



## ROLE OF RURAL INFRASTRUCTURE TOWARDS THE ADOPTION OF IMPROVED AGRICULTURAL PRACTICES: AN EXPLORATORY STUDY IN CACHAR DISTRICT OF ASSAM

Munim Ahmed Barbhuiya<sup>1</sup>, Niranjan Roy<sup>2</sup>

<sup>1</sup>Asstt. Professor, Deptt. of Economics, M. C. Das College, Cachar, Assam, India.

<sup>2</sup>Professor, Deptt. of Economics, Assam University, Silchar, Assam, India.

### ABSTRACT

*In a country like India, where agriculture has always been considered as the backbone of the economy, public investment on rural infrastructure not only increases the performance of this sector but also motivates the farmers to adopt improved farming technology. In this study an attempt has been made to estimate the rural infrastructural facilities available in the study area and to find out casual relationship between the availability of rural facilities in the selected villages and adoption of new agricultural technologies by the paddy farmers. The results showed that the farmers of infrastructural developed villages adopted many improved methods of paddy cultivation rather than the farmers of less-developed villages. The study suggested that there is a significant scope for increasing output by formulating policies for the development of rural infrastructure of the study area.*

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**Keywords:** rural infrastructure, new agricultural technology, technology adoption, farm mechanisation

### 1. Introduction

In a developing country like India, agriculture has always been considered as the backbone of the economy. Agriculture and allied activities constitute the single largest contributor (almost

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33 per cent) to the Gross Domestic Product of the country. About two-thirds of the work force in the country depends on agriculture as a means of livelihood. Therefore, agricultural development is essential for economic growth, rural development, and poverty alleviation of the country. But, in India, where structural transformation process is in progress, agriculture sector is still in traditional character. It is technological innovation and investments in rural infrastructure that can change traditional agriculture of the country into modern one by facilitating the increased rate of adoption of new technology by the farmers of the country.

Traditional agriculture, in the opinion of Schultz (1964) can easily be transformed into a relatively cheap source of economic growth by the method of increasing the value of farm products and other facilities such as new transportations, irrigation and reducing the cost of different factors of production. According to Schultz, transformation problem is basically an investment problem. Investment in rural infrastructure will improve the performance of this sector. A large share of traditional subsistence and semi-subsistence agriculture has been transformed through the investments in rural infrastructure and markets thereby facilitating the increased rate of adoption of new technology and the design and implementation of appropriate policies (Andersen, 2006). The spread of technology in agriculture depends critically on both physical and institutional infrastructure. It is also indicated that infrastructure plays a strategic role in producing large multiplier effect in the economy with agricultural growth (Mellor, 1976). Rural infrastructure leads to agricultural expansion by increasing yields, farmers' access to markets and availability of institutional finance. Strengthening rural infrastructure can help to lower production costs which can further augment agricultural output and income for rural farming community (World Bank, 1994). Productivity increase in agriculture is an effective driver of economic growth and poverty reduction both within and outside agricultural sectors. Such productivity increase depends on good rural infrastructure, well functioning domestic markets, appropriate institutions and access to appropriate technology. Vaidhyathan (1994) while discussing agrarian relations in the context of new agricultural technology pointed out the positive relationship between the availability of agricultural facilities and adoption of new technologies by the farmers. The studies of Sarap (1980); Saikia (1982); Narain (1998) also indicated that availability of infrastructural facilities in rural areas has improved the performance of agricultural sector. Bezbaruah (1989) highlighted that prevalence of rural facilities may greatly facilitate the adoption of new productive technology and thereby improve the farm production and productivity to a large extent in the state of Assam.

Cachar is one of the prominent districts of the state of Assam. The socio-economic condition of the district still remains backward with lack of basic infrastructural establishment in the district. Existing studies confirm that agricultural performance of the district, in terms of growth of output of its principal crop rice, is to some extent better than the state as a whole; but in comparison to all-India standards, the district as well as state continues to lag behind (Roy et al., 2002). Limited empirical work is found in the district as regard the relationship between the adoption of improved technology and agricultural productivity. But, no specific study has so far been made to explore the role of rural infrastructure towards the adoption of new technology by the farmers of the district..

Given the above backgrounds, the present study seeks to estimate the rural infrastructural facilities available in the selected study villages of the district. Secondly, we have also made an attempt to evaluate the role of rural infrastructure on adoption of new agricultural practices by the paddy farmers of Cachar district of Assam.

## **2. Data and Sample Design**

The micro level analysis of the present study is mainly based on primary data collected from the field survey. To retain the representativeness of the entire district, the site for sample survey has been selected following a Multistage Random Sampling frame.

