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Travel Behaviour of Rural People in Developing Countries.

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Abstract
Travel patterns in rural areas of developing countries are dominated by trips required to access basic needs and services. Studies revealed that the time spent on such travel is relatively constant throughout the year. Any community with less than 20,000 people is said to be rural, while settlement with population of over 20,000 people is regarded as an urban centre. In many developing countries, national transport policies do not address the travel needs of rural people. This is either due to lack of awareness or total ignorance of government. In some countries, after the construction of rural roads, travel behaviour of rural communities change in order to meet their day-to-day basic needs. The rural travel is usually done with goods. The perspective of rural transportation planning in developing countries has changed from a 'road-and-car' approach to a 'needs-led' approach. This paper examines the travel pattern of rural dwellers in developing countries through review of literature on the subject, in order to suggest measures to enhance the travel behaviour of the rural dwellers.
Keywords: Travel, trips, community, rural, behaviour, planning, population, developing

1. Introduction

In the strictly traditional sense, various parts of Nigeria had their own conception of the rural area referring to the farm and farming settlements while the town referred to the seat of an important chief or ruler (Ekong, 1988). Historically, rural referred to areas with low population density, small size; relative isolation, where one major economic activity was agricultural production, and where the people were relatively homogenous in their values, attitudes and behaviour (Bealer et.al; 1965). Any community with less than 20,000 people is said to be rural, while any settlement with over 20,000 people is regarded as an urban area.

Travel patterns in rural areas of developing countries are dominated by trips required to access basic needs and services. It has been reported that the time spent on such travel is relatively constant throughout the year (Edmonds 1998). Rural individuals (especially women and children) spend approximately 0.3-1.5 hours daily in acquiring basic needs like water and firewood. Poor access is responsible for critical problems like high mortality rates, inadequate food security, and improper education (Howe 1996). It is therefore important to understand the role of rural transport in the provision of access. This understanding is possible within the framework of accessibility of activities. The concepts based on accessibility of activities recognize transport as one of the requirements to access an activity. In many developing countries, national transport policies do not address the travel needs of rural people. This is either due to lack of awareness or total ignorance of government and the national planners. The rural travel needs are different and can be categorized into two sections. That is "on farm" and "off farm". Travel needs relating to on farm activities includes travel for domestic needs such as collection of water and firewood mainly performed by women along with farm elated travel. Off farm travel is to access the markets and other services like schools and health centres Private sector operates public conventional transport in the rural areas. That does not solve the transport problems of the poor rural people as they have different needs before reaching a bus route or a motor able road. As a result, the markets, health centres, schools and other services remain inaccessible to them. The only available option is to walk long distances from villages to reach these services. This results in low productivity in the rural areas that depends mainly on agricultural produce. The supply to the market centres from the rural areas remains very low and the poor rural farmers hardly get any income beyond the "break even".

Matalon (1992) confirmed that, the travel behaviour of individuals is not uniform and he attributed this difference to gender. In the opinion of Okoko (2007), difference in travel behaviour of men and women stems on the fact that women are vulnerable to a number of factors in their choice of travel (mode or in their travel behaviour). A study by Fadare and Morenikeji (2001) on gender bias in intra-urban trip pattern in Niger State, Nigeria, shows that, there was a remarkable difference in the travel behaviour of men and women. Also, Hanson and Hanson (1980) noted that women travel less frequently than men and they travel shorter distances than men do and rely on bus (public transport) to a greater extent than men. Despite the transport bias against women, scholars emphasized that, there would be an increase productivity, improved nutrition and health for children and the society at large when gender discrimination against women is eliminated in terms of accessibility (Blackden and Wodon, 2006; Okoko, 2007). This paper is to examine the travel pattern of rural dwellers in developing

countries through the review of literature, in order to suggest some possible measures to enhance the travel behaviour of the rural dwellers.

