truck is occupied during the return trip?	0-20% …………………………………………..1 20-40% ………………………………………..2 40-60% ……………….………….………...3 60-80% …………………………………………4 More than 80% ………………….…..……….5	
3.9c On average, what is your revenue as a rent in the return trip as a fraction of the revenue from the original trip?	0-20% …………………………………………..1 20-40% ………………………………………..2 40-60% ……………….…………….………...3 60-80% …………..…………………………4	

QUESTIONS	ANSWERS	SKIP FUNCTION
	More than 80% …………………..……..5	
3.10 Do you allow the driver to stop unscheduled during the trip to the destination cities?	Yes…………….…………………………1 No……….……………………………….2	
3.11 If answered Yes to 3.10, what are the reasons for such permit?	Slow Business…………..……………….1 Drivers Require/Demand it…………….…..2 Third Party setting at revenue posts……....3 Others…………………………………..…..4 Specify [ ]	

5. license, permits and Rate Setting

QUESTIONS	ANSWERS	SKIP FUNCTION
4.1 What is the most important regulatory restriction you face on the routes that you operate?	Licenses and permits………………….……1 Axle-load………….……………….…..……2 Road Safety………………………….……..3 Insurance……………………………………4 Other…..………………………………5 Specify: _____ Blank…………….……..………….......997 Don't know…………….…………….………999	
4.2a Did you need to get a license to operate on this route?	Yes…………….………………………………1 No….…………….……………………………2 Blank………….……..……………….997 Don't know…………….…………….………999	
4.2b How many days did it take to get this	[ ] [ ] [ ]	

QUESTIONS	ANSWERS	SKIP FUNCTION
license?	Blank………………………………………997 Don't know………………..………………999	
4.2c Was a gift/informal payment expected or requested in order to obtain a license?	Yes………..………………………………1 No………..…………………………..2 Blank………………………………………997 Don't know………………..………………999	
4.2d How much was the gift/informal payment?	[ ] [ ] [ ] [ ] [ ] [ ] Blank………………………………….997 Don't know…………………..……………999	
4.3a Did you need to get a license to own your own vehicle before you began operations?	Yes………..…………………………………1 No……………..…………………………..2 Blank………………………………………..997 Don't know……………………………………999	
4.3b How many days did it take to get this license?	[ ] [ ] [ ] Blank………………………..…………….997 Don't know………………………………………999	
4.3c Was a gift/informal payment expected or requested in order to obtain a license?	Yes………..……………………………………1 No……………..…………………………..2 Blank………………………………………….997 Don't know…………………………………………999	
4.3d How much was the gift/informal payment?	[ ] [ ] [ ] [ ] [ ] [ ] Blank……………………………..…………997 Don't know……………………………………999	
4.4a Did you need to get any other license before you began operations?	Yes………………………………….…………1 Specify: _____	

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QUESTIONS	ANSWERS	SKIP FUNCTION
	No…………………………………………….2 Blank……………………………………….997 Don't know………………………………….999	
4.4b How many days did it take to get this license?	[ ] [ ] [ ] Blank……………………………………….997 Don't know………………………………….999	
4.4c Was a gift/informal payment expected or requested in order to obtain a license?	Yes….…………………………………….1 No……………………………..…………..2 Blank……………………………..……….997 Don't know………………………………….999	
4.4d How much was the gift/informal payment?	[ ] [ ] [ ] [ ] [ ] [ ] Blank……………………..……………….997 Don't know………………………………….999	
4.5 How many government agencies (such as police, revenue collection) stop you at your current route?	[ ] [ ]	
4.6a Do you normally pay to these agency officials to speed up the process?	Yes……..…………………………………1 No………………………………………..2 Blank……………………………..……….997 Don't know………………………………….999	
4.6b How much do you pay each trip?	[ ] [ ] [ ] [ ] [ ] [ ] Blank……………………………..……….997 Don't know………………………………….999	
4.6c How much does the type of cargo you carry influence the amount of informal	Not at all important….…………………….1 Slightly important…….…………………….2	