From the existing 3(three) Agricultural Sub-Division Officer (ASDO) Circles in Cachar district, 2 VLEW Elaka have been selected at random. In the second stage, one revenue village from each of the VLEW Elaka has been selected at random. In the third stage, the availability of a variety of services or infrastructure within the selected 6 nos. of villages was assessed on the basis of the information provided by the Gram Panchayats and Village Level Extension Workers. On the basis of highest and lowest score obtained on infrastructure indicators, the selected villages were then clustered into two categories, viz., 'infrastructural developed villages' and 'infrastructural less-developed villages'. In the final stage, 2 top-scored villages and 2 bottom-scored villages were selected for the present study. In the selection of ultimate sample units, 30 nos. of the farm households have been selected from each village randomly and thus, 120 nos. of farm households has been interviewed through a pre-designed schedule. The data were then analyzed by using simple statistical tools in order to achieve the desired objectives of the present study.

### 3. Results & Discussions

The central focus of the study is to estimate the availability of rural facilities needed for the agricultural development and the extent of their relationship with the adoption of new technology by the paddy farmers in rural Cachar. The estimate was done by providing scores i.e., presence (=1) or absence (=0) of a set of services or infrastructure in the selected village. The services or infrastructure items considered were: 1.Paved Approach Road, 2.Irrigation, 3.Safe Drinking Water, 4.Electricity, 5.Post Office, 6.Bank, 7.Bus Station, 8.Health Center, 9.School, 10.Primary/Secondary Market, 11.Seed/Fertilizer Sale Depot, 12.Warehouse/Storage, 13.Food Processing/Agro Industry, 14.Farmers Training Centers, 15.Farm Management Committee, and 16.Veterinary Dispensary. The descriptive statistics on the availability of the infrastructure facilities on selected villages is depicted in Table: 1.

**Table: 1**  
**Availability of Rural Infrastructure in the Study Villages**

ASDO Circle	Silchar ASDO		Sonai ASDO		Lakhipur ASDO	
VLEW Elaka	Masimpur VLEW	Borkhola VLEW	Dakshinmohanpur VLEW	Tulargram VLEW	Kamranga VLEW	Badripar VLEW
Villages	Village-1 Ardballik	Village-2 Borkhola, Pt-I	Village-3 Dakshinmohanpur Pt-II	Village-4 Tulargram, Pt-II	Village-5 Narainpur Grant-I	Village-6 Gangapur
1.Paved Approach Road	0	1	1	1	1	0
2.Irrigation	0	0	0	0	0	0
3.Safe Drinking Water	0	1	1	1	0	0
4.Electricity	1	1	1	1	1	1
5.Post Office	0	1	0	1	1	0
6.Bank	0	1	0	1	0	0
7.Bus Station	0	1	1	1	0	0
8. Health Center	0	1	1	1	1	0
9.School	0	1	1	1	1	0
10.Primary/Secondary Market	0	1	0	1	1	0
11.Seed/Fertilizer Sale Depot	0	1	0	1	0	0
12.Warehouse/Storage	0	0	0	0	0	0
13.Food Processing/ Agro Industry	1	1	1	1	1	0
14.Farmers Training	0	1	0	0	0	0

Centers						
15.Farm Management Committee	1	1	1	1	1	1
16.Veterinary Dispensary	0	1	0	0	0	0
Total Score	<b>3</b>	<b>14</b>	8	<b>12</b>	8	<b>2</b>

Source: Field Survey

The selected study villages has been investigated personally through a series of interviews with VLEW worker of the Elaka and the President of the respective Gaon Panchayat to study the availability of a variety of services or infrastructure. The study was done strictly by putting score = 1 for the presence and = 0 for the absence of the particular facilities within the selected village area. Surprisingly, the result revealed that irrigation, the most needed component for agricultural development, is absolutely absent in the all the study villages. However, electricity is present in each selected villages, but that are actually used only for domestic purposes. A small number of farmers reported the use of electricity for minor irrigation purposes. Warehouse/Storage facility is another important rural infrastructure for agricultural development, but that was also completely absent in all the selected villages. As the survey was done on the basis of the reports of VLEW workers of the area and the President of the respective Gaon Panchayats, the survey result revealed that each of the selected villages has Farm Management Committee (FMC). But, household survey revealed the fact that a small numbers of farmers are aware about the presence of FMC in their respective villages.

