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Study of Development of Road Network in Rural Transportation

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ABSTRACT

Established and distinguished from other forms of road investment are rural road planning in developing countries. Diverse approaches to the problem are examined, a new modeling approach to the network has been proposed and a combinatorial design problem has been formulated as the basic model decision; mathematical programming techniques, accurate enumerative and heuristic methods have been presented. Test experience suggests that the heuristic performance proposed is satisfactory. The use of approaches in real world decisions is given special consideration. The new approach appears to be more feasible than any conventional method in the framework of developing countries. According to the 2011 census, 69 percent of the total population in India is in rural areas. Important stimulation to the country's economic growth will therefore be improved connectivity and accessibility to rural areas. Rural infrastructure development is very important in India in general and rural transport infrastructure in particular. Rural road connectivity ensures access to critical services and opportunities and supports programs to reduce sustainable poverty as well as job creation through rural industrialisation. An inadequate rural road network or poor road condition, which provides impedance for the transportation of this type of commodity to the user's needs, has been estimated to waste 20 to 30 percent of agricultural, horticultural and forest products.

1. Introduction

The sine qua non for economic development of a nation is that sufficient infrastructure is provided for both in rural and urban areas. There is a strong positive connection with rural economic development to access to rural infrastructure and a strong negative association with poverty. In order to create extra jobs, create new economic opportunities, provide related services, and increasing the absorption of lending, we need to speed up investment in rural infrastructure. All these eventually lead to improved life quality and to a reduction in rural poor vulnerability. Rural connectivity is a central component in rural development that significantly contributes to rural socio-economic development through access to services such as education, healthcare, marketing etc. Investment in rural roads has been shown to raise rural populations over the poverty line. Furthermore, evidence shows that rural poverty decreases as rural connectivity increases. Enhanced roads can create economic growth and poverty reduction opportunities through a variety of mechanisms. The costs of transport, use, and production of goods and services are minimized by highways. Enhanced roads increase farming and non-farm production with better access to markets and technology by increasing the availability of relevant inputs and lower input costs. At the household level, road development contributes to improved productivity and demand for jobs, as well as better education and health, including for girls and women. Infrastructure's significance is well known for agriculture and rural development. It is estimated that only poor roads and inappropriate storage facilities have a loss of 15 per cent of crop production between the farm and the consumer, which adversely affect farmers ' incomes (World Bank, 1997). Rural road construction inevitably leads to higher agricultural production and productivity by cultivating new soils or by stepping up existing ground use, in order to benefit from increased market opportunity. Rural infrastructure, especially roads, consolidates link between agricultural and non-agrícolas activities in rural areas and between rural and urban areas as well as facilitating agricultural commercialization and diversification.

2. Rural Roads Infrastructure in India

The requirement that rural India and the whole country had a proper road network for the socio-economic development was understood early in India. On a long-term basis, the road system was considered by the first road development plan of 1943-61 known as the Nagpur Plan and graded for the first time into functional hierarchy including National Highways (NH), State Highways (SH), Major District Roads (MDR), Other District Roads (ODR) and Village Roads (VR). The last two road classes form the countryside 's rural road system. The Lucknow Plan (1981-2001) third development plan estimated the country's rural demand, and proposed various actions for rural road growth. This plan proposed a number of rural road development approaches. Such strategies include preparation of the long-term R&D master plan; construction of stages given the low level of transport at the initial stage of rural road development; integration of the R&D plan into other R&D programmes. Rural roads received considerable attention and emphasis during all the road development plans. A number of programs in the field of rural connectivity, such as the Minimum Needs Program (MNP), the National Rural Jobs Program (NREP), the rural landless employment guarantee program (RLEGP), JawaharRozgarYoja (JRY), have been launched under several central and state governments' job generation and poverty reduction programmes, but the program has failed to achieve its aims An apragmatic analysis of recent schemes shows many shortcomings throughout the entire process, from planning and execution to monitoring to assessment. The

misconception was largely that rural roads as the least class of roads do not require elaborate construction and engineering. The Ninth Five Year Plan recognizes that several thousand kilometers of such roads have been built without proper design and engineering in the past and with little proportion to the resources for the effort. Consequently, rural roads had poor geography, poor settlements and poor drainage, so the roads that were built were not all-weather highways. Those roads didn't last long, therefore.