QUESTIONS	ANSWERS	SKIP FUNCTION
payments you pay at the border?	Fairly important……………………………….3 Very important….…………………………….4 Blank…………….……………………….997 Don't know…………………..………………999 Specify: _____	
4.6d What other factors affect the amount of money you are asked to pay?	Specify: _____	
4.7a Does your business operate in a fully competitive environment or does an association such as TEA play a role in allocating freight?	Fully competitive….…………………………1 Association plays a role…………….………2 Specify:_____ Blank…………….…………………………997 Don't know…………………..………………999	
4.7b How frequently are such freight allocation systems active?	0-3 months each year………………………..1 3-6 months each year………..………………2 6-9 months each year …………………………3 9-12 months each year……………………….4	
4.7c How frequently are your transportation prices fixed by such system?	0-3 months each year………………………..1 3-6 months each year……..…………………2 6-9 months each year …………………………3 9-12 months each year……………………….4	
4.7d How frequently are the prices you charge below the government fixed charge?	0% - 25%...1 26%-50%...2 51%-75%...3 76%-100%...4	
4.7e Do you, despite the price fixed by TEAs and Government, negotiate prices with the client?	Never………………………………………….1 Occasionally………………………………….2 Always……………………………………………3 Blank…………….…………………………997	

QUESTIONS	ANSWERS	SKIP FUNCTION
	Don't know………………………………999	
4.7f In general, when Jor-Bijor system is in place, do you always get load?	<= 20% of times ………………………………..1 21-40% of times ……………………………….2 41-60% of times…….……………………………..3 61-80% of times…….………………………….4 80-90% of times….…………………………….5 90-100% of times….…………………………….6	
4.8 Do you have regular/preferred customers?	Yes………………………………………………..1 No…………………………………………………..2	
4. 9 If yes in 4.8, do you charge them different price from the ones fixed by your TEA or the government?	Yes………………………………………………..1 No…………………………………………………..2	

6. Specific operating costs

QUESTIONS	ANSWERS	SKIP FUNCTION
5.1a What is the salary paid to the driver and helper in your truck? Please don't include allowance paid per trip in it.	Driver ……………………………………………. Helper ……………………………….…………	
5.1b What is the allowance paid to the driver and helper per trip?	Driver …………………………………….……… Helper ……………………………….………..	
5.1c what is the average number of trips your truck makes every month?	Please write the number here ………………..	
5.1d What is the average length of the trip taken each month?	Please write the trip length here ………..……	
5.2a In general, how much of your earning is paid towards income tax each year?	Please write the number here………………..	
5.2b How much do you pay as a transport tax per trip?	Please write the number here………………..	
5.2c How much do you pay as a renewal (blue	Please write the number here…….…………	

QUESTIONS	ANSWERS	SKIP FUNCTION
book renewal) charge?		
5.2d How much do you pay as a route permit to government each year?	(Please write the amount here……………….	
5.2e How much do you pay as the fitness tax per year?	Please write the amount here…………..……	
5.2f How much do you pay as Jaach Pass per trip?	Please write the amount here………………..	
5.2g How much do you pay as the municipality tax per year?	Please write the amount below……………….	
5.2h How much you pay as the pollution tax per year?	Please write the amount here…...……………	
5.3 How much is your insurance cost per year?	Please write the amount here………………..	
5.4.a How much is your maintenance cost in engine overall per year?	……………………. (Per year) [If it is for 4 years, please divide by 4]	
5.4b How much do you spend on gear and differential maintenance cost?	…………………………….(Per Year) (If it is for 4 years, please divide by 4)	
5.4c Besides those in 5.4(a) and (b), how much do you pay in other general maintenance per year?	………………………………	
5.5 What is your battery cost per year?	………………………………… (If information is in 2 years, please divide by 2)	
5.6a What are other overhead costs? Please mention them.	(Write the names of those costs along with the total cost here) Name Cost 1 …… 2 …… 3 ……	

QUESTIONS	ANSWERS	SKIP FUNCTION
	4 ……. 5 …… 6 ……. Others ……	
5.6b Please write the sum of all overhead costs here	…………………………………….. (All overhead costs)	
5.7a How much diesel do you need per kilometre?	……………	
5.7b How much do you pay as a total diesel cost per month?	…………….	
5.8 How much is your cost in lubricant per month?	1. Crown Oil ………….. 2. Gear Oil ……………… 3. Mobil………………. Total (including others if any)………..……….	
5.9 How much is your cost in tire per year?	…………….	