It is evident from the table 1, out of total 16 indicators of rural facilities, 14 nos. are available in village Borkhola, Pt-I. Next is Tulargram, Pt-II where 12 nos. of rural facilities are available. These two villages scored highest with respect to the availability of rural facilities within the village area. On the other hand, the village Gangapur is suffering worst in case of availability of rural facilities. Out of total 16 indicators, only electricity and farm management committee are available in the village. But, actually the electricity was not being used by the farmers at all for the agricultural purposes and the availability of farm management committee is seem to be nominal. Similar is the case for Ardballik village where electricity and farm management committee are available, and in addition to these one rice mill is reported to be present in the village area. Thus, the availability of facilities in Ardballik is almost equal to that of Gangapur except the presence of one rice mill. Thus, these two villages scored lowest in case of the availability of rural facilities.

The household survey revealed that the farmers of the selected villages are engaged only in one or two types of paddy farming practices out of available practices viz., Ahu(traditional & hybrid), Sali(traditional & hybrid), Boro(traditional & hybrid) in the district. So far the selected villages are concerned, early ahu(both traditional & hybrid) are not cultivated at all. Only regular ahu(both traditional & hybrid) are cultivated. But the proportion of hybrid variety is very limited. The cultivation of boro(traditional) are noticed only in two villages, viz., Arballik and Narainpur Grant. Sali(traditional) is most common type of paddy farming practiced by the farmers of all the selected villages. Sali(hybrid) is also popular in almost all the selected villages, but few numbers of farmers are engaged in hybrid variety.

As the objective of the present study is to find out the casual relationship between the availability of rural facilities in the selected villages and adoption of new agricultural technologies by the paddy farmers, therefore, the selected farm households were interviewed with a structured questionnaire. Moreover, as Sali(traditional & hybrid) is the most common type of paddy farming practiced by almost all the farmers of each selected villages, the responses relating to cultivation of Sali(traditional & hybrid) are taken into account for sake of simplicity of the present study. The responses for each type of practices are collected in simple form i.e., by putting (√) for ‘practice adopted’ and (×) for ‘practice not adopted’. The total responses and the calculated percentages of responses are presented in table 2 separately for both the ‘developed villages’ and ‘less-developed villages’ in order to realize the objectives of the study.

**Table:2**  
**Practices adopted by the farmers of ‘Infrastructural Developed’**  
**and ‘Infrastructural Less-developed’ Villages**

Practices	Infrastructural Developed Village		Infrastructural Less-developed Village	
	Total	Percentage	Total	Percentage
<b>1. Land Preparation</b>				
(i) Desi Plough	18	30.00	22	36.67
(ii) Tractor/Other Machines	11	18.34	09	15.00

(iii) Combination	31	51.67	29	48.34
<b>2. Manure Applied</b>				
(i) Compost	03	05.00	00	00.00
(ii) Dung	19	31.67	22	36.67
(iii) Green Manure	00	00.00	00	00.00
(iv) Oil Cake	02	03.34	00	00.00
(v) Combination	30	50.00	26	43.34
(vi) None	06	10.00	12	20.00
<b>4. Seed Variety</b>				
(i) Traditional	37	61.67	41	68.34
(ii) Hybrid	23	38.34	19	31.67
<b>4. Seed Treatment</b>				
(i) Plain Water	34	56.67	41	68.34
(ii) Chemical	03	05.00	00	00.00
(iii) Obtained Chemically Treated	23	38.34	19	31.67
(iv) None	00	00.00	00	00.00
<b>5. Method of Sowing</b>				
(i) Broadcasting	00	00.00	00	00.00
(ii) Behind the Plough	00	00.00	00	00.00
(iii) Line Sowing	24	40.00	21	35.00
(iv) Irregular	36	60.00	39	65.00
<b>6. Implements Used for Sowing</b>				
(i) Manual	60	100.00	60	100.00
(ii) Desi Plough	00	00.00	00	00.00
(iii) Machine	00	00.00	00	00.00
<b>7. Method for Weeding</b>				
(i) Manual	24	40.00	26	43.34
(ii) Weedier Machine	24	40.00	21	35.00
(iii) Bullocks Drawn Implements	00	00.00	00	00.00