2. Understanding the Differences between Urban and Rural Areas

Settlements in Nigeria, and indeed all over the world, vary from the pure rural to the pure urban types with a lot of variations in between. The term "rural Nigeria" will be used to embrace those places in Nigeria with less than 20,000 people as well as those with larger population but in which a greater proportion of the inhabitants (50% or more) are engaged in farming and are equally lacking in most basic amenities.

There are many distinctions between the rural areas and urban areas, among which include: Have you ever queried some people when they refer to themselves as brothers even when they are not in any way related by blood, but just because they hail from the same place or speak the same language? That phenomenon is what is referred to as social solidarity or the degree of togetherness among people. According to Jibowo (2000), there is a greater degree of social solidarity among rural than urban dwellers. Rural area usually has larger number of old people than the youth. This is because the youth often migrate to the urban areas in search of work, higher education, apprenticeship to a trade or other engagements for survival. Vertical social mobility is more frequent in urban than rural areas (see figure 1). The reason is that, the urban areas offer more opportunities for personal development which translates to growth, promotion and change of occupation, marriage and residence. One can easily observe between a rural and an urban area is that the urban area is larger in size than the rural area. This may be attributed to the fact that more people live in the urban area than in the rural area. Individuals migrate from rural areas to urban areas in search of better paid jobs or apprenticeship in vocations. Rural people are closer to nature than the urban people. The rural people on a daily basis have interaction with their environment. The predominant occupation in rural areas is farming. That is, crop production, livestock rearing, fish production and processing of farm products. In urban areas however, there are varieties of occupation ranging from artisans, marketing, clerks, office work, teaching, nursing, administration, driving and a lot more.

The movement of an individual from one social class or group to another is referred to as social mobility. In Figure 1, social mobility may take vertical movement upwards or downwards or may take horizontal movement, which is within the same social ladder. There are fewer social classes in rural areas than in urban areas because of the homogeneity of occupation, economic level and social status. Vertical social mobility is more frequent in urban than rural areas. The reason is that, the urban areas offer more opportunities for personal development which translates to growth, promotion and change of occupation, marriage and residence. Social interaction in the rural area is mainly through primary group contacts such as the family, the neighbourhood or the entire village. Such interaction is mainly face-to-face and it takes place on the farms, and in places of worship. More interactions also take place during the use of common facilities such as the village square, village streams, other sources of water, village market and during village development meetings. Whereas, in urban areas, social interaction is through secondary contacts mainly. This is achieved through the use of newspapers, radio, television, and magazines which provide news and information to the urbanities more than through family members or neighbours. Urban dwellers may also meet at sports centers, business contacts and other recreational points. In the rural areas, the behaviour of individuals tend to be guided more by internalisation of societal norms and values. Urban areas however tend to rely more on formal institutions such as the police, traffic warden, immigration officers and customs officers for the maintenance of law and order generally.

Private sector operates public conventional transport in the rural areas. That does not solve the transport problems of the poor rural people as they have different needs before reaching a bus route or a good road. As a result, the markets, health centres, schools and other services remain inaccessible to them. The only available option is to walk long distances from villages to reach these services. This results in low productivity in the rural areas mainly dependent on agricultural produce. The supply to the market centres from the rural areas remains very low and the poor rural farmers hardly get any income beyond the "break even". The IMT can assist in these two consequences of the rural set up in order to reduce the transport burden of the rural isolated communities. Figure 1 reveals an outline of the pattern of rural transport. It shows that IMT plays a key role in both "on farm" and "off farm" travel. An IMT (Intermediate Means of Transport) is defined as a substitute between walking and motorized transport. In some countries, even after the construction of rural roads, people continued walking. The reason being non-availability of affordable and appropriate transport modes. The rural travel is usually done with goods. The IMT therefore should be dual purposed to carry both goods and the passengers**.**

2.1 Travel Behaviour of the Rural Elderly

Carp (1988) associates the well-being of an elderly person with the satisfaction of two categories of needs: those activities that precipitate independent living, and needs that give positive quality of life or "higher-order" needs. He defines "higher-order" needs (such as social interaction, usefulness, recreation, and religious experience) as not being essential for living, but are necessary for the well being of the person. Other studies have referred to these dichotomies as mandatory and discretionary activities or needs. A 1978 travel diary study of able-bodied

elderly in Lawrence, MA showed that 38.1 % of all vehicle trips related to the satisfaction of higher order needs, which was less than the 61.9% of trips for essential needs, but significant nevertheless (Slavin and Jacobson, 1985). Both necessity and "higher-order" needs can be difficult to satisfy if the person does not own a private vehicle. An elderly person in a rural area is further restricted where the automobile is often the sole means of personal transportation. When an older person ceases driving, it is usually the "higher-order" needs trips that are most adversely affected.