7.Constraints

QUESTIONS	ANSWERS	SKIP FUNCTION
6.1 What were primary constraints when you started your business?	Access to credit…………………………………………1 License Raj…………………………………2	
6.2 How congested are roads along your current route?	Very congested….…………………………1 Somewhat congested………………………..2 Not congested……………………………….3	
6.3 How frequently do you encounter mechanical failure during your trip?	0 per 10 trips….…………………………….1 1-2 per 10 trips….………………………….2 >2 per 10 trips….………………………….3	
6.4 Are mechanical helps easily available during the times of such failures?	Yes………………………………………….1 Yes, but they charge a lot……………………2	

QUESTIONS	ANSWERS	SKIP FUNCTION
	No…………………….…..………………3	
6.5 How frequently do you encounter strikes?	0 per 10 trips.…………………………….1 1-2 per 10 trips.…………….……………..2 >2 per 10 trips.…………………………….3	
6.6 How frequently you feel the pinch of fuel shortage?	0 per 10 trips.…………………………….1 1-2 per 10 trips.…………….……………..2 >2 per 10 trips.…………………………….3	
6.7 How many agencies stop you during your trip to the destination city?	0.…………………………………………….1 1-2 .…………………………………………2 3-4.………………………………………3 >4.…………………………………………4 (Write _____ in case of >4)	
6.8 How many times are you stopped during your trip to the destination?	0 .…………………………………………….1 1-2 .…………………………………………2 3-4.………………………………………3 >4.…………………………………………4 (Write _____ in case of >4)	
6.9 How rampant is criminal activities along the route?	Not at all .………………………………….1 Some .……………………………………..2 Highways are riddled with criminals………..3	
6.18 Please rank the top 3 impediments to your doing business?	1) _____ 2) _____ 3) _____	

8. Questions For Interviewer

QUESTIONS	ANSWERS	SKIP FUNCTION
7.1 I perceive the answers to questions regarding opinions and perceptions to be….	Truthful……..……………………………………1 Somewhat truthful…………………….……..2 Not Truthful……………………………………….3	
7.2 The answers to questions regarding figures….	Are taken directly from business's records .1 Are estimates computed with some precision………………………………………….2 Are arbitrary and unreliable numbers…..…..3	
7.3 The questionnaire was finished…..	One face to face interview with one person…………………………….…………...1 One face to face visit with different management…………………….…………….2 Several visits with same person……………3 Several visits with different people………..4	
7.4 Interviewer's comments (open ended):		

Footnote:
1.   From the personal communication of the author with Rajendra Shrestha (general secretary, Nepal Truck, Tanker and Transportation Entrepreneur Association), Ramesh Bohara (Office Secretary, Nepal transportation entrepreneur national Association) and Subash Paudel (Vice Chairman, Narayani TEA)

Appendix 2 List of TEAs

a.   List of TEAs listed under Nepal Truck Yatayat Mahasangh(FTTEN):

S.NO	Organization Name	Chairman	Number of Trucks	Telephone/Mobile	Membership offered	Membership cost
1	Pawa Nepal Mechi T.E.A	Shriram kharel	156	023-543529/9852672121	Single	RG- 30,500 RN- 2100/yr
2	Biratnagar T.E.A	Binod khadka	223	021-523651/9852021591	Multiple	RGF- 17000 RN- 3000/yr RGP-7050 RN-3000/yr
3	Koshi T.E.A	Bidhapati Upadhyaya	800	025-580590/025580590	Single	RG-10,100 RN- 18000/yr
4	Purwanchal Truck Syndicate	J.B Khadka	255	025-533180/9852045234	N/A	N/A
5	Himali T.E.A	Om bhakti Mainali	115	035-420240/9852835001	Single	RG-25000 RN- 200/yr
6	Janakpur Anchal T.E.A	Babu Saheb Shah	150	041-522191/9854026635	Single	RG- 3500
7	Terai T.E.A	Om Karki	1500	053-521347/9855024108	Single	RG-10,000
8	Narayani T.E.A	Gokarna Parajuli	4600	057-521034/9855067616	Single	RG- 30,000 RN- 1200/month
9	Nepal T.E.A	Rohit Shrestha	300	01-4036157/9841213323	Single	RG- 15000 RN-3000
10	Gandaki T.E.A	KrishnaHari G.C	900	061-521490/9856021871	N/A	N/A
11	Paschimanchal T.E.A	Ganesh Panta	300	071-438552/9857020938	Single	RG-100,000 RN- 500/yr
12	Band Ganga T.E.A	Altarfahaman Kha	600	076-550097/9857020516	Single	RG-25000 RN- 1200/month
13	Ratpi Anchal T.E.A	Janak Pra. Kharal	185	082-561482/9857820052	N/A	N/A
14	Bheri Anchal T.E.A	Mohan Singh K.C	199	081-550336/9848021560	Single	RG- 35000 RN- 1200/month
15	Mid western T.E.A	Prakash Adhikari	615	083-521399/9858021879	N/A	N/A
16	Seti Mahakali T.E.A	Meghraj Bhatta	635	091-526355/9858420570	N/A	N/A
17	Dhankuta T.E.A	Mohan Shrestha	25	026-520060/9842061693	No reg	No reg
18	Sarlahi T.E.A	Rajan K.C	200	046-530490/9854035463	Single	RG-2500 RN-1000
19	Rautahat T.E.A	Sudip Raj Kandel	150	055-540253/9855040128	N/A	N/A
20	Tanahu T.E.A[**]	Devkumar Shrestha	120	065-560608/9856023985	Simple Objective Associative Special	RG-1400 RN-300 RG 3000 RN- 1500 RG 3000 RN-1500 RG- 100,000
21	Karnali Anchal	Karma Buda	200	057-520143/9848320543	Permanent	RG-40000

