More Roads = Fewer Villages

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[1] I am grateful to Bibek Debroy for suggesting this topic and line of argument. All errors are mine. All data are from Census of India and Ministry of Rural Development unless otherwise mentioned. Contact: laveesh@indicus.net

Background

This paper takes the view that by improving infrastructure especially road infrastructure the government would inadvertently create conditions where the number of villages would fall. This in the view of the authors is a *desirable* outcome, as fewer villages would lead to lower costs of supplying essential services. In other words, not only would the government's fisc be affected positively but it would also lead to better lifestyles for the masses.

As is true of urban residents, rural residents also chose their residential location based on a host of factors. Broadly however we can categorize these factors as lifetime income related and lifetime consumption related. First consider income. Most rural economies are based on an agriculture base. Location of the residence close to the work-place (read farms) is desirable as it reduces the time, effort, and monetary costs of frequent travel to and forth from the work-place. A well distributed road network combined with mechanized (not necessarily motorized) transport means reductions in these costs, and therefore the costs of being farther from the farm are reduced. Next consider those in non-agri based services. For such occupation groups (whether in services or manufacturing), it is extremely important to be close to markets. Non-agro occupations involve many more market interactions. A better spread road system would enable them to relocate close to the larger markets (larger villages) as well.

Next consider consumption. We can roughly categorize that into two parts: private and public. Private or exclusive consumption involves private consumption such as food and manufactured items, etc. With a better road infrastructure a large part of these services would be better supplies at a lower cost, *but only as long as relatively larger scales exist.* In other words, exclusive consumption commodities are cheaper to supply to larger villages. Provided that larger villages with larger number of consumers would ensure lower monopolistic power of suppliers of such commodities, they would be available at lower cost in larger villages.

Public consumption elements include those that require physical and/or social infrastructure. These include education, health, electricity, communications, post offices, banks, and other social infrastructure such as religious locations, places of entertainment, etc. Each of these has high levels of fixed costs and consequently enjoy scale economies to the last mile.

In other words, fewer villages imply lower costs for all – private providers and government. Moreover larger concentration of people also supports better functioning of markets as

forces that create small localized monopolies are weakened. As a result these lower costs can be passed on to the consumers (residents). Finally, larger concentrations also bring with them a better choice of commodities and services.

The net result is that, not only would a better road system lead to better and cheaper lifestyles and easier supply of public utilities and services, but would create conditions where it would be in the interest of those living in very small villages to relocate to larger villages. The above arguments can all be tested, however the available data do not allow us that liberty. For that we would need to undertake specific village level surveys that would include among other things details on costs and prices across a representative cross-section of villages.

It is however possible to test the final outcome of the above arguments – that is, does better road connectivity lead to a reduction in the number of villages? The rest of the paper shows that indeed that has been the case in the past. This will have significant ramifications on the cost of supply of basic services and utilities, and as a consequent on future policy.

The size and numbers of villages change over time for many reasons. These range from economic factors to geographic to policy related. But one of the most important factors affecting that is the population growth. Greater population in rural areas might either result in growth of number of villages and increase in size of the villages. We argue that the rate of this increase in the number of villages would be lower in those areas that have better road connectivity. On the other hand areas that are not as well connected, the needs to be closer to the place of work will tend to push people to the peripheries and form new villages.

The Facts

But first the facts. The tables that follow show four important aspects about villages.

- Inhabited village numbers have been increasing only marginally since independence – about 0.1 percent per annum from 1951 to 2001
- Villages are typically getting larger in terms of population residing in them
- Smaller villages are becoming less and less important in terms of the percentage population contained.
- Smaller villages are reducing in absolute numbers as well.
- The most important – fewer people live in smaller villages now than they ever did.