A study of focus groups of those over 70 years of age in Maine and Florida found that older people who ceased driving concentrated their trips on life maintenance activities, often at the expense of recreational trips (Burkhardt, 1999). The rural elderly are particularly dependent on the private automobile. A 1996 survey by Stamatiadis et al. (1996) of 155 people in rural Kentucky found that the automobile accounted for a total of 83.2% of all trips being taken as either a driver or passenger. In the Lawrence study, 66% of all trips were taken in an automobile, with 58.4% of those trips as a driver and 35.6% as an automobile passenger (Slavin and Jacobson, 1985). Hildebrand and Myrick (2001) found that the rural elderly retain their licenses longer than their urban counterparts presumably because often no alternative to the private automobile exists. Consequently, accident rates were found to be much higher for the rural elderly.

The travel behaviour of an elderly person as described in several recent studies can be generalized in the following manner: a typical elderly person has independence and social needs that require mobility, and the most prevalent means of mobility is the private automobile. It becomes more likely that as a person ages, they will suffer effects that reduce physical and cognitive abilities, making the use of the private automobile difficult or dangerous. Consequently, one would need to switch travel modes to maintain mobility, or compromise independence and social needs. The rural elderly are especially prone to losing mobility because rural mobility is secured predominately with the private automobile.

2.2 Trip Characteristics

This section presents an analysis of the collected data, and employs various descriptive terms. For clarity, these terms are defined below:

2.2.1 Trip (or round trip): Travel characterized by participants leaving their Home, performing a task or series of tasks, then returning Home. A trip is composed of a series of trip links.

2.2.2 Trip link (or link): The one-way path connecting an origin and destination. A trip is composed of a minimum of two trip links; Home (origin) to Desired Location (destination), and Desired Location (origin) to Home (destination).

2.2.3 Trip Frequency: When trip frequencies were analyzed, it was found that urban seniors engaged in, on average, 2.1 trips per day, while rural seniors performed 1.7 trips per day. As the data in Figure 1 show, there is a fair degree of variability in the survey data.

2.2.4 Trip Chaining: Trip frequency cannot be considered in isolation of the number of stops or activities included in each link. Trip links refer to the one-way path connecting the nodes of an origin and destination. A chain refers to sequential trip links. Consequently, a round-trip with one destination would consist of two trip links, one being to the destination, and the other the return segment.

2.3 Perspectives of Rural Transportation Planning in Developing Countries

The perspective of rural transportation planning in developing countries has changed from a 'road-and-car' approach to a 'needs-led' approach (Howe 1996). The first approach, which continued till the 1980s, focused on the rural transport network and assumed that motorized transport is capable of handling all transport needs of rural households. In the second approach (since 1986), transport was seen as a component of an overall system serving the needs of the rural population (Dawson and Barwell 1993). This change of perspective occurred as a result of a series of concerns on the rural transport interventions in developing countries that failed to bring about the expected developmental benefits. It was revealed that a major component of rural travel, namely the off-road network, cannot be addressed using the first approach (the road-and-car approach). The second approach (the needs-led approach) although still in its evolution stage, has been able to provide improved insight into the actual development needs and benefits from the data at the base level. Hine (1982) emphasized the role of rural roads in providing basic accessibility, and found that personal travel constitutes the highest proportion of rural travel demand. As such, better access to rural roads can increase the demand for passenger movement.

