

Utility of Physical Infrastructure and Rural Development: An Analysis of Physical Infrastructures in Kalvarayan Hills Block, Villupuram District, Tamil Nadu

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Abstract - Infrastructure is generally a set of interconnected structural elements that provide the framework supporting an entire structure. The term has diverse meanings in different fields, but is perhaps most widely understood to refer to roads, airports, and utilities. It involves the following:-Physical structures that form the foundation for development. Infrastructure includes: wastewater and water works, electric power, communications. Basic services necessary for development to take place are for example, roads, and electricity, Sewerage, water, education and health facilities. The public facilities and services needed to support residential development, including highways, bridges, schools and sewer and water systems. Permanent resources serving society's needs, including roads, sewers, schools, hospitals. Railways, communication networks etc. Lack of infrastructure is the main obstacle for the economic development of the rural area; mass poverty leads to poor health, backwardness, illiteracy, ignorance, and isolation; these social conditions working further as a cycle to encircle the pro poor marginalized people in the strong bound of poverty line.

Keywords: Physical Infrastructure, Infrastructure Index, Public Policy

I. INTRODUCTION

Physical infrastructures are a set of interconnected structural elements whose function is to participate in attracting capital flows in order for the economy to function efficiently. They transfer capital flows that are able to ensure growth and stability. They also constitute a major challenge for growth and development. In fact, the determinants of the infrastructures of the economic environment have been recognized for a long time as significant elements which have an influence on the productivity of economies. The physical infrastructure plays a significant role in productivity, but a debate continues concerning the importance of its impact on the attraction of private capital as indicated in several studies such as those of: Maleck (2014), Calderon and Servén (2004), Garcia-Milà et al. (1996), Gramlich (1994), Aschauer (1989). In effect, globalization and the rise in trade flows have increased the demand for physical infrastructures for countries at all levels of development. The role of infrastructure in spearheading economic development of a country and also setting its pace can hardly be over emphasized. Like a foundation in an edifice, the place of infrastructure as well as its soundness, are crucial to the nation's total development. This never ending cycle of poverty continues

until we start the comprehensive huge and continuous intervention in terms of infrastructure development that could only break the line wall of poverty and bring the people in the main stream of prosperity, progress, happy, development and welfare. Infrastructure plays a decisive role in reducing the rate of poverty. Therefore it is main duty, responsibility, humanity to start welfare based urgent and utmost developmental activities focuses on rural infrastructural development, these communities can be exemplified with a low ratio of inhabitants to open space. Agricultural activities may be prominent in this case where as economic activities would relate to the primary sector, production of foodstuffs and raw materials. Rural development is the development of rural economy and rural social setting by enhancing rural infrastructural development. Infrastructures are of two types one soft Infrastructure and the other is hard infrastructure. Soft infrastructure includes education, health facilities, communication, housing, marketing etc. and hard infrastructure includes transportation, electrification, buildings, canals, bridges, etc.

Most of the people of the world are still living in the rural areas but in developing nations the condition of people living in rural areas is worse because of less infrastructural development, poverty, illiteracy, lack of economic activities and less priority to the agriculture sector. It is the main common feature of most developing nation that the quality of life of people in rural areas is low, people are marginalized, deprived by basic necessities and the economic investment in such areas is very low and negligible. The economic growth of a country has evidently happened hand in hand with the development of its infrastructure. The link between infrastructure Resource management is not a once for all affair. It is a continuous process and progress in development has to be preceded accompanied and followed by progress in infrastructure, if we are to fulfil our declared objectives of a self-accelerating process of economic development". A sound infrastructural foundation is the key to the overall socio-economic development of a state. This acts as a magnet for attracting additional investment into a state and thus provides a competitive edge to it over other states. Availability of adequate and efficient infrastructural set up not only promotes rapid industrialization but also improves the quality of life of the people. The all pervading importance

of infrastructure would be clearer from the fact that it encompasses the whole spectrum of vital services such as roads, railways, civil aviation, shipping, power generation transmission, telecommunications, postal facilities and urban development. Adequate infrastructure facilities are an absolute necessity for rapid achievement of sustainable economic growth. Infrastructure facilities are like wheels of development without which the economy cannot function properly. The physical infrastructure plays a significant role in Public utilities-power, telecommunications, piped water supply, sanitation and sewerage, solid waste collection and disposal and piped gas, Public works-roads, major dam and canal works for irrigation and drainage and Other transport sectors-urban and inter-urban railways, urban transport, ports and waterways, and airports.

