Study and Analysis of Public Private Transport Accessibility

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***Abstract*—Rural public transportation is insufficient, accessibility is very much required in countries like India for the movement of passenger and goods to nearby towns with in aspects of public participation, for overall development. Rural areas are suffering from transport problems such as inadequate transport facilities in terms of shortage of buses and non-availability of services. Other problems in rural transport include pollution, accidents, parking shortage etc. Proper planning for rural transportation requires addressing the above issues.Present study focused to increase the public transport accessibility in safe and efficient way and also meeting future demand upto 2025 for thirteen villages .this study helps in financial growth to the public transport by diverting the private transport to public transport.**

***IndexTerms*—Rural regions, Accessibility, Public transport , Surveys, Quality data.**

I. INTRODUCTION (HEADING 1)

A. General

Transport or transportation is the capability of an item or material to be moved by any means such as self-propulsion, or carriage by safe, efficient, reliable methods. Modes of transport include air, rail, road, water, cable, pipeline and space. Transport is important since it enables trade between peoples, which in turn establishes civilizations. Transport represents one of the most important human activities worldwide. It is an in dispensable component of the economy and plays a major role in spatial relations between locations. Transport creates valuable links between regions and economic activities, between people and the rest of the world.Transportation has an important role to play in the conditions that affect global, national and regional economic entities. It is a strategic infrastructure that is so embedded in the socio-economic life of individuals, institutions and corporations that it is often in visible to the consumer, but always part of all economic and social functions. Transport routes are established to distribute resources between places where they are abundant and places where they are scarce, but only if the costs are lower than the benefits. Transportation studies are multidisciplinary that can involve engineering, behavioral, and economic aspects depending on the dimension being investigated such as operational management or planning. One of the current issues pertaining to rural traffic is the role of public transport. The recent studies says that the environmental quality of the roads and the lack of frequency of buses have brought the need for an efficient rural accessibility planning.

Rural Accessibility

Rural Accessibility defines access needs of rural households in relation to the basic social and economic services a household requires with respect to mobility needs, it pays attention to:
The purpose for which people travel, The availability of public transport services, The condition of the transport infrastructure, local level roads, footpaths, footbridges, etc The means by which people transport themselves and their goods, foot, bicycles, animals etc. The availability of social and economic services in relation to population density.

Rural accessibility planning

Rural accessibility planning consists of any or all activities involving the efficient movement of people, goods, and activities in an area classified as “rural.” There are many factors that should be considered in developing and executing rural transportation projects. Such as public involvement, and group discussions the identification of how projects contribute to the overall strategic objectives for a given area. There are many terms used in rural accessibility planning, and often different entities use terms specific to their individual function. The following terms and definitions are those usually encountered in rural accessibility planning. rural areas are defined , basing on two principles they are Highway functional classification where rural is considered anything outside of an area with a population of 5000 .Transportation planning purposes where rural is considered to be all areas outside of metropolitan areas consisting of a population of 50,000 or greater. The following are the three general forms of “rural” used by Census Bureau terms and definitions.

Basic Rural Area

Basic rural areas are dispersed regions with few population centers of 5000 or more. They are mainly characterized by agricultural- and natural resource–based economies, stable or declining populations, and “farm-to-market” localized transportation patterns. The fundamental issues facing basic rural areas are:

Declining populations in many areas have reduced transportation funding for maintenance and preservation of the expansive system of roads and bridges. Funding new and/or upgraded roads outside the federal-aid system to support large-scale agricultural operations and tourist attractions is difficult. The public transit–dependent segment of the population is small, and it is costly to service this segment. The transportation planning needs in basic rural areas can be characterized as having less necessity for forecasting than other rural areas. These areas are generally most interested in preservation of existing transportation facilities and stimulating economic growth. Therefore, planning approaches for these areas should emphasize strategies that address these goals. Basic rural areas will typically have the least staff and least trained planning personnel to work with compared to other types of rural areas.