3. Economies of Rural Travel

The current awareness in rural transportation planning for developing countries has given a modified view to the economics of rural transportation; a study of market forces as if people mattered. Howe (1996) developed a case in support of this concept that the conventional transport economics vision (the market place and price) is irrelevant in the context of high monetary and time constraints, prevalent in rural areas of developing countries.

The above argument means that the willingness to pay concept must be revised when dealing with rural transport problems in developing countries. In conventional transport economics arguments, the transport supply (roads,

vehicles) is the product and is available to all users in the marketplace (the region). There is an affordable price attached to this product. In the case of rural individuals in developing countries, most people, being non-users, are out of the market place. The new rural transport vision in developing countries must attach a high price to the wastage of time, and develop methodologies based on this concept.

There is evidence in developed countries that need and deprivation provides justification for special transport provisions (Moseley 1979, Howe 1996). The provision of facilities for the disabled may be cited as an example. This argument is the basis of the recent developments in methodologies such as the Integrated Rural Accessibility Planning (IRAP) and Integrated Rural Transport Planning (IRTP), devised for developing countries. These methodologies are people centred and provide a starting point for understanding the economics of rural travel in developing countries (Howe 1996, Edmonds 1998, Dixon-Fyle 1998).

3.1 Rural Accessibility Analysis

It is understood that the real source of deprivation of the rural population is their lack of accessibility to various activities (Barwell 1996). It is therefore necessary to explore this concept in order to have a better understanding of rural transport problems. Moseley (1979) provided guidelines for quantifying accessibility and presented various alternative solutions to accessibility problems. He developed a hierarchical transport / land use plan defining area-wise accessibility ratings. Moseley showed that a *population potential index* could be found, based on the gravity model and the accessibility of a location, which can be quantified in terms of generalized transport cost.

Through his work, Moseley (1979) defined two fundamental guidelines for studying rural accessibility:

a) Mobility: This deals with the transportation solutions to the accessibility problem.

b) Siting of services: This deals with non-transport solutions for the accessibility problem.

These guidelines are the foundation of the recent work done in accessibility planning in rural areas of developing countries (Barwell 1996). Among other land-use categories, Howe and Tenant (1977) did not find accessibility to be a significant factor in explaining on-road trips. This leads to a need to investigate the accessibility for the off-road travel. These were the trips that were 'unrealized' due to several reasons. A quantification of these unrealized trips, though, is required for proving this point. It is clear that only an accessibility-based methodology can address this issue.

The conventional trip-based methodologies are unable to handle this issue. Hine et al (1983, 1983a) argued that the provision of basic accessibility, for example replacing footpaths by vehicle tracks, has much higher impact (about one hundred times) than improving the existing accessibility condition (for example, by providing road resurfacing). They concluded that accessibility has a less direct effect on market agricultural production, however, it affects it indirectly through loan financing.

3.2 Modeling Individual Rural Travel Behaviour

In modeling the travel behaviour of rural individuals, the desire to participate in an activity may be related to the accessibility benefit derived by the individual. In the accessibility-activity framework developed in this research, this means that the activity participation of an individual provides an index of the accessibility benefit. Using the data on the accessibility benefit index measured for each individual, as well as their activity participation (i.e. travel), it is therefore possible to model the travel behaviour of the individuals.

This concept is used to develop the mathematical form of a rural travel demand model within the discrete choice approach, under the utility maximization framework. The accessibility benefits index is used as a proxy to the utility of the activity for the individuals (Shabbar, 2000).

3.2.1 Discrete choice approach

According to the discrete choice approach of utility maximization, an individual *i* will select an activity *j* if the utility of that activity is the maximum within his set of activities. This stochastic problem can be mathematically written as:

$P^i_j = P_r(U^i_j > \hat{U}^i_m)$; for all $m \neq j$

Where

P^i_j = probability of selection of alternative *j* by the individual *i*

U^i_j = utility of alternative *j* for individual *i*

$\hat{U}^i_m$ = all combinations of *U* where $m \neq j$

In the utility maximisation framework, equation above would give the probability of individual *i* choosing alternative *j*, expressed as the probability that the utility of the alternative *j* is higher than the utility of any other activity in his choice set.

