

Infrastructure For Agriculture & Rural Development In India
Need For A Comprehensive Program & Adequate Investment
Dr Amrit Patel

The studies unanimously confirm that rural infrastructure is a *sine qua non* for significantly improving the quality of human life and phenomenally accelerating the process of agricultural development. Infrastructure projects, however, involve huge initial capital investments, long gestation periods, high incremental capital output ratio, high risk, and low rate of returns on investments. Rural infrastructure has direct and strong relationship with farmers' access to institutional finance and markets, and increasing crop yields, thereby promoting agricultural growth. Agricultural infrastructure has the potential to transform the existing traditional agriculture or subsistence farming into a most modern, commercial and dynamic farming system in India.

According to Wharton [1967] agricultural infrastructures are categorized into [i] capital intensive, like irrigation, roads, bridges [ii] capital extensive, like extension services and [iii] institutional infrastructure, like formal and informal institutions. Infrastructure, such as irrigation, watershed development, rural electrification, roads, markets, in close coordination with institutional infrastructure, such as credit institutions, agricultural research and extension, rural literacy determines the nature and the magnitude of agricultural output in India. Adequate infrastructure raises farm productivity and lowers farming costs and its fast expansion accelerates agricultural as well as economic growth rate. It is acknowledged that infrastructure plays a strategic role in producing larger multiplier effects in the economy with agricultural growth. It is estimated that a 1% increase in the stock of infrastructure is associated with a 1% increase in GDP across all countries. The level of both physical and institutional infrastructure significantly influences the spread of proven and demonstrated yield enhancing agricultural technology.

Agricultural infrastructure primarily includes wide range of public services that facilitate production, procurement, processing, preservation and trade. Agricultural infrastructure can be grouped under following broad based categories.

- Input based infrastructure: Seed, Fertilizer, Pesticides, Farm equipment and machinery etc.
- Resource based infrastructure: Water/irrigation, Farm power/energy
- Physical infrastructure: Road connectivity, Transport, storage, processing, preservation, etc
- Institutional infrastructure: Agricultural research, extension & education technology, information & communication services, financial services, marketing, etc.

Development economists recognize the growing importance of agricultural infrastructure in its role not limited to agricultural development but expanding it to encompass economic development of the country. Researchers have identified 11 components of infrastructure, such as [i] irrigation and public access to water [ii] means of transportation [iii] storage services [iv] commercial infrastructure [v] processing infrastructure [vi] public services [vii] agricultural research and extension services [viii] communication and information services [ix] land conservation services [x] credit and financial institutions and [xi] health and education services.

Studies on Infrastructure: The scientific literature on agricultural infrastructure including road connectivity deals with comprehensively its significance on agricultural development, of which following, among others, are a few most relevant to India.

Binswanger [1993] in a study of 13 States in India observed that investments in rural infrastructure lowers transportation costs, increases farmers' access to markets and leads to substantial agricultural expansion. World Bank studies [1994] showed that the growth of farm productivity and non-farm rural employment is closely linked to infrastructure provision. This has considerable significance since most poor households in developing economies are in rural areas.

The effects of infrastructure accentuate the process of commercialization in agriculture and rural sector [Jaffee and Morton, 1995]. It can also lead to a conversion of latent demand into effective commercial demand. Fan et al [1998] showed that rural infrastructure is not only an important driver for total factor productivity [TFP] growth, but also directly contributes to a substantial reduction in rural poverty. If the Government were to increase its investments in roads by Rs.100 billion [at 1993 constant prices], the incidence of poverty would be reduced by 0.87% and TFP would increase by 3.03%. Similarly, investment in agricultural research and extension would contribute to 6.08% growth in TFP and 0.48% reduction in rural poverty.

Improved infrastructure leads to expansion of markets, economies of scale and improvement in factor market operations. It also opens up the rural economy to greater competition from outside. This may take the form of cheaper products from lower-cost sources of supply or new or improved products that may displace some locally produced items. The majority of studies recognize that infrastructure investment has a strong impact on rural incomes and especially on small holders.

Among the various infrastructure facilities, agricultural development was strongly correlated with agriculture infrastructure index followed by index of transport and communication [Singh, 1983]. On the basis of a regression analysis and State level cross-section data for each year from 1971 to 1995, a study indicated that among various physical infrastructures, it was transport infrastructure that had a significantly positive effect on the agricultural output level and the agricultural development index. The social infrastructure, besides physical infrastructure, had significant positive impact on the dependent variables. At the district level from the regression analysis, at three points of time viz, 1971, 1981 and 1991, the study observed that agricultural and transport infrastructures were important determinants of agricultural output and agricultural development index [Majumdar 2002].