Table 1: Percentage of Total Population in Rural

Areas by Size of Villages in India, 1961,1971,1981,1991

Villages of Population:	1961	1971	1981	1991*
Less than 200	3.83	2.68	1.78	1.18
200-499	12.55	9.91	7.49	5.48
500-999	18.33	16.45	14.21	11.78
1000-1999	19.8	19.9	19.25	18.13
2000-4999	17.22	18.71	20.09	21.34
5000-9999	5.05	5.44	6.9	8.17
10000 and above	2.80	4.07	4.56	5.16
Total Population (Million)	439.24	548.16	683.33	846.3
Population in villages of size less than 1000	152.46	159.19	160.45	156.06
Population in villages of size less than 500	71.95	69.01	63.34	56.36

Source : India Yearbook 2002, Manpower Profile. * Excludes Jammu and Kashmir (which accounted for less than 1 percent of total rural population)

Table 2: Population Size-wise Distribution of Villages in India

(1971,1981 & 1991)

Population Range	Number of Villages			% of Total Number of Villages			% of Population		
	1971	1981*	1991$	1971	1981*	1991$	1971	1981*	1991$
Less than 500	318633	270795	245095	55.3	48.6	42.2	16.4	12.5	9.5
500-999	132990	135928	144998	23.1	24.4	25	21.5	19.1	16.8
1000-1999	81973	94486	114395	14.2	17	19.7	25.8	25.9	25.7
2000-4999	36005	46892	62915	6.3	8.4	10.8	23.8	27.1	29.8
5000-9999	4974	7202	10597	0.9	1.3	1.8	7.4	9.3	11.2
> 10000	1358	1834	2779	0.2	0.3	0.5	5.1	6.1	7
Total	**575936**	**557137**	**580779**	**100**	**100**	**100**	**100**	**100**	**100**

Note : *: Excludes Assam. $: Excludes the population of J & K where 1991 census was not conducted. Source : Rural Development Statistics, National Institute of Rural Development, Govt. of India.

Table 3: Number of Inhabited Villages

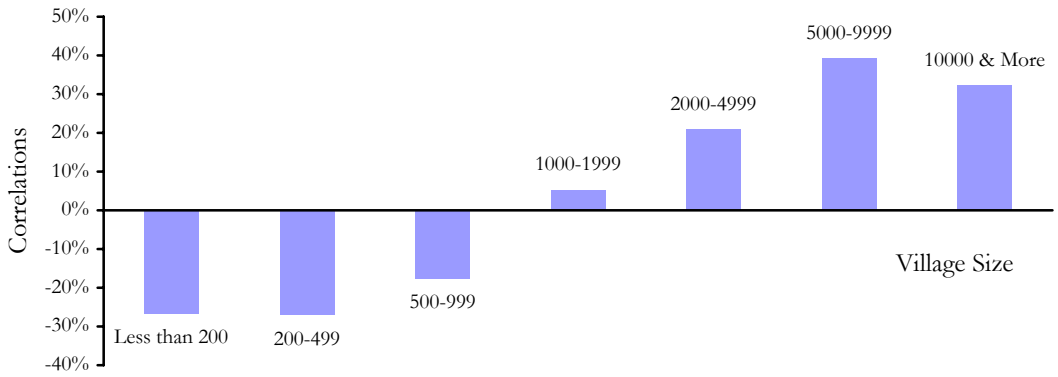
States/UTs	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991
Andhra Pradesh	29950	27748	28362	28432	26355	26306	27084	27221	27379	26586
Arunachal Pradesh							2451	2973	3257	3649
Assam**	101 33	12,239	14,304	17703	18601	18965	20565	21995		24685
Bihar	73616	68826	66761	65297	66526	68148	67665	67566	67546	67513
Goa	102	102	165	166	166	251	251	383	386	360
Gujarat	17919	17598	18161	18301	17821	18724	18584	1827-	18114	18028
Haryana	6783	6811	6739	6743	6725	6580	6669	6731	6745	6759
Himachal Pradesh	N.A.	6326	6539	10211	11016	11133	13060	16916	16807	16997
Jammu & Kashmir	6836	7052	7086	7085	7049		6559	6503	6477	
Karnataka	29288	28548	29349	28365	28290	27629	26377	26826	27028	27066
Kerala	5725	5383	5362	4910	4358	4618	1573	1268	1219	1384