Objectives

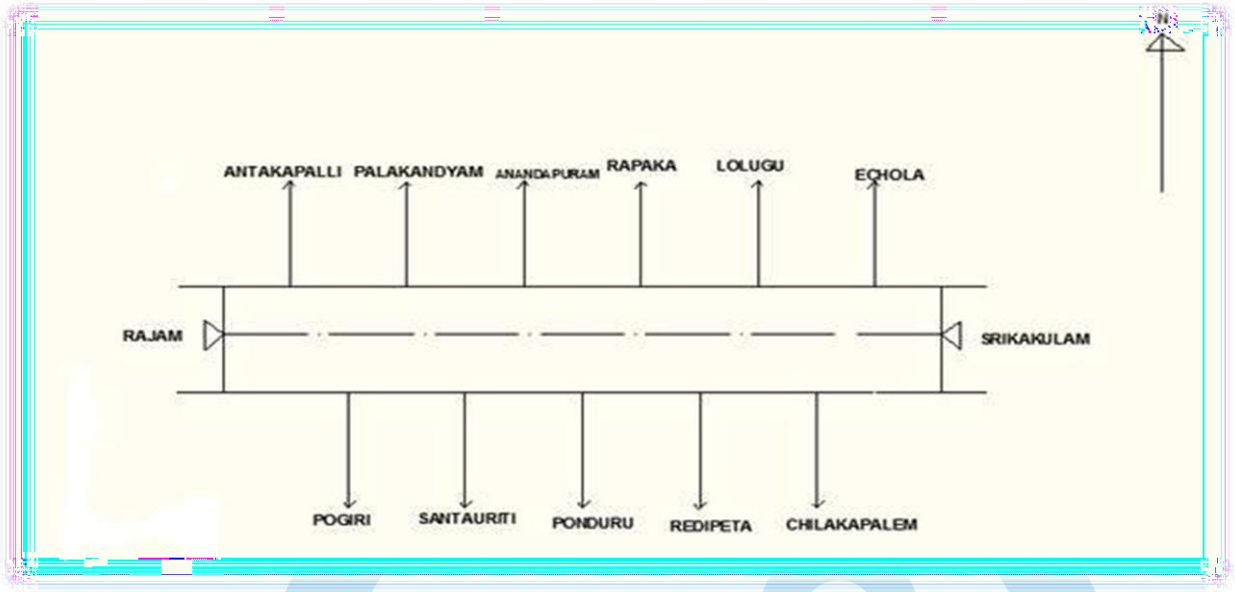
The main objective is to study the public transportation accessibility and population percent of public and private transport in study area. Identifying travel-based activities and their importance to different groups of people in rural areas.
To study the existing trip generation and accessibility.
To analyze the future trip generation and accessibility required.
Develop Measures for developing the accessibility levels of different rural areas.
To analyze the public and private mode cost per day from the trips generated in the study area.

Literature Review

This chapter discusses the theoretical and literature background for there portand it comprises of the topics, related to general facts about public transportation,
"Quantification of accessibility level so frural areas: Acase study in the north ernprovince SouthA frica"(1995).
(Ashoke K. Sarkar and M.A. M Mashiri) The study showed that the accessibility to basic needs in the study area is highly inadequate. The respondents indicated higher importance rating son accessibility to water source, fire wood source, educational facilities and health care centers compared to other facilities and services considered in the study. However, the present accessibility levels to shop, church were found to be satisfactory in all the villages.
By taking the sample size from each zone and they are divided by the total number of thequestionnaireswhiledoingthesurvey,fromthatwegettheweightageofactivities.Thetechnique used for the quantification of accessibility levels based on responses from the villagerson the importance of activities and the satisfactions on the existing infrastructure and service helps to identify the problems
a "Transportation Planning Survey Methodologies for the Proposed Study of Physical and Socio-economic Development of Deprived Rural Regions. Published by Canadian Center of Science and Education.(2012) Vol. 6, No. 7.
(**Mir Aftab Hussain Talpur,Madzlan Napiah, Imtiaz Ahmed Chandio & Shabir Hussain Khahro)** Large amount of data were collected at the beginning era of transportation planning, which was based on face-to-face home interviews with the sample size of 1 to 3% of the total population. This data really helped transport planners in formulating different remedial policies for transportation issues. Ndprioritize them
Data can play crucial role in clarifying the ground realities with respect to various development issues including transportation related problems of deprived regions. If the data shows problem with respect to shortage of roads for the proposed study area. Various surveys techniques have been discussed in this paper in order to know the importance and credibility of surveys.
Different surveys tools and techniques can help transport planners and surveyors in collecting accurate information. Regardless of the subject matter, transportation surveys may serve many purposes. Predictive models and policy proposals can be developed after analyzing such conditions of transportation systems and existing data.