In the light of the above statement, therefore:

$P^i_j = P_r[U^i_j \geq \max \hat{U}^i_m]$ where $m = 1, 2, \ldots M$ represents the different alternatives available in the individual's choice set *Ci*. (Shabbar, 2000)

3.3 Problem Analysis of Related Rural Transport Situation

- Bias attitude of government as regards road constructions and reconstructions, in favour of urban areas at the expense of the rural areas.
- Some constructed roads in rural areas of developing countries are underutilized, because governments had put round pegs in squared holes, when such constructions were not people-based, but politically based.
- Low affordability and economical options.
- Gender and cultural hindrances.
- Community's degree of empowerment and participation in local government planning.
- Local and national awareness of transport options.
- Poor road conditions.
- Poor management of transport operations.
- Reasons for lack of services and vehicles, road infrastructure, affordability and critical mass supplies of vehicles and spare parts and characteristics of the marketing systems.
- Lack of or unfavorable laws and regulations.
- Institutional arrangements and involvement of stakeholders in decision-making.
- Rural markets, access to facilities, infrastructure type and condition.
- Safety and environmental problems.

3.4 Recommendations to Improve Rural Transport Means and Services

1. Promotion Of Private Ownership Of Means Of Transport

• Outline options for appropriate rural transport services and show how Complementarity and diversity can improve rural mobility.
• Provide guidance on appropriate spending for transport services in relation to people served, tonnage handled, increased income from sales, and so on. Consider economical options to enhance affordability and use of transport among the poor (including credit, subsidies, taxes and duties).
• Propose ways to adopt participatory planning and empowerment and explain the benefits to the concerned people.
• Propose ways to enhance human capacity and awareness and to stimulate local initiatives.
• Propose interventions to address gender and cultural obstacles to make transport available to those in need.

2. Promotion of Transport Services

• Consider ways to improve the supply and distribution of vehicles and maintenance.
• Consider ways to improve effective demand.
• Outline options for improving safety and environmental conditions.
• Consider economical options to promote transport use (credit, subsidies, taxes, duties).
• Outline options for institutional arrangements and stakeholder involvement.

3. Other Options

• Consider alternative ways to improve access (rural markets, relocation of facilities, and provision of infrastructure).

3.5. Conclusion

Inadequate transportation services and deplorable conditions of roads in rural areas of developing countries have enormous effects on the travel behaviour of the rural residents. The major activities of the rural areas in the "Third World Countries" are agriculturally based (animal rearing, crop cultivation, fishery inter alia). Each community needs to be provided with adequate transportation services based on the characterized activity of the area and not to be politically motivated. Travel behaviour of people living in rural areas usually results to time wasting (long distance to access basic services and facilities), energy consuming (energy used to achieve the travel goals), economic loss, health challenges inter alia. Government intervention into the transportation system of rural areas is inevitable to bring a change and relief to the travel behaviour of the people in rural areas of developing countries, and thereby promote their economy viability.

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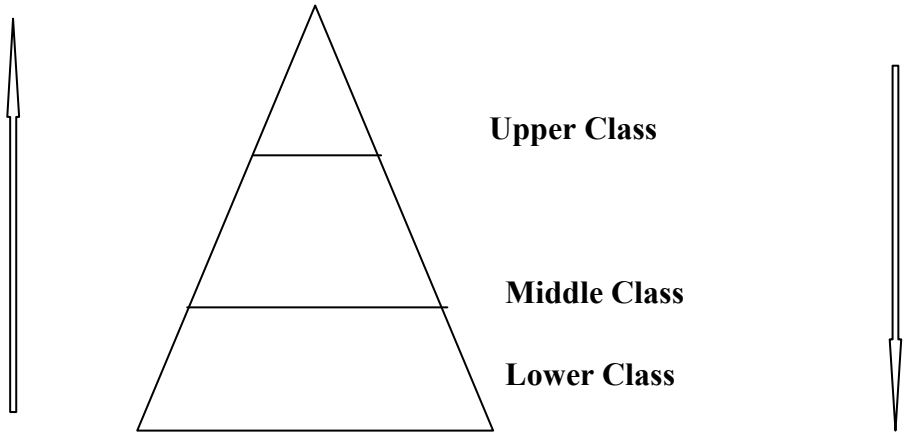