II. REVIEW OF LITERATURE

Review of literature on Utility of Physical infrastructure and its impact on making better livelihoods. Since the area of research is vast, plenty of literature available, and the researcher has delimited to the review to the core literature to identify the knowledge gap in the area of research. Review highlights the various views, application, concepts, trends, and empirical results of various authors regarding Physical infrastructure.

Anupam Ghosh, 2011. While the importance of physical infrastructure in the development of secondary sector of the Indian economy is acknowledged, there is little or no empirical study to validate its role at the state-level. This paper presents a quantitative analysis of the relationship between development of physical infrastructure and the growth of secondary sector at the state level. Six states of the Indian Union, first three states being more developed industrially, and the other three states being industrially the least developed, are studied for this purpose. We discuss the important issue of whether all the states will be able to reap similar benefits from improved infrastructure or will the benefits be different for different states.

Ranjan Kumar Dash, Pravakar Sahoo, 2016. The paper examines the output elasticity of infrastructure for four South Asian countries viz., India, Pakistan, Bangladesh and Sri Lanka using Pedronia panel co integration technique for the period 1980-2005. In this context we develop an index of infrastructure stocks and estimate growth accounting equations to investigate the impact of infrastructure on output and per capita income. The study finds a long-run equilibrium relationship between output (and per capital income) and infrastructure along with other relevant variables such as gross domestic capital formation, labour force, exports, total international trade and human capital. The results reveal that fixed capital formation, labour force, export and expenditure on human capital exhibit a positive contribution to output. More importantly infrastructure development contributes significantly to output growth in South Asia. Further, the panel causality analysis shows that there is mutual feedback between total output and

infrastructure development where as there is only one-way causality from infrastructure to per capita income.

Kinda, Tidiane, 2008 This paper shows the relevance of physical infrastructure and financial development for developing countries attractiveness to private capital (Foreign Direct Investments -FDI- and portfolio investments). Contrary to other studies, this analysis is based on “push-pull factors” and the “Lucas paradox” theoretical approaches, and takes into account the relationship between components of capital flows. The analysis also highlights the importance of non-linearity effects when assessing the role of infrastructure for capital inflows and the specificity of Sub-Saharan African countries compared to other developing countries.

Elie Ngongang, 2015. Physical infrastructures are a set of interconnected structural elements whose function is to participate in attracting capital flows in order for the economy to function efficiently. They transfer capital flows that are able to ensure growth and stability. They also constitute a major challenge for growth and development. We have attempted in this paper to study the influence of physical infrastructures and financial development on foreign direct investments (FDIs) in the context of Sub-Saharan African (SSA) countries by combining two theoretical approaches (the paradox of Lucas and the external-internal factors), and by integrating the correlation between the components of capital flows. Our regressions show the importance of nonlinear effects in the explanation of the determinants of private capital. This analysis also emphasises the more important role physical infrastructures play in attracting FDIs despite perverse effects.

Polukhina M.G., 2016. Social infrastructure in general and physical culture and sport in particular plays a huge role in ensuring a decent quality of life of the population, including in rural areas. Unresolved issues in the field of physical culture and sports led to a restriction in the availability of services and do not contribute to the full satisfaction of needs of the population. The article provides the analysis of the sphere of physical culture and sports at the regional and municipal levels. By results of the conducted strategic SWOT analysis were to identify the main problems in this field and prospective ways of development on the example of the Orel region.

III. STATEMENT OF THE PROBLEM

The one third of the population in this green planet is living in rural area, the areas with poverty, scarcity, ignorance, and marginalized and economically backward. The World's developed nation's rural parts are not characterized by these above problems however remaining developing world is really in state of imbalance injustice and improper management in the respect of rural development and welfare of rural human beings. Apart from these the rural areas are the main sources and centers of agricultural productivity. This study entitled “The utility of Physical

infrastructure" in Kalvarayan Hills”, somewhat try to find out the situation of rural infrastructure, the status of living conditions of rural people in the study area and the existence of relationship and impact between physical infrastructure development and rural livelihoods. Kalvarayan Hills is one of the underdeveloped areas in India; approximately one third of population living under absolute poverty and the lack of the physical infrastructures. Because of its landlocked nature and formation of territory the economy is mainly agriculture based besides this the tourism is the alternative and potential sector for economical growth and livelihood.

IV. OBJECTIVES OF THE STUDY

1. To portray the socio economic and demographic profile of the sample rural study region.
2. To examine the utility of different components of Physical infrastructure.
3. To evaluate the relationship between basic utility of rural physical infrastructure and livelihoods of rural areas.