States/UTs	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991
Madhya Pradesh						70037	70414	70883	71352	71526
Maharashtra						35526	35851	35778	39354	40412
Manipur				1372	1521	1601	1866	1949	2035	2182
Meghalaya	2865	4077	4262	4589	4658	4059	407	4583	4902	5484
Mizoram							730	229	721	698
Nagaland	292	407	449	481	497	512	814	960	1112	1216
Orissa	N.A.	N.A.	N.A.	48092	45387	48393	46466	46992	46553	46989
Punjab	12309	12235	12318	12223	12186	11526	11947	12188	12342	12428
Rajasthan	30986	32594	32739	34080	32081	31693	32241	33305	34968	37889
Sikkim	125	315	407	367	99	99	462	215	440	447
Tamil Nadu	24677	21530	20784	20139	18712	18470	14124	15735	15831	15822
Tripura	1463	2316	3373	3382	4387	3453	4932	4727	856	855
Uttar Pradesh	108646	108210	109726	111003	105775	111724	112626	112561	112566	112803
West Bengal						38474	38465	38074	38024	37910
India	**351582**	**350078**	**352582**	**357146**	**393609**	**557409**	**562183**	**556561**	**556014**	**579688**

Source : Census of India, 1991. Source : Rajya Sabha, Unstarred Question No. 383, dated 14.07.2004.

On the whole therefore we find that the size of Indian villages has been increasing across the country, and across time. More importantly, states that have a higher share of villages connected with *pucca* roads tend to have *fewer smaller villages*. The graph below shows the correlations of percentage of villages connected by roads with village sizes.

Figure 1: State-level Correlation b/w % villages of different sizes & Village Connectivity: 24 States, 1991



The above figure graphs the various correlation coefficients between villages of different sizes and percentage villages connected across the major 24 states of India. The data are from 1991 and are from the Census of India as well as Ministry of Rural Development. These show a very unambiguous relationship, across the states of India, the larger the

percentage of villages connected, the fewer are the proportion of small villages. And conversely, the larger the percentages of villages connected the higher are the percentage of villages that are larger.

The figure that follows graphs the percentage growth in the number of villages through the nineties against the proportion of small unconnected habitations in total unconnected habitations for the year 2001. The term small here refers to population less than 500. Villages are of course not homogenous entities, a village may consist of more than one habitations. Circumstantial evidence suggests that a habitation tends to be more homogenous with fewer households living together in a more concentrated manner than in the village it is a part of. Here as well we find a positive relationship. In other words, greater the degree of un-connectivity greater has been the growth in villages. More important, note the outliers. Rajasthan and Himachal, both have large areas that are difficult to reach in a manner that is difficult for simplistic data such as this to capture. And poor accessibility as discussed before is the primary force behind increase in villages. Next consider the states that have had a fall in the number of villages not coomensurate with the pattern. These states are also those that have had a large increase in urbanization levels. This in turn tends to reduce the number of villages for many reasons – expanding towns take over outlying villages, rural to urban migration, etc.