3. State Road Transport Undertakings

North Bengal State Carriage Corporation was the oldest Indian State carriage company founded on 1 April 1945 on three buses and three trucks, by the Raj Durbar of Koch Bihar. Kingdom regime. The service to North Bengali passengers is still vibrant and efficient. Buses occupy over 90% of public transport in Indian cities and provide all classes of society with cheap, convenient means of transport. Services are mainly operated by transport companies owned by the government. However, many state transport companies have implemented a series of facilities, such as low-floor busses for the disabled and air-conditioned busses, in order to attract private automobile owners to help decongest roads. In January 2006, Bengaluru was India's first city to introduce Volvo B7RLE intra-city buses. The air-conditioned bus stop near Cubbon Park is the first Indian city in Bengaluru. It's been constructed by Airtel. APSRTC is recognized as the single company with the world's largest bus fleet. One of the largest bus terminals in Asia, the Mofussil Bus Terminus, is located in Chennai City. In 2009 a pro-poor bussing service called Atal Sarige was introduced by the Karnataka government and the Bangalore Metropolitan Transport Corporation. It aims to provide affordable links to the financially backward sections of the company to the closest major bus station.

In order to improve public transport systems in cities, the various governmental governments have taken new initiatives like the Bus Rapid Transit (BRT) and air conditioned bus systems. Brazil was first introduced in 2000 in the context of a feasibility study conducted by Swedish consultants in Bangalore on the BRT model in India based on the successful method in Curitiba, but not at that time. Actually however, the idea is in operation and there are already Bus Rapid Transit networks with new systems in Kolkata, Hyderabad, Lucknow and Bangalore in Pun, Delhi, Ahmedabad, Mumbai and Jaipur. In cities such as Mumbai, Bengaluru, Nagpur and Chennai, high-capacity busses are located. Passenger road transport services operate in India in a proportion between 29 percent and 71 percent of the public sector and mainly the private sector. The extent of nationalizing public transport also varies considerably in different states with the highest level at approximately 70 per cent in the State of Maharashtra. In India, the public road transport network in the passenger transport industry is run by 71 passenger road transport undertakings, which own 1.13.370 busses, each of which has a capacity of 5 to 17 000 coaches. There are 20 bus companies with more than 1000 buses, as at 31-3-1997, in their fleet. The biggest of these are the "State Transport Corporation in Maharashtra and the State Transport Corporation in Andhra Pradesh with around 17000 buses each. There are also differences in the state organizational form for public bus transport; the most common form of "statutory corporation" is the Road Transport Corporation Act, 1950 provisions. There are 21 such companies, while the Indian Companies Act of 1956 provides for 31 companies. 10 Local Municipal Councils and the remaining 9 companies are operated as part of government departments by Urban Bus transportation systems.

4. Pradhan Mantri Gram SadakYojana (PMGSY)

The Government of India, as a centrally funded State support system, on 25 December 2000 launched Pradhan Mantri Gram SadakYojana (PMGSY), with a view to creating enduring and permanent property, adequate arrangements for drainage and security function, and quality control in the construction and maintenance of assets. The main objective of PMGSY is to provide the eligible non-connecting housing, as specified by the CoreNetworking with a population of 500 (as at the 2001 census) and above, via an All-Weather Road (with required tumbles and cross-drainage structures operable throughout the year). The current PMGSY funding source is High Speed Diesel (Rs. 0.75 / litres), budget assistance, ADB funding, World Bank financing and NABARD loans. Subjects are not yet covered. Fundings for 2000-2001 to 2013-14 are described in Table 1. The total amount of Rs. 1.11.368, including funding from the World Bank and the Asian Development Bank was already spent under this program. It is more and more important to ensure that existing roads are preserved and render services routinely as originally planned before such assets are pursued more and more. PMGSY-II is launched, taking into account the asset value of the road network. This system was designed for the purpose of sharing the existing rural road network by updating, renewing and sustaining the already built vast network. This would include the upgrade of selected rural roads on the basis of a criterion for the revitalization of the road network. Routes would be selected to identify rural centers and other critical rural hubs, important rural sites (connectedness to other growth centres, markets, rural hub, tourist sites, etc.). The development of rural hubs and growth centres, through rural infrastructure creations, is essential to the overall strategy for poverty reduction. Development centers / rural hubs provide markets, bancary facilities and other services that allow and enhance self-employment and livelihoods. During the 12 Five Year Plan, the proposal aims to consolidate the RSS-PMGSY-II rural road network at an estimated cost of Rs. 33,030 crore (at prices for 2012-13), including administratory and management costs of Rs. 530 crore for the total 50,000 km of road length by upgrade. At 75:25 for the plain regions and 90:10 for the special areas, the costs will be shared between the Center and State/Ut.. The main share is Rs. 27,022 (2012-2013) and the administrative and administrative costs are Rs. 530 crores.