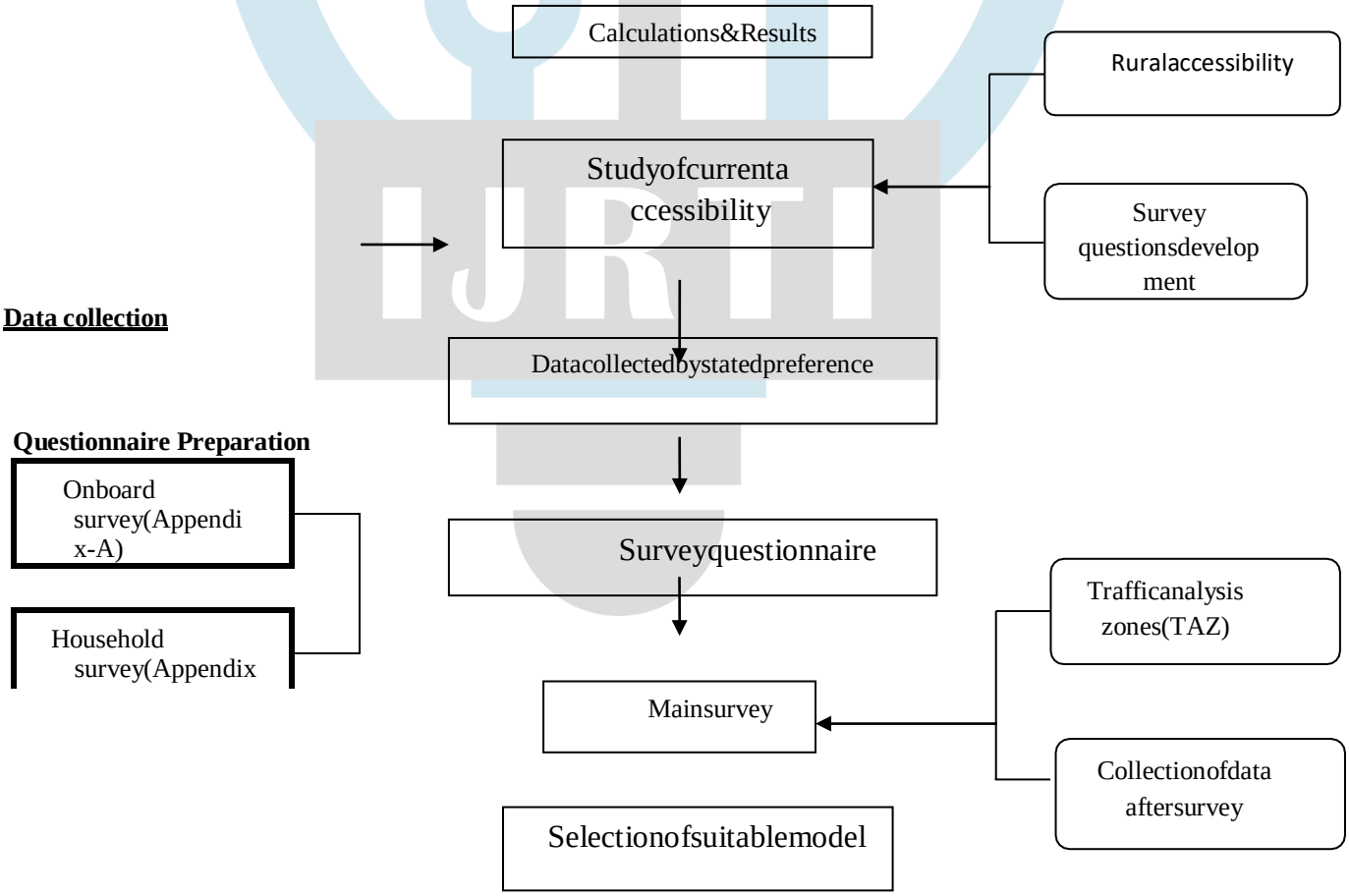
Study area & Data Collection

This chapter describes the study area and proposed methodology of study. The area proposed for the study is within the srikakulam district. The study area is between Rajam – Srikakulam. It is located between latitudes and longitudes of (Rajam) 18.2800° N, 83.4000° E and(Srikakulam) 18.3000° N, 80.9000° E . The major occupation of people living in this area is daily labour and farming.The small population and absence of major transport facilities made the Governments to pay little attention to the provision of public facilities in the area and particularly the development of modern transport network. As noted by accessibility levels are poor in these zones. This condition has made accessibility in the study area very difficult and consequently militated to some degree, against the level of infrastructural development of the study area. The area choosen for the study is Rajam to Srikakulam of length 40 km.
Figure 3.1 shows the road network.