Figure 2: Un-connectivity of habitations and growth in villages in 1990s

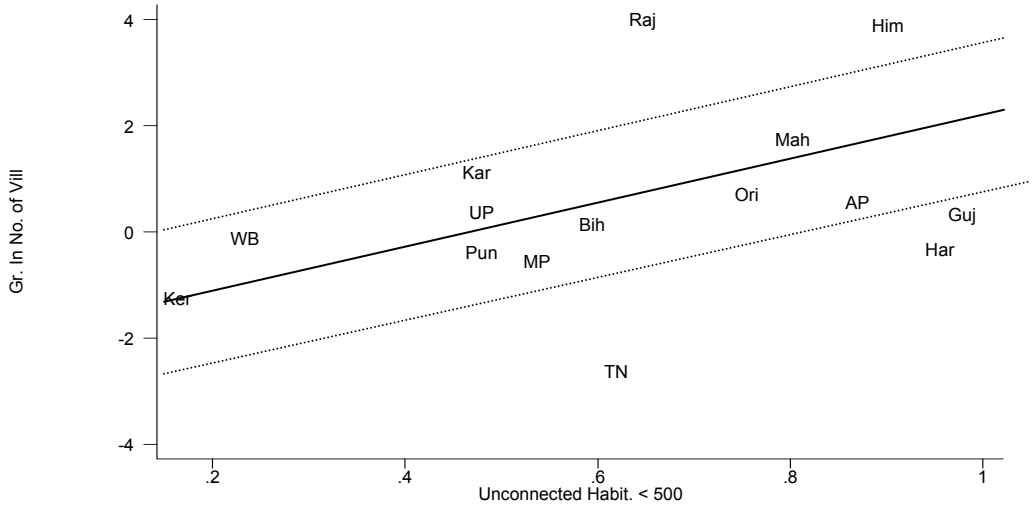


Figure 3: Habitation Connectivity and Village Growth in Large States

	States where <40% of habitations remain unconnected in 2001	States where **>40%** of habitations remain unconnected in 2001
States where number of villages has **increased** in the nineties	*[3] Maharashtra, AP, Gujarat, Karnataka*	**[2] Bihar, UP, Orissa, Rajasthan, Himachal, West Bengal**
States where number of villages has fallen in the nineties	**[1] Haryana, Punjab, Tamil Nadu**	*[4] Kerala, MP*

Consider the figure above. Cell 1 shows that states such as Haryana, Punjab, and TN that have high levels of road connectivity have had a fall in the number of villages. Whereas states such as Bihar, UP, Orissa, Rajasthan (Cell 2) have had an increase in the number of villages and these are precisely the states that have had a large number of villages that remain unconnected. But there are outliers. Kerala (Cell 4) for instance can be explained in terms of connectivity through waterways due to its terrain.

However, states such as Maharasthra and Gujarat (Cell 3) have seen a rise in the number of villages despite generally having better connectivity. On the other hand these states also have large parts that have low levels of cooectivity. Kuchh in Gujarat, Telangana and Rayalseema in AP, Marathwada in Maharasthtra, the Gulbarga area in Nortrhern Karnataka all have low levels of infrastructure. (This however cannot be tested as sub-state data on these aspects are as yet unavailable.)

The Future

Whichever way we see it, it is farily clear that the number of smaller villages are going to fall in India. This will be due to many factors – the three key ones being road connectivity, economic growth and population growth. This is leading to a fall in proportion of population in such small villages of about 3.5 percentage points every decade. By 2010 therefore we should expect about 6 percent of the population living in the smaller villages and about 3 percent by 2020.

However, note that the important factors – GDP growth is likely to be higher in the coming years, and with the greater emphasis on rural roads the connectivity would also be significantly higher. In all likelihood therefore we should expect that the number of people in such small habitations to be insignificant. This is not a pattern that is peculiar to India. It is well known that rural populations fall with economic growth. What is normally not well

known that this fall in rural population is not merely due to migration. It is also the result of (i) increase in the size of villages - many of which eventually become towns (ii) fall in the number of villages – due to rural-rural migration, and (iii) take-over of rural areas by fast expanding urban areas.