S.NO	Organization Name	Chairman	Number of Trucks	Telephone/Mobile	Membership offered	Membership cost
	T.E.A				temporary	RN-1500 RG-20000 RN-1500
22	Nepal Truck Container T.E.A	Raj Kumar Paudel	980	01-6635040/9851021832	N/A	N/A
	TOTAL		13208			

** Tanahu TEA offers four types of memberships: Simple, Objective,Associative and Special. Simple Membership only provides support to the truck owners by giving the association name. It does not include any kinds of benefits.Objective and associative registration are similar in terms of benefit offered but these registration are done according to the route where the trucks operate.And includes insurance benefits in case of undetermined circumstances.Special registration provides the truck owner the entire benefits of insurance and Valai kosh and this registration need not be renewed, it is for full time.

List of trucks under Nepal Yatayat Rastriya Mahasangh:

S.NO	Organization name	President	Number of trucks	Contact number	Membership offered	Membership cost
1	Garuda TEA	Kapil Pandey	25	9855055932	Single	RG-10,000 RN- 1500
2	Bhaktapur Truck EA	N/A	407	6612970		
3	Om Halesi Transportation Entrepreneur Association	Shatrughan Karki	130	9852820684	Single	RG-70,000 RN-1000/yr
4	Far Western Truck and Tractor Enterpeneur Association	Padam Singh Raul	150	9858420566	Single	RG-15,500 RN-500/yr
5	Waling Truck EA	Chet Narayan Shrestha	52	9856027590	N/A	N/A
6	Nepal T.E.A	Rajendra Shrestha	1100	01-4036157/9851035548	Single	RG-18000 RN-1000
7	Gandaki Midsize Truckers Association	Dharma Raj Adhikari	205	9856027444	N/A	N/A
8	Nepal India Transportation Entrepreneur Welfare Association	Sunil Bishta	175	9847060082	Single	RG-32000 RN-1000/month
9	Bheri Karnali Truck and Tractor Entrepreneur Association	Surya Raut	180	9858051183	N/A	N/A
10	Lumbini TEA	N/A	70	987024684/061-520088	Single	RG- 10,000 RN- 50/day
11	Truck TEA, Dang	Bharatnath Yogi	200	9857830561	Single	RG- 20,000 RN- 1500 yearly

S.NO	Organization name	President	Number of trucks	Contact number	Membership offered	Membership cost
12	Kalaiya TEA	N/A	185	053-551260	N/A	N/A
13	Nepal Tripper &truck TEA		18	01-4288640 9851045581	Single	RG- 5000 RN-1000/year
14	Kathmandu Mini truck TEA	Narayan Ghimire	30	9841405949	Single	RG-5000 RN-1000 yearly
15	Municipality Mini truck TEA	Nir Ratna Newa	35	01-5535300	Single	RG-5000 RN-1000 yearly
16	Koteshwor Minitruck TEA		18	N/A	Single	RG- 5000 RN-1000/year
17	Manohara Local Truck and Mini Truck TEA	N/A	25	N/A	Single	RG- 8000 RN-1500/year

*_for organizations 12-17 above, the truck size, registration and renewal are just an approximation and are provided by Ramesh Bohora Karyalaya pramukh Nepal Truck Yatayat Mahasangh._