V. METHODOLOGY

This present study is based on both primary and secondary data. The success of a research depends mostly on the methodology on which it is carried out. The appropriate methodology will improve validity and accuracy of the research study, by which a scientific generalization can be made to the whole population based on studied sample. The research is based on both quantitative data and qualitative; the quantitative data are collected by adopting non-probability sampling technique with the help of self-administered interview schedule that contains of questions related to different areas and background. The interview schedule which contained different segment of socio-economic and physical aspects related questions, distributed to the sample units i.e. selected individuals of population in study area. The filled up interview schedules are collected and proceed ahead for coding, editing, and entries of data into SPSS software package. In analysing, statistical description, tabulation, simple percentage average and testing hypothesis were made by using this SPSS software computer programme. Here the villages are separated into four categories are given below.

A. Sources of Data

Primary data is the main source of information in this study. The present study based mainly on primary data which is collected with the help of structured interview schedules in the Kalvarayan Hills Block. The total numbers of Households in the study area is the universe of this study and out of those 330 Households was selected using Area of Villages like North, south, East and West and Simple Random Sampling technique procedure is the sample of this study. From each 330 Households an individual aged between (20-60) years is requested to tap or fill up the

interview schedule therefore each Household is the sampling unit of the study. The information obtained from this study sample is the primary source of information. Based on this primary source of data all the tables were formulated and analysis is being made and conclusions, findings and summary are drawn.

TABLE I SEPARATION OF VILLAGES

S. No.	North Villages	South Villages	East Villages	West Villages
1	Serappattu	Erukampattu	Vanchikuzhi	Kilakadu
2	Aalanur	Vengodu	Vazhaikuzhi	Kinilavoor
3	Kurumpalur	Mottaiyanor	Perumpur	Vilvaathi
4	Sirukkalur	Pacheri (Centre)	Puthupalapattu	Kalliparai
5	Kallipattu	Vellarikadu	Mulakadu	Perumanatham
6				Koodaram
7				Melnilavoor

B. Secondary Source of Data

Secondary source of data are also collected for this study. The study also carried on depending secondary source of data, which are collected from the government offices in Villupuram district of Tamilnadu, as well as from the Village Panchayat, of the study area. Some Governmental, Non-governmental sectors and international publications and reports related to study area, are also included, as the source of secondary data.

C. Tools of the Study

The Present study has conducted with help of well-structured interview schedule for data collection. The interview schedules were distributed to 330 Households and collected data are coded, edited, tabulated, and analysed with SPSS computer package, suitable necessary statistical tools, simple percentage, averages, chi square one way ANOVA and Multiple Regression was used to analyse the infrastructural development and impacts various aspects of economic, social, and impacts on the livelihood status of the sample respondents in the Study area. Programme. A small number of households (9.19%) are privileged by Housing for people project.

VI. RESULTS AND DISCUSSION

The above table shows that the data obtained from the study area. The data reveals the utility of the physical infrastructure and rural development related features of the Kalvarayan hills block, of Villupuram district of Tamilnadu. The data are analyzed and discussed in the form of simple percentage, averages, and standard deviation. Some statistical tools viz., chi square, one way ANOVA and Multiple Regression Analysis are used to find out the association between the independent and dependent variables and to find out the influencing factor for the utility of Physical infrastructure and rural development.