A recent study attempted to analyze the impact of infrastructure on agricultural development using larger data, both in terms of time period and coverage of infrastructure variables that included 10 explanatory variables. The results indicated that transport, power, irrigation and research infrastructure were four critical components that affected the agricultural productivity in a significant manner. With improvement in access to power, irrigation facilities substantially improved, particularly through massive energisation of pumpsets. In turn, improved irrigation facilities, coupled with research input enhanced agricultural productivity. The other infrastructure facilities like access to fertilizer sale points, markets, credit, extension services, also developed with the development of transport infrastructure [Thorat and Sirohi, 2002]. Irrigation infrastructure increases the land use and cropping intensity, and provides incentives to farmers to use yield enhancing inputs and thus results in higher agricultural output [Dhawan, Shah, Vaidyanathan]. Rural electrification increases the energisation of pump sets, which helps to increase the irrigated area using groundwater and the output of crops cultivated under groundwater irrigation is always higher than those under canal or tank irrigation, because of its better reliability and controllability.

In a State level analysis for two periods of time, viz, 1970-71 and 1980-81, the inadequacy of infrastructure facilities has been observed as a major obstacle in the path of progress of developing States. It was observed that infrastructure had a positive impact on development at least in six States, while in another five States low development levels were associated with poor infrastructure development [Tewari, 1984]. Another study for a recent period found positive and significant relationship between the level of infrastructure and per capita net state domestic product between 1971-72 and 1994-95 [Ghosh and De, 1998].

The studies to examine the relationship between infrastructure and agricultural output showed that Punjab, which has the highest index of infrastructure also has the highest yield of food grains and value of agricultural production per hectare. Tamil Nadu and Haryana, which have the second and third highest index of infrastructure have third and second highest yield per hectare of food grains. Rajasthan and Madhya Pradesh, which have a very low index of infrastructure also have low yield of food grains and total value of agricultural production per hectare [Bhatia, 1999]

Fan et al [1999,2000] studied the impact of the Government expenditures on agricultural research & development, irrigation, roads, education, power, soil & water conservation, on agricultural growth and rural poverty. The study concluded that expenditure to improve infrastructure and disseminate technology had contributed to agricultural growth. Government expenditure on road and R&D had by far the largest impact on poverty reduction and growth in agricultural productivity.

The cross-country as well as global empirical studies have established the linkages between infrastructure development & sustained output growth. Antle in 1983, using cross-sectional data for 47 less developed countries including India, established a strong & positive relationship between infrastructure development and aggregate agricultural productivity. These views have been substantiated by several studies from Asian countries and more importantly Antle [1984] documented evidence of positive linkages between various types of infrastructure and agricultural output growth specifically from studies under Indian settings. Using annual data for 58 countries, positive & significant correlation between road development and aggregate crop output was established.

Studies in India document positive linkages between various types of infrastructure and agricultural output growth. Rural infrastructure [both physical & institutional] such as irrigation watershed development, rural electrification, roads, markets, credit institutions, rural literacy, agricultural research & extension together

play a key role in determining agricultural output in India. A classic study by Bhatia [1999] showed that Indian States with the highest rural infrastructure index [a composite measure for rural electrification, roads, transport, health, irrigation, farm credit, fertilizer, agricultural marketing, research & extension] such as Punjab, Haryana & Tamil Nadu have the highest food grain productivity per hectare and the States with the lowest index such as Rajasthan, Bihar & Madhya Pradesh have the lowest food grains productivity per hectare; the rural infrastructure index explains about 68% of the variability in the yield in different States; and 10% improvement in rural infrastructure index in States with lower score would increase their food grains productivity by about 470 kg / ha on an average.

Road Connectivity: World Bank study [1997] estimated that 15% of the agricultural produce is lost between the farm gate and the consumer because of poor roads and inappropriate storage facilities alone, adversely influencing the income of farmers. Poor rural road infrastructure limits the ability of the traders to travel to and communicate with remote farming areas, limiting market access from these areas and eliminating competition for their produce. Easier access to market allows expansion of perishable and transport-cost intensive products. International Fund for Agricultural Development [1995] observed that construction of rural roads almost inevitably leads to increase in agricultural production and productivity by bringing in new land into cultivation, intensifying existing land use to take advantage of expanded market opportunities. Better roads also lowered the transaction costs of credit services, resulting in increased lending to farmers, higher demand for agricultural inputs and higher crop yields.

