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Study of rural travel characteristics with special reference to agriculture: Case study, Jalangi block, Murshidabad, West Bengal

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Abstract
Historically road network planning of rural area in India primarily focused on connecting various villages depending on their population size only. But a good understanding of the travel characteristics is a prerequisite for planning of road networks. Several studies have already established that there exists a strong positive co relation between rural roads development and agricultural development which leads to economic growth and socioeconomic development of a region. Studies on the pattern of rural transport reveal that rural trips involve many types of movement for a wide range of purpose of agriculture (farming and marketing of crops and livestock). This study is an attempt to ravels rural travel characteristics with special emphasis on agriculture. The study area is located in the eastern most part of the country is a community development block (Jalangi) of West Bengal. This is one of most fertile land in the world situated in the lower Gangetic plain of Murshidabad district. Agriculture is a major activity or important contributor to economy is almost every rural area however, in this region studies deals with travel related agricultural activities where the economy of Jalangi block primarily rests on agriculture as more than 75% of the block population directly depends on it. After analysis of primary (through household survey) and secondary data the paper suggested that it is necessary to construct road link not only for population based settlement area but also link to agricultural field and market which will play a vital role for the socio economic development of rural area.

Keywords: travel charecterstics, agriculture, rural travel, rural road

1. Introduction
Road network is one of the basic infrastructures in rural areas, which plays a vital role in socio-economic development of the community. It contributes significantly in rural development by creating opportunities to access goods and services in villages and market centers. A well planned road network is prerequisite for the development of rural area which in turn leads to poverty reduction. Several studies have already established that there exists a strong positive relation between rural roads investment and socio-economic and agricultural development. But there is a lack of basic understanding of defining the actual role of rural roads in the overall road network hierarchy in developing countries. (Hine JL 1982).Some researcher explain that infrastructure increases agricultural production and productivity (L Venkatachalam 2003). For example an empirical study done by Ahmed and Hussain (1990) demonstrated that the use fertilizer in the agricultural sector increases with the improvement of quality of road. Minten (1999) documented that there is a positive relationship between rural infrastructure and prices of agricultural commodity. That implies unavailability of rural road linkage to fram and market centres increase the cost of agricultural production. A study carried out by Tunde, A. M., & Adeniyi, E. E. (2012) shows that deficiency of proper road network in rural area reduced the farmer income and increase the cost of transport and production.

In 2000, the Government of India launched the nationwide program known as PMGSY, to provide connectivity to all the villages in a phased manner, so as to connect through all-weather roads to unconnected habitations with population 1000 and above by 2003 and those with population 500 and above by 2007 in rural areas which provide prioritized links for connectivity of habitations carved with quantifying population only (P.k. Sikdar) but did not consider the agricultural sector. (Jalegar and Shaheen Begum 2017).

This paper aims to 1. Investigate the travel characteristics in the study area in general and special reference to agriculture. 2. The role of the agricultural activities in the prevailing travel pattern in particular. To investigate the travel characteristics, Jalangi community development block of Murshidabad district has been taken as the case study area. Basically this is one of the most backward region of India has the diversity of agricultural activity. To identify the travel characteristics of the area a primary household survey has been carried out through different villages. After collecting primary and secondary data of the case study area a review and analysis has been done to investigate the travel characteristics and influence of road access on subsistence agricultural production.

This paper is organized as follows: Section 2 shows the methodology of the study. Section 3 gives an overview of the study area with a glimpse of agricultural activity. Section 4 focuses on major findings from primary house hold survey and section 5 made a concluding remark after review the salient findings of the study.

2. Methodology

To investigate the travel characteristics of the case study area a primary household survey has been carried out through family covering 10 gram Panchayets of Jalangi block which is comprises about 1% of the total population of the block. (Source: Indian Census report) The collected data was analyzed to study category wise for trip generation pattern, trip length frequency of major categories of trips, average travel distance between agricultural field and nearest all weather road, mode choice in major categories of trips for agriculture and overall trip generation.

In this primary house hold survey a structured questionnaire was prepared to canvas with the sample farmer respondents on the issues connected to their socio economic activities in relation to the rural road connected to their respective villages. To collect data from the Jalangi block the researcher personally went to the respondents. For the agricultural related secondary data the block office and district agricultural office has been visited by the researchers. After the collecting information from the farm and farmers, local Panchayets (Rural local body) and blocks office, district agricultural office, DLLRO office, district statistical hand book and census data also used as a secondary data to arrive at certain conclusions.