TABLE II UTILITY OF PHYSICAL INFRASTRUCTURES IN KALVARAYAN HILLS BLOCK

S. No.	Facilities Available at Village	Villages				Total
		North	South	East	West	
1	Village pond	48 (24.7)	53 (27.3)	41 (21.1)	52 (26.8)	194 (330)
2	Gov. Pipeline	18 (20.7)	14 (16.1)	27 (31.0)	28 (32.2)	87 (330)
3	Bore well	9 (18.4)	8 (16.3)	7 (14.3)	25 (51.0)	49 (330)
4	Temporary Barracks	19 (20.2)	19 (20.2)	29 (30.9)	27 (28.7)	94 (330)
5	Semipacca/ Kacha	46 (23.2)	47 (23.7)	44 (22.2)	61 (30.8)	198 (330)
6	Pacca/RCC	10 (26.3)	9 (23.7)	2 (5.3)	17 (44.7)	38 (330)
7	Water Pump	33 (23.4)	32 (22.7)	31 (22.0)	45 (31.9)	141 (330)
8	Two wheeler	29 (26.1)	26 (23.4)	20 (18.0)	36 (32.4)	111 (330)
9	Community Service Centre	60 (21.1)	70 (24.6)	62 (21.8)	93 (32.6)	285 (330)
10	Village market	35 (23.3)	31 (20.7)	35 (23.3)	49 (32.7)	150 (330)
	Weekly usage	44 (23.7)	41 (22.0)	42 (22.6)	59 (31.7)	186 (330)
	Monthly usage	11 (26.2)	8 (19.0)	11 (26.2)	12 (28.6)	42 (330)
	as per need	20 (19.6)	26 (25.5)	22 (21.6)	34 (33.3)	102 (330)
	<u>Mode of travel</u> Local transport	38 (21.8)	40 (23.0)	41 (23.6)	55 (31.6)	174 (330)
	Personal vehicle	17 (22.1)	18 (23.4)	17 (22.1)	25 (32.5)	77 (330)
	Share vehicle	20 (25.3)	17 (21.5)	17 (21.5)	25 (31.6)	79 (330)
11	<u>Panchayat office</u> Weekly usage	6 (21.4)	7 (25.0)	6 (21.4)	9 (32.1)	28 (330)
	Monthly usage	34 (27.6)	29 (23.6)	25 (20.3)	35 (28.5)	123 (330)
	As per need	35 (19.6)	39 (21.8)	44 (24.6)	61 (34.1)	179 (330)
12	PHC	16 (51.6)	0 (0.0)	15 (48.4)	0 (0.0)	31 (330)
13	Medical store	15 (33.3)	0 (0.0)	15 (33.3)	15 (33.3)	45 (330)
14	Private hospital	58 (23.1)	56 (22.3)	58 (23.1)	79 (31.5)	251 (330)
15	Banking service	65 (21.9)	69 (23.2)	67 (22.6)	96 (32.3)	297 (330)
16	ATM service	60 (21.8)	67 (24.4)	58 (21.1)	90 (32.7)	275 (330)
17	Police station	41 (22.0)	46 (24.7)	37 (19.9)	62 (33.3)	186 (330)
18	Community hall	60 (21.1)	70 (24.6)	62 (21.8)	93 (32.6)	285 (330)
19	E.B Office	16 (34.8)	15 (32.6)	15 (32.6)	0 (0.0)	46 (330)
20	Waiting hall, Toilet Facilities	18 (27.7)	12 (18.5)	15 (23.1)	20 (30.8)	65 (330)
21	Veterinary hospital	15 (50.0)	0 (0.0)	15 (50.0)	0 (0.0)	30 (330)
22	<u>Drinking water facilities</u> Govt connection	67 (23.8)	64 (22.7)	64 (22.7)	87 (30.9)	282 (330)
	Bore well	8(16.7)	11 (22.9)	11 (22.9)	18 (37.5)	48 (330)
23	<u>Irrigation facilities</u> Govt. supply	66 (23.4)	61 (21.6)	67 (23.8)	88 (31.2)	282 (330)
24	Cooperative	9 (18.8)	14 (29.2)	8 (16.7)	17 (35.4)	48 (330)

Source: Computed

The above table refers that the usage of Village facilities in the study area of kalvarayan hills. The village pond in the study area are 24.7 percentage in north, 27.3 percentages in south, 26.8 percentages in west and the lowest level was 21.1 percentages in east respectively. While the govt. pipeline in the study area are 32.2 in west, 31.0 in east. The other two regions were holding around and 16.1 and 20.7

south and north respectively. The answer obtained from the respondents are 94 were living in temporary barracks, 198 respondents were living in Semipacca, Kacha houses and 38 were living in Pacca / Rcc buildings and 189 are not having water pump facilities, 141 having water pump facilities. It shows that this proportion was low in North to Pacheri. Here 193 were males and 137 were females. Of the male

respondents, about 35.2 percent of the respondents were in the west of Pacheri, this proportion was very low (19.7 percent) in the west. But, female proportion was 27.0 percent in the west and east to Pacheri. It is note that this proportion was low in North to Pacheri. According to the usage of study area are 189 are not having water pump facilities and 141 having water pump facilities. It shows that this proportion was low in North to Pacheri.

TABLE III THE ACTUAL PERCENTAGE VALUE OF THE RESPONDENTS USING BASIC INFRASTRUCTURE FACILITIES IN THE KALVARAYAN HILLS

Chi-Square Tests	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.967	20	0.04
Likelihood Ratio	34.453	20	.023
Linear-by-Linear Association	31.410	1	.056
No. of Valid Cases	330		

H₀: There is no association between educational status and availability of infrastructures level of the respondents. Table III shows the actual percentage value of the respondents using basic infrastructure facilities in the kalvarayan hills block. The calculated value of Chi-Square is 40.967. The Tabulated value of chi-Square for a 0.05 probability level with 20 degree of freedom is 31.410.