Table -1 Release of fund under PMGSY to the state (2000-2001 to 2013-14)

Sr. No.	Year(s)	Release for Programme	Release for Admn. Fund	Release under ADB Assistance	Release under World Bank Assistance	Total Release
1.	2000-01	2,435	0	-	-	2,435
2.	2001-02	2,493	7	-	-	2,500
3.	2002-03	2,497	3	-	-	2,500
4.	2003-04	2,299	26	-	-	2,325
5.	2004-05	2,111	37	93	220	2,461
6.	2005-06	3,770	40	193	218	4,221
7.	2006-07	4,415	100	1000	750	6,265
8.	2007-08	3,834+4,500*	66	1,950	650	11,000
9.	2008-09	5,380+7,500*	151	2,000	250	15,281
10.	2009-10	10,390+6,500*	140	800	10	17,840
11.	2010-11	21,325	185	800	90	22,400
12.	2011-12	10,598	83	1075	627	12,383
13.	2012-13	3,272	125	425	575	4,397
14.	2013-14	4,553	164	-	643	5,360
Total		**97,872**	**1127**	**8336**	**4033**	**1,11,368**

5. Bharat Nirman

Bharat Nirman, one of the important Programmes launched by the Government of India in December 2005 identified six core infrastructure sectors in rural areas viz rural housing, irrigation, drinking water, rural roads, rural electrification and rural telephone connectivity. In the program included Bharat Nirman. Initially, it was launched for the four-year period 2005-09 as a timely rural infrastructure development program for implementation. Rural Road is one of the six components for all eligible unconnected dwellings in plains and for more than 500 people, with population 1,000 and above (as at 2001 census), seeking to provide all-water connections to all eligible unconnected dwellings in Hilly or Tribal areas. In terms of housing connectivity, construction targets and financial investment, the Bharat Nirmanprogramme. A total of 51,253 residences of 63,940 connecting homes were connected until March 2014 and work has been agreed to connect 62,876 residences. The targets and achievements of rural road network under Bharat Nirman are given in Table 2.

Table-2 Rural road network under Bharat Nirman

Year	Target		Achievement	
	No. of Habitations to be connected	Length of road works to be completed (in Km.)	No. of Habitations connected	Length of road works completed (in Km.)
2005-06	7,895	17,454	8,202	22,891
2006-07	9,435	27,250	10,801	30,710
2007-08	12,100	39,500	11,336	41,231
2008-09	18,100	64,440	14,475	52,405
2009-10	13,000	55,000	7,877	60,117
2010-11	4,000	34,090	7,584	45,109
2011-12	4,000	30,566	6,537	30,995
2012-13	4,000	30,000	6,864	24,161
2013-14	3,500	27,000	6,560	25,316

6. Challenges of Developing Rural Road network

India has about 2.7 million kilometers of rural roads and is about 80% of the overall road network. This is important for rural and agrarian growth and provides access to social facilities for millions of rural people. Medical training, as well as market education. Maintenance failure has a serious effect on the vulnerable as time has increased to enter markets and other social infrastructures. The challenge lies, therefore, in both the expansion of the network and the maintenance of the current huge country road network which has been built for the economy at a huge cost over the course of the past 50 years. For the core rural road network, and including for PMGSY

roads that completed their initial maintenance contracts for five years, the Thirteenth Finances Commission (FC) has specifically made provision for maintenance funds. The most critical questions to be tackled for sustainable maintenance of rural roads include Government policy, funding allocation, maintenance backlog, connection to the initial construction, maintenance system, institutional reforms, maintenance of the contracts, Panchayati Raj Institutions, modernisation, sharing of experience etc.

7. Financing the Rural Road network Infrastructure

In the network, rural roads often get the least attention. This is due to the financing at national and regional and local levels from a range of sources. Input from the national , regional and local governments is handled and is situated at the intersection between the mandates of transport, agriculture and local governments. Often they are handled economically or socially. India's Constitution restricts the use of sufficient resources by the government to fund rural infrastructure. Concurrent financial capital demands and mortgage loan constraints limits state governments' capacity to adequately fund rural infrastructure. In several states there is little ability of government machinery to implement and execute rural infrastructure projects. It is therefore evident that resources in the public sector will still be below the necessary investment in infrastructure in rural areas. Private-sector investments must therefore be viewed in order to complement public resources. The development and implementation of innovative financing methods such as the PPP, annuity payments, viability-gap funding, etc. are required to encourage the private sector to work with government machinery to provide and maintain rural infrastructure.

8. Conclusion

Rural highways reflect a nation's wealth, an instrument for social inclusion, economic development and sustainability of the environment. The main transport system and markets are linked by rural roads with communities and their agriculture sectors. Rural road enhancement reduces transport costs and promotes marketing. As a result, production and productivity are increased, crop diversification and profitability improved. A limited, poor quality rural road network is often a major bottleneck for local economic development. The Plan documents show very clearly that private sector involvement in the Road Sector was limited to the growth, maintenance and operation of certain highways, expressways, bridges and bypasses (national and state). The private operator can hardly profit on rural roads, in particular for connecting remote, hilly and rear settlements. Therefore, it is very difficult to expect private sector involvement in this region, without any major policy revision in the development of rural road infrastructure. Until then, public investments must be large-scale and immediate. This crucial aspect of rural infrastructure, which was neglected during the decade of reforms, needs to be financed by the state in a timely manner in order to prevent the growth or development of urban disparities.

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