3. An overview of the study area

Jalangi (community development block) indicated in the figure 1. Is an administrative division of Murshidabad district which comprises 10 gram panchayet (local administration) of West Bengal state in India. As per 2011 census, Jalangi block had a total population of 2, 15,538, out of which 1, 11,267 are males and 1, 04,271 are females (Source: Murshidabad statistical Hand Book). About 75-80% of the population directly depend on agricultural activity (Principal Agricultural Office, Berhampur, Murshidabad) District.Road is the only way of transportation.SH-11 is the only state highway passes through the block, including several major district road and village road, till date most of the village road are remain as nonmetal. Cycle is the common form of transport within the block. For the short distance freight the people use the engine van or van rickshaw. Milk and dairy product are transported by bicycle and van rickshaw. Trucks and tractor carry majority of goods within and outside the block. In the remote agricultural farm area the bullock cart can be seen in this block for the transportation of jute and other product.

A glimpse of agriculture related activity

Jalangi block is one among the agriculturally favorable regions of West Bengal and the main economy of the region is agriculture. In stud area, agriculture is practiced throughout the year and covers three distinct agricultural seasons, namely, Pre-Kharif season covering the months from March to June. The season is characterized by deficiency of water and crops grown during this season mainly thrive on irrigation. Paddy is the most important crop of this season. The Kharif season, covering the months of monsoon rains, is dominated by the cultivation of Aman paddy, which is the main and traditional crop of West Bengal and the Rabi season which begins from October and continues till February. The region is noted for the cultivation of good quality and high quantity of paddy including all of its varieties, namely, Aman paddy, Boro paddy and Aus paddy, Jute, Wheat, Mustard, Potato, Pulses and Vegetables are also important crops in the region. A large number cattle population is also found in the region which facilities about 41% of the households and generation of freight trips and also contributes the economy population of the study area and consider as the one of the part of agricultural activity.

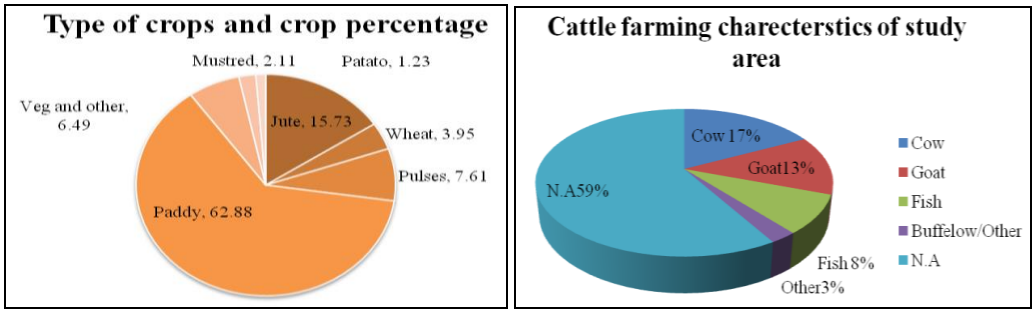

Fig 1: Different types of crop and cattle farming characteristics of the study area

Crop calendar of the study region

Table 1: Crop calendar of the study region

Name of the crops	preparation of Land	Sowing	Growing	Hervesting
Aus Paddy	March	March-April	May-July	July-Aug
Aman Paddy	June- July	July -Aug	Aug-Nov	Nov-Dec
Boro Paddy	Dec	Jan-Feb	Feb-April	April-May
Jute	March	March-May	May-June	June -Aug
Wheat	Nov	Nov-Dec	Decr-Feb	Feb March
Mustred	Oct -Nov	Nov- Dec	Dec- Jan	Jan- March
Patato	Sept-Oct	Oct -Nov	Nov- Jan	Feb- March
Pulse	Oct	Oct -Nov	Nov- Jan	Feb March

Source: Report of Principal Agricultural Office, Berhampur, Murshidabad District.