Figure 4: Villages less than 500 people

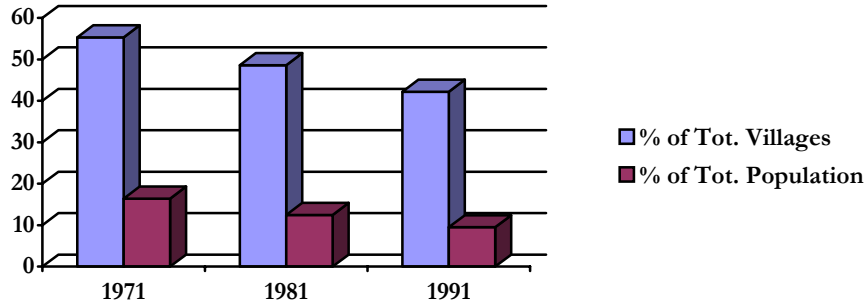
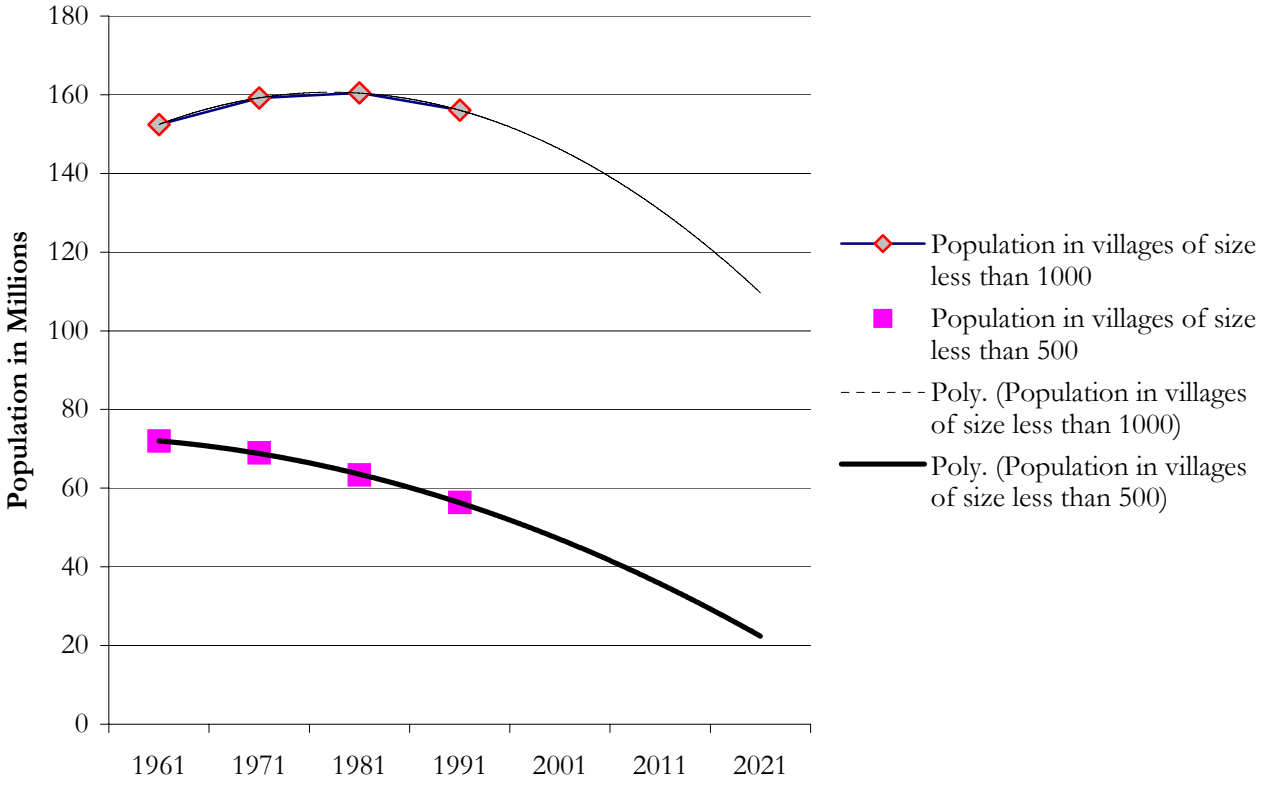


Figure 5: Projected Fall in Small Villages



Of course these relationships with village size/numbers are not exogenous. Two crucial elements are economic growth and road connectivity. Since economic growth itself is a function of infrastructure, communications, markets and lowering of costs of transactions, road connectivity is the critical element that completes the picture. As has already been argued, greater connectivity would lead to lower need to for peripheral villages. In other words, both number of villages connected, as well increase in rural roads should be negatively related to the change in the number of villages.