There was a direct relationship between increase in acreage of export crop cultivation and the standard of roads and distance from the main commercial centers. There is enhanced entrepreneurship activity, sharp decline in freight and passenger charges and improved services as a result of investment in rural roads [Bonney,1964]. Binswagner *et al* [1987] using annual data for 58 countries reported a positive and significant correlation between road development and aggregate crop output.

Rural road increases the diffusion of agricultural technology by improving access to markets, enhances more efficient allocation of resources, reduces the transaction costs as well as helps the farmers to realize better input and output prices. Improved road infrastructure also increases the transport facility through which the rural farm households are able to get better health care, education and credit facility. Rural-urban linkages are developed through road development, which also helps strengthening the backward and forward linkages in agricultural sector. Better road connectivity opens up employment avenues outside the village that improves the living conditions of the poor, reduces the marginal costs of agricultural production through lower transaction costs that has the potential to increase both producer and consumer surpluses which eventually have a positive impact in reducing rural poverty.

Government's Initiatives: India has been well endowed with natural, physical and biological resources, such as land, water, labor, livestock, fisheries, forestry, vegetation, climate, solar, wind energy etc. With the aid of science, technology and capital the country has not exploited even 25% of its potential for agricultural development. Agriculture, apart from providing livelihood and food security, has tremendous potential to fuel country's economic growth and has maximum cascading impact on the development of secondary and tertiary sectors in rural areas. With a view to developing agriculture, after independence, the Government of India over a period of time created following organizational, institutional and physical infrastructure.

- Community development blocks and national extension service; rural financial institutions, panchayati raj [local bodies] institutions; district rural development agencies; district industries centers, national rural road development agency; khadi & village industries commission/boards; sericulture/ coir/handloom/handicraft boards; rural electrification corporation; central water commission and groundwater boards;
- Agricultural research, extension and education institutes; farmers training centers and kishi vigyan kendras [Agricultural Science Centers];
- Seeds, fertilizers, pesticides and farm machinery manufacturing units; developing irrigation potential,
- Processing, preservation, storage, roads, transport and marketing facilities

Government of India's effort more particularly since 1969 to create extensive banking infrastructure, comprising 13,500 branches of District central cooperative banks supported by 109,924 Primary Agricultural Credit Societies at village level, 31,645 and 3,751 rural and semi-urban branches of 27 public and 22 private sector banks respectively and 14,500 branches of 96 regional rural banks, facilitated rural households easy and reliable access to agricultural credit and helped them raise country's farm output. Provision of credit by banks for production, processing, storage, transport and marketing including export

trade has inspired farmers with medium and large-holdings to mechanize, commercialize and modernize agriculture.

India between 1950-51 and 1995-96 increased irrigated area to 70.25 million hectares, produced 11.703 million tons of fertilizers, established 6836 regulated wholesale markets, generated 380 billion kwh power, constructed 28,84,000 km of roads and added 2.221 million commercial vehicles, which modestly improved farm productivity and output and the process continues.

Table No.1: All India Expanded Stock of Infrastructure [1950-51 to 1995-96]

Year	Irrigated Area Million Hectares	Fertilizer production Million tons	Number of Regulated Wholesale Markets	Power Generation Billion kwh	Road length Km	Number of commercial Vehicles Million
1950-51	22.56	0.05	206	5.1	400,000	0.116
1960-61	27.98	0.15	715	16.9	524,000	0.225
1970-71	38.19	1.05	1777	55.8	918,000	0.437
1980-81	49.73	3.008	4158	110.8	1,491,000	0.701
1990-91	62.47	9.045	6250	264.3	2,037,000	1.744
1995-96	70.25	11.703	6836	380.0	2,884,000	2.221