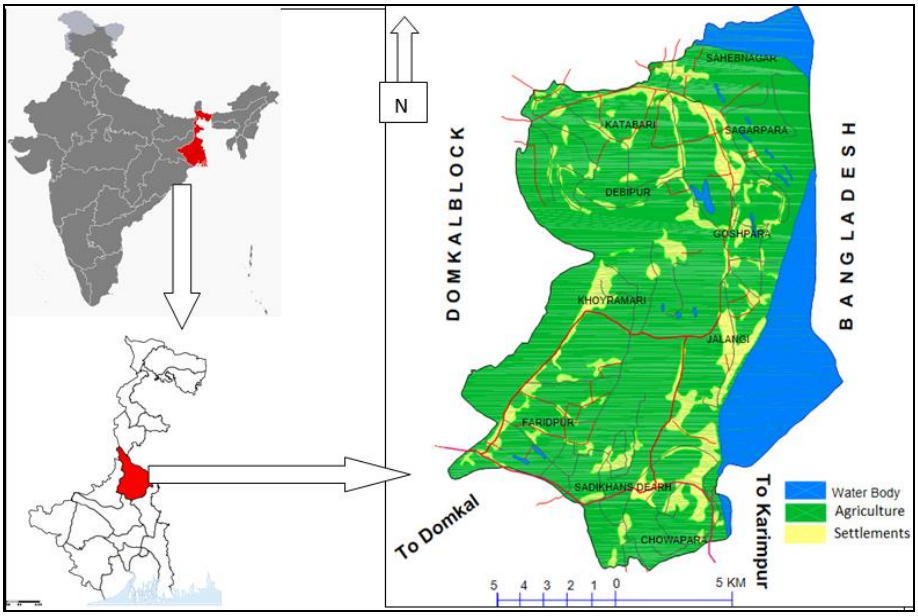

Fig 2: Location of case study area (Jalangi block) in Murshidabad district, WB. India

4. Major findings from primary house hold survey

4.1 Trip Category

In Jaalangi block several types of trip category has been divided in a) Educational trips (44%) b) Agricultural trips (39%) c) Health and other trips (1%) and c) Business and other trips (16%) are indicated in the fig no. 3. It is found that most of the trip related to the education and secondly agricultural trips. The study also shows that in case of working age group trip category agricultural trip (48%) is maximum followed by the educational trips (34%) i.e. indicated in the figure no 5.

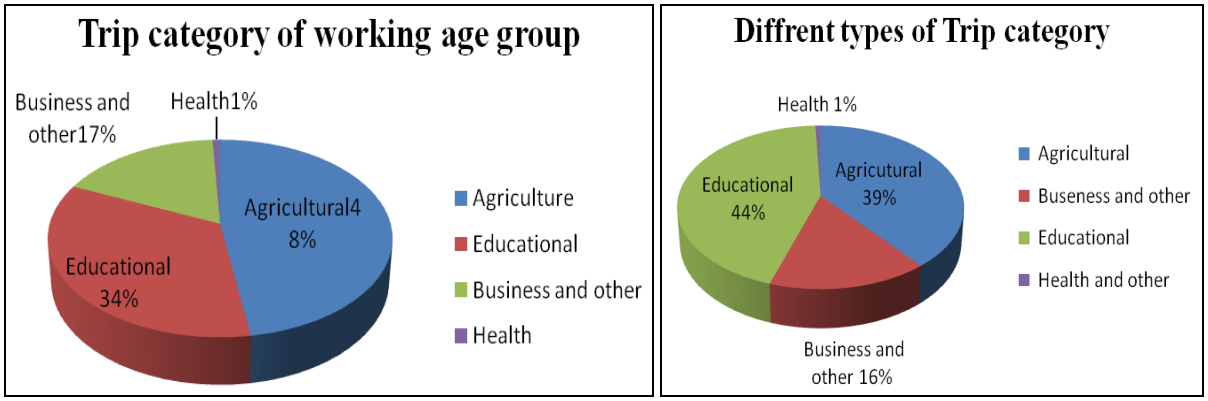

Fig 3: Different types of trip category

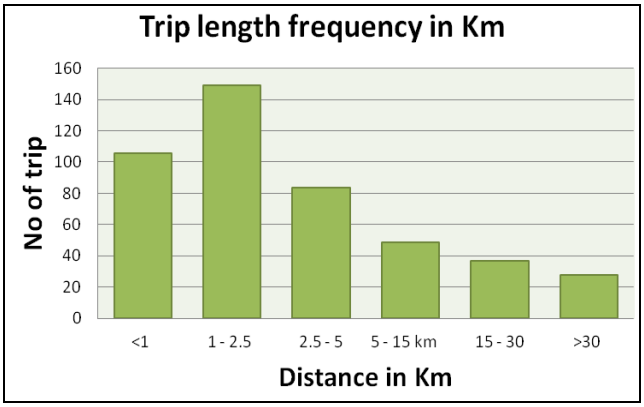

Fig 4

4.2 Trip length frequency

Trip is a model of the number of trips that occur between each origin zone and each destination zone. It is the frequency of length of trips originating in each origin zone (trip production) and the length of trips ending in each destination zone (trip attraction) figure no. 6 the trip length frequency of the study area.