Road Connectivity

Rural roads are the most important element of rural development. Whether it is the usage of new technologies, the availability of inputs, the presence of a good economic climate, the presence of a large number of buyers and suppliers, the reach of mass media, delivery of services, all are intimately connected with rural roads. Not surprisingly, we find that all advanced countries tend to have high road penetration in the hinterlands. What causes what is for others to deliberate, the point being made here is that rural development and road penetration go together. And as road penetration increases the number of villages fall.

An important aspect of road connectivity is in the reduction of costs of transactions. What are these costs of transactions? These are the costs of transportation, search costs, costs of finding the relevant buyers and sellers for products and services that can be produced by village dwellers, etc. These costs might be seen purely as monetary, but time and effort costs (that could be quantified in money terms) are not insignificant and can strongly affect production and resource allocation decisions of both public and private entities.

What then would make a good road transport network? Others have written significantly about this – many factors have been identified as important. Should the connectivity be to other villages? Should it be to nearby towns, or should it be to large markets or frequently held haaths? Or should a hub and spoke system be the standard norm?

Rural road and transportation networks affect both production and consumption. And for different areas the answers will be different. For instance, villages that tend to predominantly producers and exporters of a single commodity the kind of road connectivity required would be different than one that produces heterogeneous commodities.

It is well known that since village connectivity has been under the policy radar, administrations in different parts of India have generally been aiming at improving the number of villages connected. However what is not so well known is what has been the process of determining which village should be connected to which location. The current practice in India considers the connectivity based on the population of the villages and the

small sized villages tend be neglected. By improving the spread of rural roads to the hinterlands these small habitations and villages will become redundant. For this to occur the planning of the rural road network has to be done in a systematic manner in a comprehensive and coordinated manner.

Conclusion: The Windfalls and Concerns

According to the 1961 Census, there were 5,67,169 inhabited villages and 54,891 uninhabited villages in the country. The numbers for 1991 were not very different at 58,7226 inhabited and 47,095 uninhabited and all indications are that the totals have stabilized and will start to fall especially for the smaller villages. Given that we are going to see a fall in the villages what should be the policy reform to gain from this eventuality. There are many and some are discussed below.

First, flexibility at the lower levels of governance in deciding on provision of public services and public utilities need to be enhanced. The 73rd and 74th amendments do on paper provide that flexibility but in reality that is hardly the case. Take for instance the norms of a primary school within 1 km walking distance. In the coming years many if not most of the schools servicing small habitations will become redundant. Similar issues apply for police stations, health centers, post offices, drinking water, etc. Many such utilities/services would be 'freed' up in the coming years due to the fall in small villages. The re-allocation of these facilities – infrastructure as well as manpower would be an important issue.

Second, the per head costs of supply of many such facilities/infrastructure would fall. As a consequence, if managed well, there would not be a negative impact on the state governments' budget. Provided migration improves lifestyles it way even be easier to impose user charges for some services.

Third, as villages expand, the need for better systems of village administration will become more and more important. The Gram Panchayat would need to function more like Nagar Panchayats and perhaps even municipalities. One very important aspect of this would be issue of revenues for such larger habitations. In all likelihood some form of property tax would have to be imposed by many such local governments.

Fourth, village connectivity and rural road building efforts should not be top down. A democratic process should be followed. That is the largest numbers of the rural population should benefit, not necessarily those that produce or consume high values. This mechanism will have the highest impact for opening up the possibilities and opportunities for everyone. And the number of villages will fall further.