NOTE:
*RG- initial registration charge paid to the transportation association by the truck owners.
*RN- Membership Fee renewal charge to paid by the truck owners
*RGF- registration fee for the full membership
*RGN- registration fee for the partial membership
(P.S these all registration fees are paid at once at the initial registration of the trucks)
*S.NO 17 does not provide any kind of membership to the truck owners, instead it provides membership through Koshi TEA and Purwanchal TEA

2.   Clusters and their associated TEAs
   a)   Narayani Cluster: Narayani TEA, Rautahat TEA, Kalaiya TEA, Terai TEA,
   b)   Gandaki TEA: Paschimanchal TEA, Gandaki midsize TEA, Gandaki TEA, Waling Truck TEA,
   c)   Lumbini TEA: Bheri TEA, Karnali TEA, Seti Mahakali TEA, Bheri Karnali TTEA, Rapti TEA, Bandganga TEA, Nepal India TEWA, Lumbini TEA, Far Western TEA
   d)   Koshi Cluster: Mechi TEA, Koshi TEA, Dhankuta TEA, Om Haleshi TEA, Janakpur TEA, Biratnagar TEA, Garuda TEA, Purbanchal Truck TEA, Himali TEA, Sarlahi TEA,
   e)   Bagmati Cluster: Nepal TEA, Nepal Truck and Container TEA, Bhaktapur TEA

S.N	description	Rate	quantity	Rate per year	remarks
1	Salary and allowance				
	a) driver	7000/Month	1.0		
	b) helper	1000/ Month			
	c) Allowance	600/day			
2	Taxes				
	a) Income tax	11,500/year			It is to be paid by the truck owner.
	b) Transport tax	600/per tip			Paid to the transport companies which help the owners to get the goods for supply.
	c) Renewal	380/ Month			The Blue Book renewal of the

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S.N	description	Rate	quantity	Rate per year	remarks
					vehicle.
	d) Permit	12000/year			Route Permit, to be paid Annually to the government.
	e) Fitness	200/year			
	f) Pollution	80/year			
	g) Jaach Paas	75/per trip			
	h) Municipality	3000/year			
3	Insurance	6000/month			
4	Maintenance				
	a) Engine overall	45000 for 4 years			
	b) Gear + differential	Gear oil 50000 4 year Crown – 37000 for 3 years			
	c) General maintenance	5000/ month Air 100 Grease 150			
5	Battery	17000 / 2years			
6	Depreciation	10 % / Year			
7	Interest	12% / Month			
8	Overhead				
	Variable costs				
9	Diesel	100/ Month			
10	Tyre	32,000/Year			
11	Lubricant	Crown oil: 7000 Gear Oil: 2800 Mobil: 9750			14 ltr Crown oil is required , it is priced at 500/ltr and can run 36000km 8 ltr Gear oil is required which costs 350/ltr and can run 36000Km 15 ltrs of Mobil is required which costs 650/ltr and runs18000 km

Transport tax, income tax, permit & Renewal is to be paid to the government
Municipality charges is to be paid to the local municipality where the vehicle belongs to.

Table 1 Current operating cost of a typical truck

| Year	Total Numbers
046/47	6532
047/48	834
048/49	1524
049/50	1491
050/51	1740
051/52	1629
052/53	1151
053/54	907
054/55	1291
055/56	978
056/57	829
057/58	1271
058/59	1798
059/60	1212
060/61	1477
061/62	1592
062/63	2263
063/64	3278
064/65	3594
065/66	3643
066/67	4524
067/68	1969
068/69	1333
069/70*	2544

(Note: Year is in Bikram Sambat. Bikram Sambat is 56 years 8 months ahead of AD. Hence 069/70 roughly corresponds to 2012/13 AD. Year reported above changes at June 15th.)
*- First 9 months only.