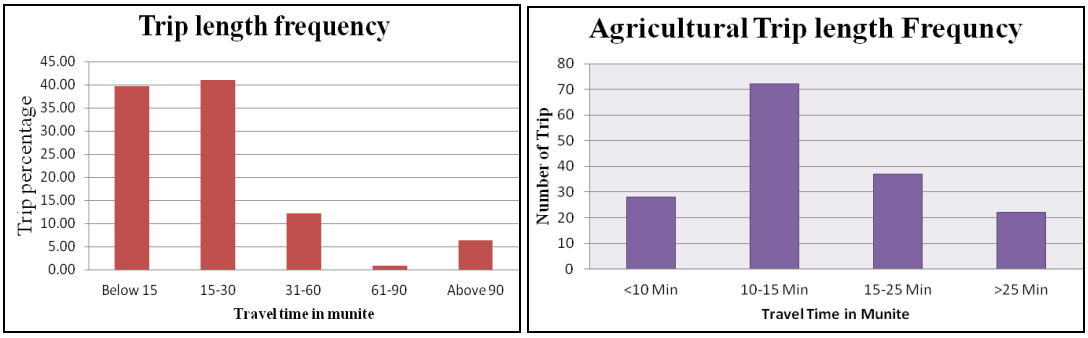

Fig 5: Different types of trip length frequency

4.3 Use of transportation mode for different trips

Jalangi which is predominantly a block of villages and where agriculture is the main occupation of the people has still primitive conditions of rural transport. The bullock-cart is still the major means of transporting goods between the villages, between village and market. It also serves as passenger transport in rural areas. A bicycle is a two wheeled non-motorized road vehicle. Bicycles have become equally important in rural transport as that of urban transport. Bicycles are mainly for individual passenger transport. Three wheelers cycle generally called rickshaw and when it is used for the goods carrier then it is called Van rickshaw. It is one of the most popular transportation modes in rural areas although the motor bus has not reached the interior of the villages. The development of motor transport is linked up with the rural road development. Motor transport is very important because of poor condition of rural roads. Recently motor cycle or motor bike also used for the rural area transportation.

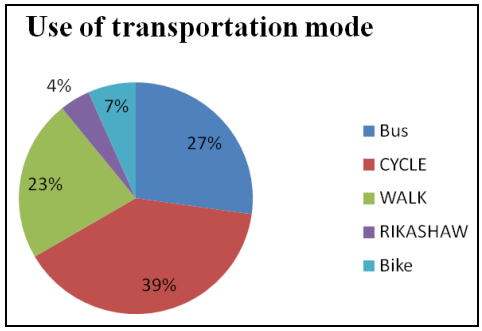

Fig 6: Use of transportation mode of the study area

4.4 Mode choice for different category of trips

The study revealed that farm plots were scattered all over the study area at varying distances away from the houses and motorable roads. This is to search for fertile land and also because of the land tenure system in the study area. Respondents were however asked about the different modes of transportation of produce to their houses as well as the markets (towns) in fig no.3. Different modes of transportation were identified by them and these included head porterage (walk),bicycle, motorcycle and public transport (lorries, pickup and buses) all of which are through road transport as the most predominant and readily available mode of transporting their produce from where produced to where needed. The fig no. 3 shows that 27% used head porterage (walk) and 23% bicycle, 27% use rikshaw. The effect of higher percentage use of head porterage (walk) and is that it has limited the potential level of production because they can only carry certain quantity at a time. Nobody use taxis so taxis are not very common in these areas. However, 7% of the respondents indicated the use of bikes in transporting their produce from farm to different towns. The reason for the use of these modes of transportation is because of the bad condition of the roads from their farm to towns in the study area.