Methodology

This chapter details the proposed methodology for understanding and analyzing the travel behavior of the people. The detailed methodology is depicted in Flow chart. The data pertaining travel characteristics is collected through a stated preference surveys. In this data is to be collected from the households around the study area. It is also planned to conduct an on-board survey for obtaining more reliable information on the travel characteristics. The aim is to study the possible change in the public mode of transport. For this, a stated preference survey will be conducted on the people to collect the data regarding their willingness to change from their current mode to the public mode of transport. The representative samples will be taken from the areas along the study area



The survey questionnaires were designed to know the personal characteristics, trip characteristics and opinion on the accessibility which are detailed in the below paragraph the main motivation is to describe the current rural transport system and identify travel behavior of the people and to assess the possible modal shift to public mode of transportation.

Household travel information survey

Household survey questionnaire was designed to obtain information mainly about the trip details of the family members, the importance put on easy accessibility to different activity centers by the respondents and the satisfaction levels with the existing accessibility level. The villagers were asked to express their opinion in the form of satisfaction levels with the accessibility to various activities. Questions were mostly close ended, simple, direct. A few questions were designed to extract the details of the family including number of members with age group and gender, number of earning members, monthly income, vehicle ownership etc. These information were collected from the head of the household.

Interviewers were selected for the study area for carrying out the household survey. Before starting the data collection process, the interviewers were explained about the objectives and importance of the study and were trained by the study team on the procedure of data collection. The interviewers were asked to explain the purpose of the survey to the respondents in the beginning. The interview was conducted on one village at a time. At least one person from the research team was always present to guide the interviewers in case of any doubts and difficulties. At the end of a day, the data collected by different persons were checked. In case of some abnormal responses, the concerned interviewers were sent back the next day to verify

NameofVillage	Population	Number ofhouseholds	Number ofhouseholds interviewed
Rajam	850	322	170
Antakapalli	252	110	22
Pogiri	485	307	62
Palakandyam	343	211	43
Santa Uriti	240	105	21
Anandapuram Agraharam	235	95	19
Ponduru	647	412	83
Rapaka	657	462	93
Reddipeta	826	316	63
Lolugu	673	286	53
Chilakapalem	783	530	106
Echerla	542	218	44
Srikakulam	947	498	100

Table :3.1.1Details ofVillage-wise data collection is done asperbureauofPublic Roads

Age Distribution of the people

The age of each individual is collected from the onboard surveys and the Figure 3.9 below indicates the age groups. Age group (15 to 25) shows more in number when compared to remaining age groups.

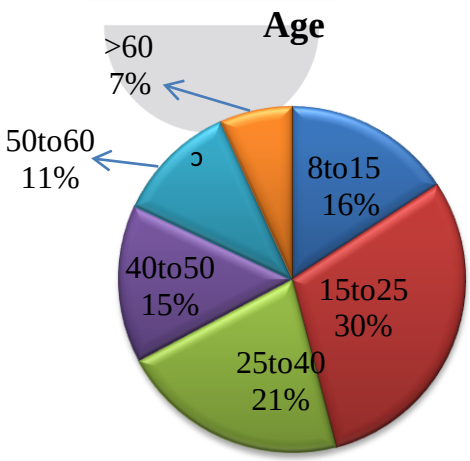


Figure 3.8 Shows the Distribution of different age groups.

DetailsofCommuterEducation

The education of each individual is categorized from the stated preference survey and the status of education among individuals is as shown in Figure 3.10 Among all Education levels, it has been observed that Intermediate and Degree persons are high in number compared to school & Postgraduation.