A. Inference

The computed value of χ^2 40.967 is greater than the tabulated value of $\chi^2(31.410)$ at 0.05 significant level with a df of 20, hence rejected the null hypothesis (H₀) and accepted alternative hypothesis (H_a). Therefore the result of the thesis is there is an association between usage of infrastructure facilities and level of income hypo respondents of the study area.

Average usage of the households does not differ significantly for households of the different villages. One of the interesting aspects of the present study is to examine

TABLE V MULTIPLE REGRESSION MODEL FOR INCOME LEVEL (R SQUARE VALUE)

Model	R	Adjusted R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					RSquare Change	Change	df1	df2	Sig. F Change
1	.814a	.662	.641	2.08695E4	.662	31.405	7	112	.000

Source: Computed

Also, the model fit is examined by using the ANOVA procedure, this procedure is used to examine whether, the independent variables put together influence, the dependent variable. So the results of ANOVA are given in the following table.

From the table it is seen that the F value is significant because the p value is equal to 0. The following table gives

whether the mean income of the households differ significantly between the households in different locations. To examine the equality of means income of the households, in the different villages, the null hypothesis taken is H₀: The basic infrastructure facilities of the households do not differ significantly for the households of the different villages. For this purpose the analysis of variance one way (ANOVA) classification procedure has been adopted.

TABLE IV MULTIPLE REGRESSION ANALYSIS FOR INCOME LEVEL DESCRIPTIVE STATISTICS

Variables	Mean	Std. Deviation	N
Total Income (Dependent)	4.3708E4	34849.59179	330
Education	.6417	.48152	330
Land Availability	.8333	.37424	330
Vehicle Availability	.2917	.45644	330
Exposure of Media	.6583	.47626	330
Value of Assets	7.59E4	72008.938	330
Availability of Electricity	.7583	.42989	330
Irrigation	3083	.45644	330

Source: Computed

Using the data collected from the informants, the multiple regression analysis has been carried out. It is observed that from the following table that the R Square value which is the co-efficient of multiple determinations is 0.662 and corresponding F static value is 4.85 the significance value p is equal to 0 which means that the F value is significant hence; the model is a good fit for the data. The Result of multiple regression analysis shows that there is predictive power of a number of independent variables such as, availability of land, exposure to media, availability of vehicles, education, availability of irrigation, value of assets, and availability of electricity have the influence on the income level of the households of the study area.

the values of the regression coefficients of the independent variables and also the ‘t’ statistic values

TABLE VI MULTIPLE REGRESSION MODEL FOR INCOME LEVEL (ANNOVA)

	Sum of Squares	df	Mean Square		Sig.
Regression	9.574E10	7	1.368E10	31.405	.000 a
Residual	4.878E10	112	4.355E8		

Source: Computed

TABLE VII MULTIPLE REGRESSION MODEL FOR INCOME LEVEL (COEFFICIENTS)

Variables	Unstandardized Coefficient		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig. (n)
Total	39262.198	6909.241		5.683	.000
Education	19822.179	4514.821	.274	4.390	.000
Availability of Land	-17741.439	5398.061	-.191	-3.287	.001
Availability of Vehicles	17132.460	4358.578	.224	3.931	.000
Exposure To Media	26425.346	4582.164	.361	5.767	.000
Value of Assets.	.074	.028	.153	2.653	.009
Availability of Electricity	-15769.898	5670.168	-.195	-2.781	.006
Irrigation	-13468.734	5163.662	-.176	-2.608	.010

Source: Computed a. Dependent Variable: Total Monthly Usage

't' is observed from this table the p values corresponding to each of the variable, are less than 0.05. Hence the regression coefficients are all significant. Hence, it can be concluded that all the independent variables chosen have significant influence on the individual households.

VII. CONCLUSION

The present study concludes that there is intricate relationship between physical infrastructural development and improvement in the livelihoods of the rural people. Rural areas are isolated and marginalized, there are no proper basic physical infrastructures, because of these problems, and people are living in deprived, distressed and deteriorated condition. When we start development activities to built infrastructures in the rural areas, certainly it changes the images of the rural areas from underdeveloped nature to prosperous, potential, vibrant, smart and successful economic regions, resulting the positive changes and dramatically increases in the living standard of rural people. Hence the conclusion of the study

is that utility of physical infrastructure decreases the rural poverty, and increases the livelihoods of the rural people.

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