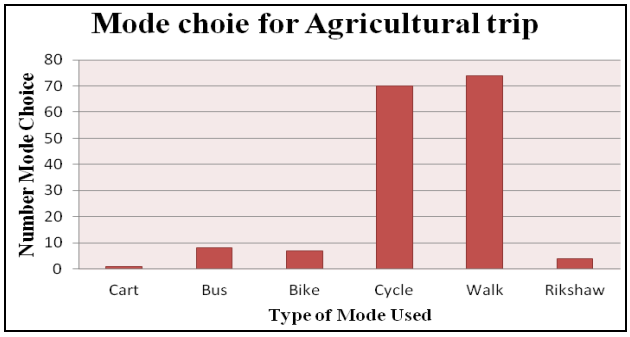

Fig 7

4.5 Choice of Transportation mode used between field and all weather roads

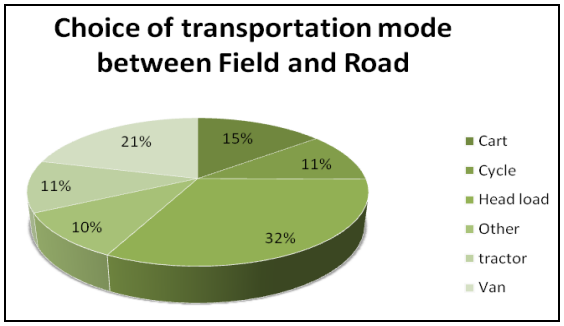

Fig 8: Choice of mode between Field and all weather roads

The farmer used to carry their food grains, fertilizer and other goods in different modes. Head load is the basic mode use for Freight between field and road. Here farmer carries the goods by loading on their head. In case of most interior field head load is used. Where the mud road and on the open field and arable road the cart is being used. Sometimes cycle is also used as goods carrier in the field and rural area. Three wheelers cycle generally called van rickshaw/ thela and when it is used for the goods carrier it is called Van rickshaw. It is one of the most popular transportation modes in rural areas. Tractor is used to carry the goods for long distance field as a goods carrier.

4.6 Distance between field and all weather road

The distance between field and road is an important factor in the rural area. Some perishable items need quick transportation on the other hand if the distance is larger their farmer has to spend more time for carrying of goods which is counterproductive. In this primary survey shows that the average distance between fields and road is about 3 km.

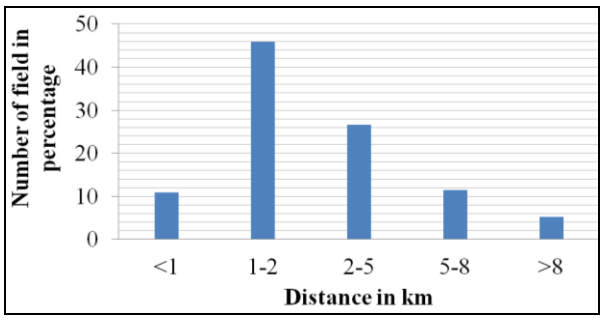

Fig 9: Average distances from the all-weather road to field

4.6 Use of chemical fertilizers, seeds and pesticides: As observed by PMGSY more than 70 percent of the beneficiaries mentioned that there has been an increased usage of fertilizers, pesticides and seeds. use of fertilizer in the agricultural field is significant in mordan era. To carry the fertilizer into the

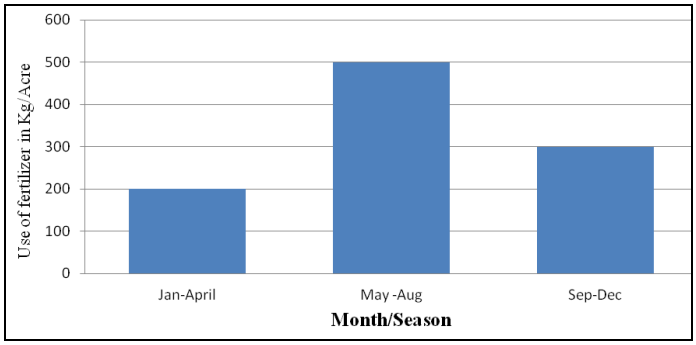

Fig 10: Season wise uses of fertilizer, seeds and pesticides

Field need proper road linkage between road and field, in Jalangi block in year about 150-200 kg fertilizer is used per household. In this block the farmer generally carry the fertilizer by head load, van rikshaw, by cycle and some time by tractor etc. Sometimes the fertilizer outlet is situated far distant from the field.