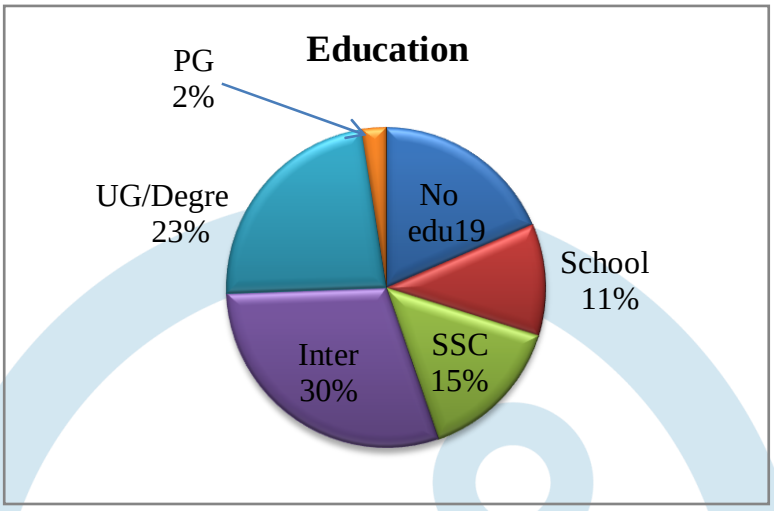
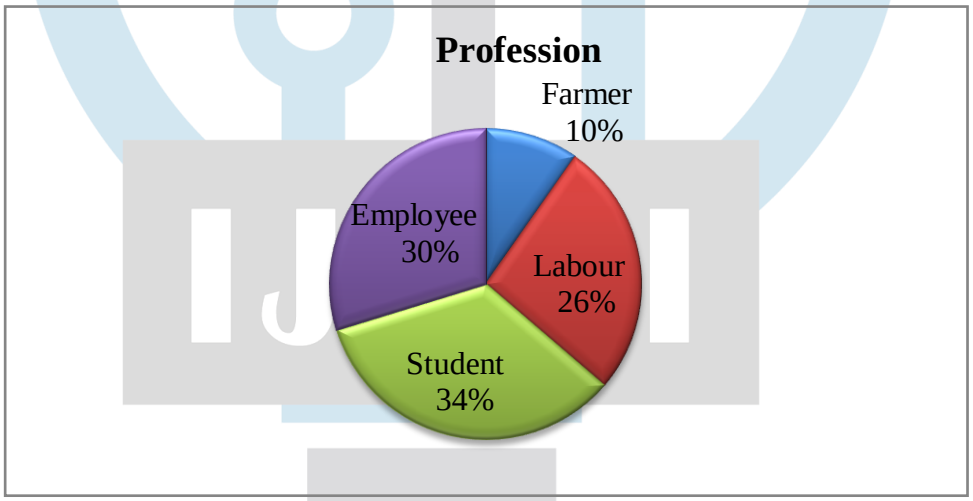


Figure3.9ShowstheEducation levels

CommutersProfession

The occupation of each individual is taken from stated preference survey and various levels of occupation are shown in Figure3.11.students are high in number compared with other occupations.

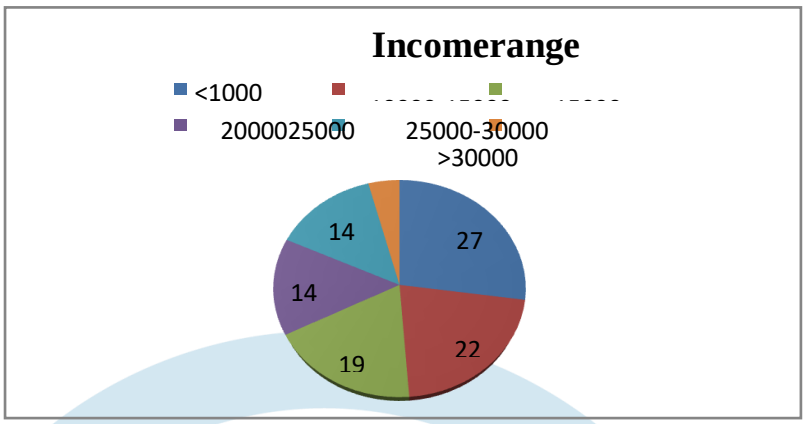


Fiugre3.10Showstheprofessionsusedinthestudy

CommutersIncomeRanges

The income of each group is categorized from the stated preference survey and the Figure 3.12below indicates the income ranges of each individual group, 49% of the income group in therangebetween10to15thousandIndianrupees.

3.11 Shows the Income ranges in the Study area



Triplength

The triplengths are collected from the onboard survey, the data obtained was presented n Figure. Among all trip lengths, it has been observed that more than 30 km trip lengths were high in number and less than 5km triplengths are low in number.