Figure 1. Pyramid of Social Class Mobility; (Source: National Open University of Nigeria {AEM 311}, 2010)

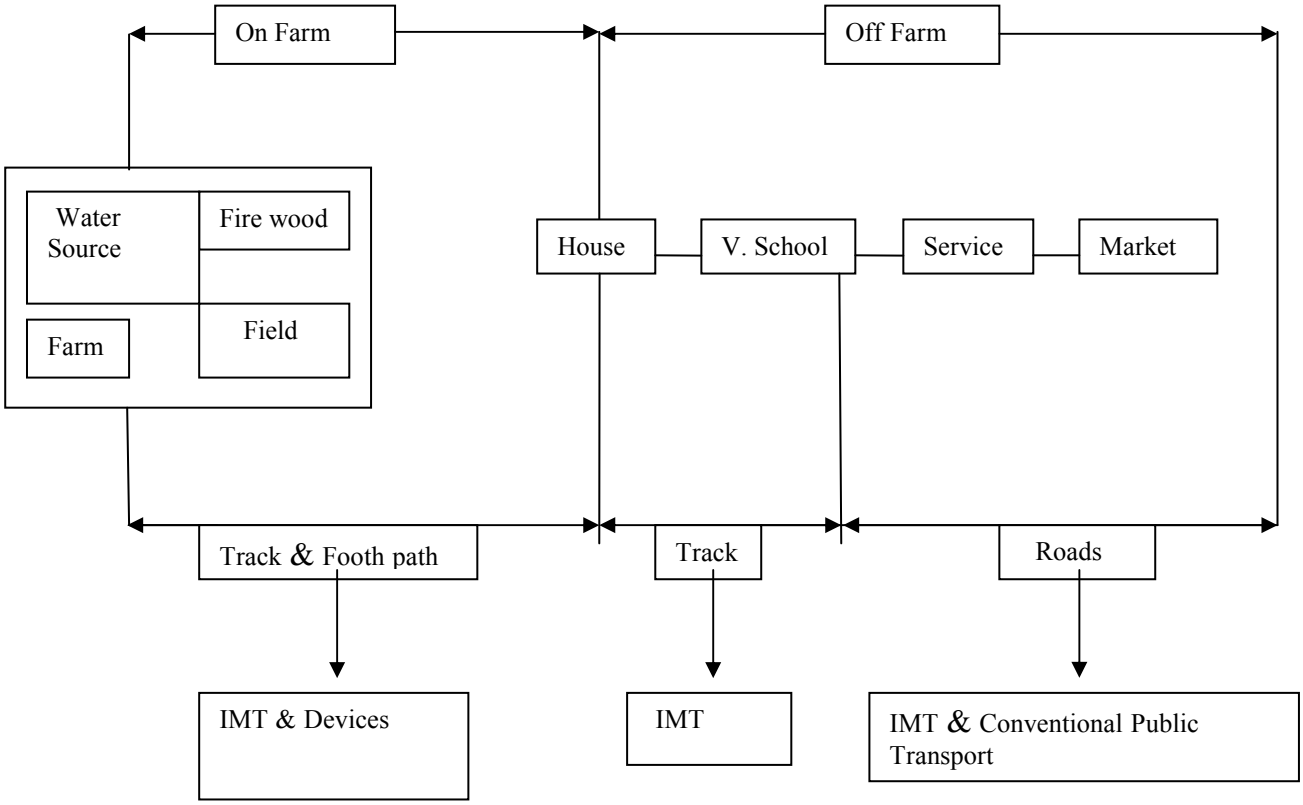

Figure 2. Rural Travel Pattern Chart; (Source: Rajinth de Silva, 2008)

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