(iv) Weeding not done at all	12	20.00	13	30.00
<b>8. Method of Top Dressing</b>				
(i) One Split	11	18.34	15	25.00
(ii) Two Split	15	25.00	11	18.34
(iii) Three Split	24	40.00	21	35.00
(iv) Not Top Dressing	10	16.67	13	21.67
<b>9. Water Management</b>				
(i) Check Basin	22	36.67	27	45.00
(ii) Irrigation (Manual)	26	43.34	24	40.00
(iii) Irrigation (Machine)	12	20.00	09	15.00
<b>10. Pest Management in Field</b>				
(i) Traditional method	03	05.00	01	1.67
(ii) Seed Treatment	03	05.00	00	00.00
(iii) Use of Resistant Varieties	00	00.00	00	00.00
(iv) Spray of Chemicals	05	08.34	06	10.00
(v) Combination of (iii) & (iv)	23	38.34	19	31.67
(vi) None	26	43.34	34	56.67
<b>11. Harvesting Method</b>				
(i) Manual	60	100.00	60	100.00
(ii) Bullock Drawn Harvester	00	00.00	00	00.00
(iii) Machine Drawn	00	00.00	00	00.00
<b>12. Storage Method</b>				
(i) Mud Vessels	00	00.00	00	00.00
(ii) Indigenous Bag	12	20.00	23	38.34
(iii) Jumpy Bags	00	00.00	00	00.00
(iv) Improved Bag	03	05.00	00	00.00
(v) Workhouse	38	63.34	29	48.34
(vi) Others	07	11.67	08	13.34
<b>13. Pests management in Storage</b>				



(i) Traditional Method	17	28.34	20	33.34
(ii) Use of Chemicals	26	43.34	19	31.67
(iii) None	17	28.34	21	35.00

Source: Field Survey.

The above table represents comprehensive results of the field survey on different practices following the paddy farmers of the sample villages. The data shows a narrow difference among the two categories of sample villages, viz., 'infrastructural developed villages' and 'infrastructural less-developed villages'. It is evident that 18.34% of the farmers of 'infrastructural developed villages' are using tractor and other machines in preparing land for paddy cultivation; whereas only 15% of the farmers of 'infrastructural less-developed villages' are using tractor and other machines for the same purpose. However, 51.67% of farmers in developed villages find it convenient to use both the methods i.e., combination of desi plough and tractor in preparing land for paddy cultivation. Corresponding percentage figure for less-developed villages is slightly lower, i.e., 48.34%. Application of manures is also high in case of developed villages than less-developed villages. 50% of farmers are using a combination of manure in developed villages, whereas in less-developed villages the percentage figure is 43.34%. Moreover, 20% of farmers in less-developed villages are not using any type of manure which is almost double the percentage figure of developed villages. Hybrid variety is more popular in developed villages whose percentage figure is 38.34%; but in case of less-developed villages, only 31.67% of farmers are using hybrid varieties. In case of seed treatment practices, 38.34% farmers treat their seed by chemicals in developed villages; whereas 5% of farmers treat their seed by chemicals in less-developed villages. Altogether, in developed villages, 43.34% farmers use chemically treated seeds; and in less-developed villages the corresponding percentage figure is only 31.67%.

Method of line sawing is also higher in developed villages (40%) than in less-developed villages (35%). However, use of machines in sawing is totally absent in both types of sample villages. In developed villages, 40% of farmers use weeding machines, but in less-developed villages 35% of farmers use machines in weeding practice. The percentage figure for three split top dressing is also high in developed villages (40%) and is again low in less-developed villages (35%). Moreover, in less-developed villages, high percentages i.e., 21.67% of farmers do not practice top dressing at all as against 16.67% of farmers in developed villages. As proper

irrigation facilities are not available in the sample villages, only 20% of farmers use mini pump set to irrigate the paddy field, which is again slightly higher than the less-developed villages (15%). In pest management at the paddy field, 38.34% of farmers use a combination of chemical spraying & resistant varieties in developed villages which are again low in less-developed villages (31.67%). However, the use of machine in harvesting of paddy is completely absent in sample villages. In storage of crop, only 5% of farmers in developed villages use improved bag, whereas in less-developed villages no farmers found to use these. Moreover, 43.34% of farmers in developed villages are found to use chemicals for pest management in storage of crops, which is again low in less-developed villages (31.67%).

#### **4. Conclusion**

The study reveals the fact that the rural infrastructural facilities are not improved in the villages of Cachar district. Out of selected six sample villages of the district, the status of rural infrastructure is developed to some extent only in two villages. But, in four of them, status of rural infrastructural facilities is very poor. Due to the poor state of rural infrastructural facilities in the villages, majority of the farmers do not find it convenient to opt for different types of paddy cultivation, rather they specialize themselves only in one type of paddy cultivation, that is, Sali(traditional). Other varieties of paddy cultivation are not much popular in the villages of the district. The study also reveals that the farmers of infrastructural developed villages adopted many improved methods of paddy cultivation rather than the farmers of less-developed villages. As established theories on agricultural economics concludes improvement in rural infrastructure is a necessary pre-condition for increasing the performance of this sector, therefore, the present study also concludes that there is a significant scope for increasing output by formulating policies for the development of rural infrastructure of the district.

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