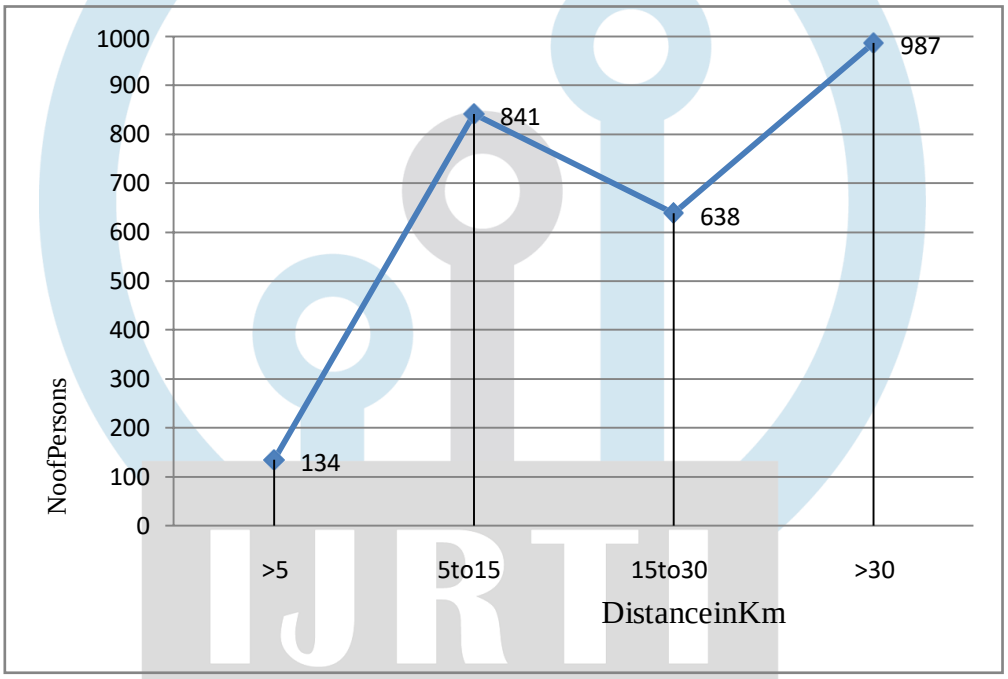


Figure3.12showstheTriplengths

II. Analysis of Public & Private Transport Demand

Parameters for Estimation of Publicand Private Transport Demand

Public transport demand may depend on various factors, ranging from travel behavior parameters (travel cost, travel time, trip length, accessibility ratio, comfort level, frequency, convenience etc). Although for the purpose & context of our study area is Rajam - Srikakulam, we selected only the parameters of travel behavior as they directly affected the demand generation in our context. Thus, the selected parameters were trip purpose, trip length, and accessibility. These parameters were selected on the basis of a detailed stated preference survey conducted founder standing the travel behavior of the study area.The questionnaires used for data collection distributed to people. The questionnaires consist of information about transport modes and purposes, major problems experienced, and recommendations for improvement. 2100 questionnaires were distributed to people while doing onboard survey.

III. Determination of over all accessibility

General

Accessibility is interpreted at the local scale and at a personal level in terms of people's ability to gain access to certain facilities relative to the ability of the prevailing transport system to overcome the distance barriers involved. Thus the overall accessibility level (OAL) of a certain rural area may be quantified as the composite index of various basic activity requirements

	Rajam	Antakapalli	Pogiri	Palakandyam	Santauriti	Anandapuram	Pondur	Rapaka	Reddipeta	Lolugu	Chilakapalem	Echerla	Srikakulam
Office	52	54	55	26	28	61	61	68	43	57	30	36	22
College	54	45	76	62	43	68	49	48	54	20	68	32	63
Work	46	54	28	57	37	30	27	30	51	57	51	46	43
Entertainment	24	24	21	28	47	221	32	28	28	34	26	45	37
Others	24	23	20	27	45	20	31	26	24	32	25	41	35

Table5.1.1Present Accessibility to different villages
(samplesizeistakenas200for eachvillage)

IV. Conclusion

This work quantified the travel characteristics of people and identified the choice of mode of commuters in Rajam - Srikakulam. The data is collected by means of a household survey and onboard survey along the study area, which provided the information about their economic status and travel behavior of a sample population.