**Table 2 Total Number of trucks registered in Nepal**

Figure 1 Spatial (Zonal) Distribution of Vehicle Registration in Nepal from 2047-2070
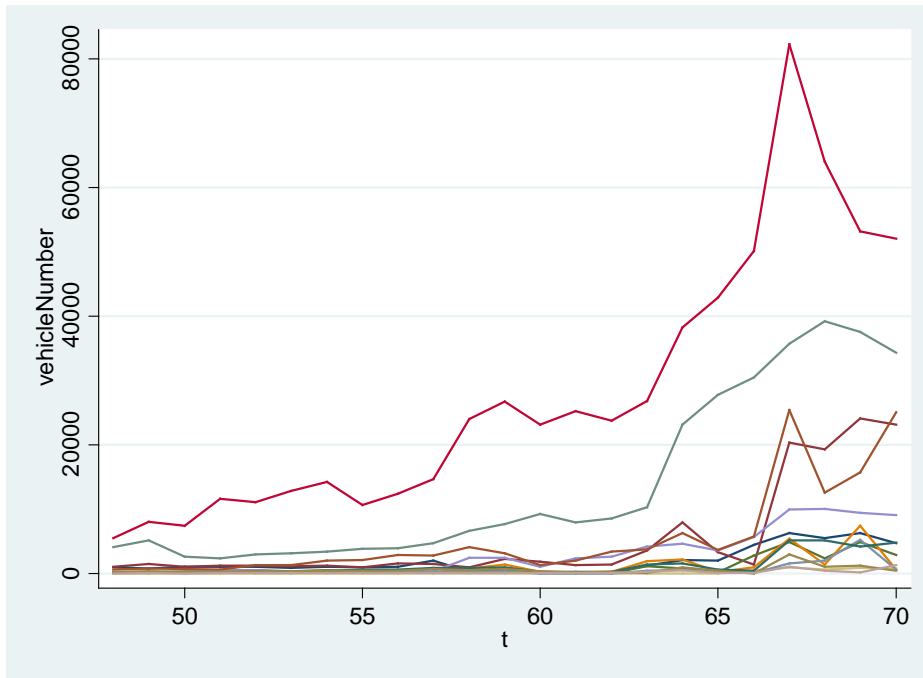
(Note: The plot above shows the total vehicle registration in 13 zonal offices of Nepal since 2047. The highest number of vehicle registration was seen in Bagmati zone, followed by Narayani zone. Karnali zone is not represented above, as it doesn't have any vehicle registration office yet.)

Figure 2 Time trend of total vehicles in Nepal
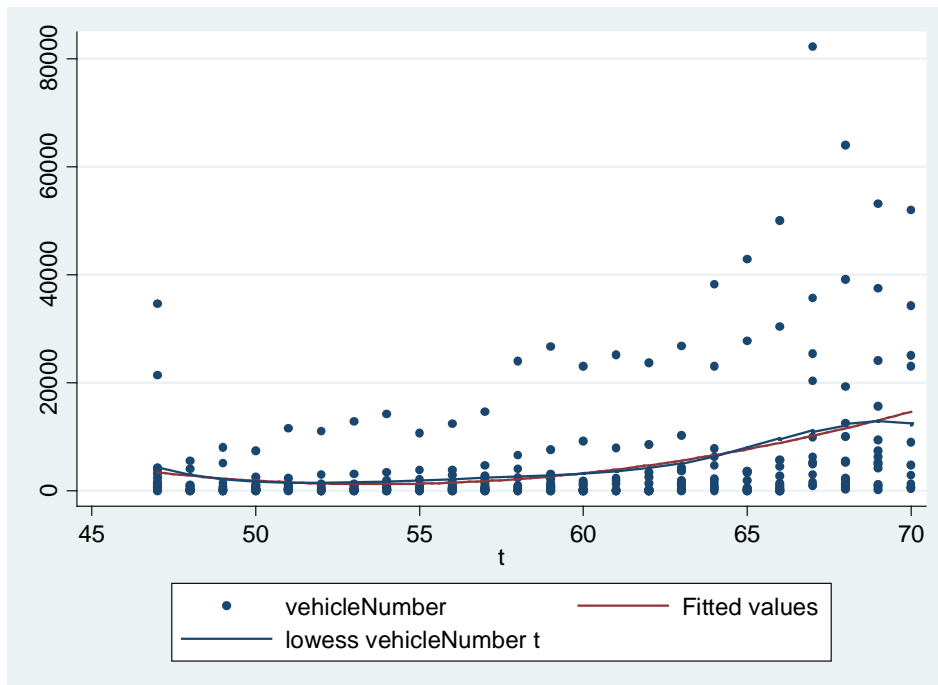
(Note: When fitting vehicle numbers over time, the quadratic fit is almost similar to nonparametric fit (lowess). The vertical axis shows the total number of vehicle registered, and the horizontal axis shows the years (2047-2070). The quadratic fit had both coefficients of t and t_square significant and R-square was 0.42. Quadratic regression of log vehicle number on time also shows that the growth rate of total vehicle is increasing by 2% each year.)