4.7 Transportation cost of agricultural goods

Cost of transportation of agricultural produce from the farm sites to the market has a great impact on production and income of farmers. This is because transport charges on agricultural produce vary with type of crops, on the length of the trip and distance travelled. From the primary survey table 3 revealed that 39.5% spent less than INR 5,000 annually in moving their produce to the market, 42% spent between 5,000 and 10,000, and 19.5% of the farmer spent above INR 10,000/- annually to transport their farm produce to the various towns. This means a significant proportion of the farmers' income had gone to transportation. Farmers that spent less than 5000 annual are those engaged in vegetable production. High cost of transportation would translate to high selling price and if the price is too high when compared with other farmers from other areas customers will not buy the product and this may result to selling at a loss some factors are responsible for the quantity of crops produced

Table 2: Transportation cost from different Panchayet

Panchayet (Settlement)	Transport cost in Rs< 5000/Year	Rs 5000-10000/	Above Rs 10000/	No. of Respondent
Jalangi	13	7	-	20
S. Dearh	10	6	3	20
SagarPara	8	8	4	20
Kata Bari	5	7	8	20
Choapara	12	7	1	20
Khairamari	5	9	6	20
Goshpara	7	9	4	20
Sahebnagar	7	8	5	20
Faridpur	6	10	4	20
Debipur	6	11	4	20
	Total (79)= 39.5%	Total (82)= 42%	Total (39)=19.5%	Total (200)=100%

By farmers in the study area and these vary from farm to farm and settlement to settlement. Such factors include availability of transport, distance of market to all weather roads, perishable product. In rural area most of the farmer produce for their subsistence and only sell the excess from their production. Transportation problems and other agricultural problems they encountered have really reduced their production capacities. Transportation cost especially has limited their production capacities hence they produce only little at a time. Respondents were asked to list the

transportation problems encountered in the process of transporting their produce from the farm to their houses and markets. According to them these problems included condition of roads, high cost of transportation, irregularity of vehicles, insufficient means of transportation and long distance from farm to their houses as well as markets. The figure no. 9 indicated that only 10% of the farmers trekked less than 1km from their houses to their farms. All other distance takes very long time for them to get produce from source to destinations.

4.8 Labour involvement / Acre

Labour is one of the basic needs for the agricultural activity for every type of crop. In the study area different agricultural production and pastoralist need a good number of labour for the daily activity based work. Generally for showing, maintenance and harvesting of paddy, jute, sugarcane, whet and various types of vegetable a large number of experienced labour is required in the study area

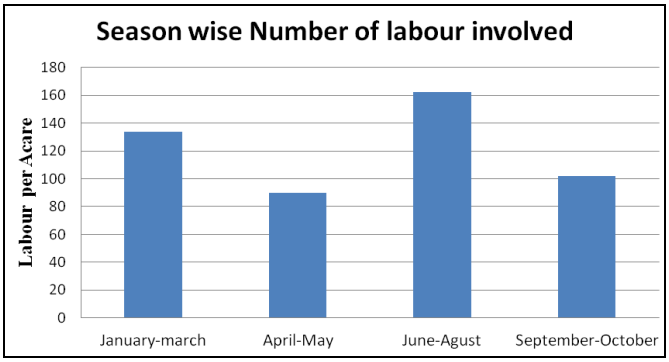

Fig 11: shows season wise labour involvement

Throughout the year. However labour involvement also is significant for the generation and attraction of a large number of trips. Table no 1 shows the involvement of labour per acre field area for different crop production.

Table 3: Shows the labour involvement/Acre

Crops	Sowing	Maintenance	Harvesting
Paddy, jute,	8-10/day /Acre	8-10/day/Acre	10-15/day/Acre
Mustard, wheat	8-10/day	5-8/day	10-15/day/Acre
Vegetables, sugarcane etc.	8-10/day/Acre	8-10/day/Acre	10-15/day/Acre

5. Concluding Remarks

In most part of the countries, priority of connection is basically based on population demand. The survey reveled that the concept of connecting villages based only on population would not provide an efficient rural road network. From the study in Jalangi block it has been observed that percentage of population benefitted and villager accessibility to basic facility requirements have increased for agricultural trip also. It has also suggested of prioritization of the construction of the road links depending upon both on settlement and agricultural growth centers. This study shows that agricultural related trip produced high travel demand in rural area by which established that agricultural activity related growth centers also is a criteria for the planning of rural road and the planners, decision makers, researchers and other different level authorities in the rural road sector will be benefited from this study.

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