Type of vehicles preferred by the residents are chosen to know the cost of each trip with reliable data base, for 2W the minimum cost of each trip was Rs.5.24, 3W the minimum cost of each trip was Rs.8.84, 4W the minimum cost of each trip was Rs.13.76 , Bus the minimum cost of each trip was Rs.36.56.Based on the cost analysis with reference to VOC (Vehicle operating cost) it is known that the cost of private transport is higher than the public transport for a resident , and this is happening because of improper time schedule , less accessibility of public transport.The average household size was 6 and trip length was observed as 20 km from each origin to destination points in the study area.The study showed that the accessibility to basic needs in study area is highly inadequate. The respondents in Santauriti , Ponduru , Rapaka , lologu indicated higher importance ratings on accessibility to work, , Educational facilities and Office.In the study area, 7 villages(Palakandyam , Santauriti , Pondur , Rapaka , Lolugu , Etcherla , Srikakulam) are having lack of public transport frequency and time maintenance comparing to the other areas.

In the villages, Santauriti (38.2) , Lolugu (39) and Echerla (38.3) are having low accessibility levels comparing to the ranges as recommended in table 5.3. From the present work status it was observed that Rajam to Santauriti(77) , Reddipeta(262) , Lolugu (336) , Chilakapalem (511.2) , Echerla (412.7) require high trips generation .The study helps public transport authorities to increase the accessibility levels in the study area.

References

1. Ashoke K. Sarkar and M.A. M Mashiri , (1995) , **"Quantification of accessibility levelsof rural areas: A case study in the northern province South Africa**" , Transportek,CouncilofScientific andIndustrialResearch,PP:1-44.
2. Anuj Jaiswal, Ashutosh Sharma, Jigyasa Bisaria, (October 2012),**"Estimation of PublicTransport Demand in Million Plus Indian Cities based on Travel Behavior".** ISSN:2249–8958,Volume-2,Issue-1, PP:249-259.
3. AmiruddinIsmail,MohammadGanji,Mohammad Hesam Hafezi, Foad ShokriandRizaAtiq(2012)**"AnAnalysisofTravelTimeinMultimodalPublicTransport"**
4. ,AustralianJournalofBasic andApplied Sciences,ISSN1991-8178,pp:165-172,.
5. C.V.PhaniKumar,DebasisBasu,andBhargabMaitra.**"ModelingGeneralizedCostof Travel for Rural Bus Users: A Case Study"** Journal of Public Transportation, 2004 ,Vol.7,No.2, PP:59–72.
6. DanangparikesitandLaOdeMuhammadmagribi.(2005).**"DevelopmentofadynamicmodelforinvestigatingtheInteraction betweenruraltransportanddevelopment"**, Journal of the Eastern Asia Society for Transportation Studies. Vol. 6,PP:2747–2761.
7. Grace Corpuz , (2006) **"Public Transport or Private Vehicle: Factors That Impact onMode Choice"**.30thAustralasianTransportResearchForum,PP:1-11.
8. J. Aderamo and S. A. Magaji, **Rural Transportation and the Distribution of PublicFacilities in Nigeria: A Case of**

Edu Local Government Area of Kwara State" .Department ofGeography,UniversityofIlorin,Ilorin,Nigeria(2010).PP:171-179.

9. Mir Aftab Hussain Talpur,Madzlan Napiah, Imtiaz Ahmed Chandio & Shabir HussainKhahro.(2012). **"Transportation Planning Survey Methodologies for the ProposedStudy of Physical and Socio-economic Development of Deprived Rural Regions"**Canadian Center of Science and Education..Modern Applied ScienceVol. 6, No. 7 ,ISSN 1913-1852,PP:1-16.
10. Mairead Cantwell, Brian Caulfield, Margaret O'Mahony **"Examining the Factors thatImpact Public Transport Commuting Satisfaction"** Journal of Public Transportation,2009Vol.12,No.2, PP:1-21.
11. Marie Thynell, Dinesh Mohan , Geetam Tiwari , (2010) , **"Sustainable transport andthemodernisationofurbantransportinDelhiand Stockholm"**,TransportationResearchandInjuryPreventionProgram,IndianInstituteofTechnology,Delhi,India,PP:421-429.
12. SanjayK.**"ReviewofUrbanTransportationinIndia"JournalofPublicTransportation**,Vol.8,No.1,2005,PP:79-97.
13. Tom Seekins , Nancy Arnold and Catherine Ipsen **. "Developing Methods for Gradingthe Accessibility of Communality's Infrastructure" journal of urban planning anddevelopment**.2012,ISSN:0733-9488,PP:270-276.