Innovative Approach: The importance of rural infrastructure in important sectors like irrigation, roads, bridges etc. was well recognized particularly in the context of the urgency for stepping up agricultural growth rate at 4.5% in the 9th Five Year Plan. While provision of adequate rural infrastructure in India where 70% of the population lives in villages and nearly two-thirds of the work force derives its livelihood from agriculture assumes critical importance, lack of financial resources, *inter alia*, with the State Governments, which are primarily responsible for its creation, development and maintenance is significantly the constraining factor. It was observed that many of the infrastructure projects were found languishing for want of adequate financial resources on one hand and on the other the commercial banks, which has a mandate to provide 18% of the net bank credit to agriculture were not able to meet their commitments. The Government of India, therefore, considered necessary to create a Fund, by way of deposits out of the shortfall in commercial bank's lending for agriculture, as “*Rural Infrastructure Development Fund*”[RIDF] to be operated and managed by NABARD. Thus, since 1995-96 the public & private sector commercial banks have been the most important additional source of finance for State Governments, on liberal terms including lower rate of interest, in their efforts to create rural infrastructure. The RIDF was set up in the NABARD with an initial corpus of Rs.20 billion in terms of an announcement made in the Union Budget for the year 1995-96 [RIDF-I]. The Fund was primarily created to extend loans at concessional rates of interest to State Governments to enable them to complete various types of infrastructure projects in the field of irrigation, flood protection, rural roads and bridges, which were started in the past but could not be completed for want of funds. From 1996-97[RIDF-II], the Fund is also used to take up new rural infrastructure projects, in addition to completion of old projects. Presently, RIDF is funding following activities covering almost all components of rural infrastructure.

- Rural roads, bridges, drinking water supply, primary school buildings; primary health centers; village haats, flood protection, citizen information centers under Information Technology
- Market yards, cold storages, fishing jetties, fisheries, forest development, watershed development, soil conservation, rainwater harvesting, forest management
- Mini-hydel and system improvement projects

Eligible activities along with loan amount, interest rate and repayment period under RIDF are as under.

- Agriculture & Allied Sectors for which the RIDF loans @ 95% of project cost are issued to all States for projects related to irrigation, soil conservation, flood protection, watershed, drainage, reclamation of water- logged area, market yard, godown, storage, warehousing, marketing infrastructure, cold storage, plantation & horticulture, forest development, grading & certifying mechanism, testing laboratories, fishing harbor, jetties, riverine fisheries, animal husbandry, modern abattoir, mini hydel projects, village knowledge centers, infrastructure for Information Technology, desalination plants in coastal areas.
- Social Sector for which the RIDF loans @ 85% of project cost are issued to all States, except hilly States of Himachal Pradesh, Jammu & Kashmir, Uttrakhand, and North Eastern States including Sikkim @ 90% of project cost for projects related to drinking water, public health centers, infrastructure for rural education institutions including construction of toilet blocks in existing

- schools, Pay & Use toilets in rural areas, construction of Anganwadi centers, setting up khadi & village industries, rural industries etc.
- For construction of rural roads and rural bridges under Union Government's Rural Connectivity program for which RIDF loan @ 80% of project cost to all States, except hilly States of Himachal Pradesh, Jammu & Kashmir, Uttarakhand and North Eastern States including Sikkim 90% Of project costs.
 - The lending rate on loans continues to be 0.5% above the Bank Rate prevailing at the time of sanction of loan [6.5% in 2008-09]. Loans are secured by means of irrevocable letters of authority [mandate] executed by State Governments registered with RBI and Time Promissory Notes. Each drawal under sanctioned projects is considered as a separate loan repayable in five equal installments over seven years, indicating moratorium of two years. The Government from 1999-00 allowed lending to Gram Panchayats, SHGs and other eligible organizations for implementing village level infrastructure projects.
 - The phasing of projects is done as per the requirements of the States and ranged from three to four years with an extra year for projects to hilly States.

Pursuant to the announcement made in the Union Budget for the year 2007-08, RIDF-XIII tranche was set up with NABARD with a corpus of Rs.120 billion along with a special window with a corpus of Rs.40 billion for the rural roads component of the Bharat Nirman Program, with contributions from domestic banks which had not achieved their target in lending to the priority sector and/or agriculture as on the last reporting Friday of March 2007.

Performance: As on 31 March 2008, RIDF completed 13 years of operation. During 2008-09, while the allocation under XIV tranche of RIDF was raised to Rs.140 billion, the sum of Rs.40 billion was also allocated under a separate window for funding rural roads component of Bharat Nirman Program raising its aggregate allocation to Rs.120 billion.

During 2008-09, under the RIDF XIV 85,527 projects involving a loan amount of Rs.147.1942 billion were sanctioned whereas amount disbursed was Rs.30.1348 billion accounting for 92.9% of the phased amount.

During the period from 1995-96 to 2008-09 the corpus/allocation increased from Rs.20 billion to Rs.860 billion, the number of projects shot up from 4,168 to 365,003 and the amount sanctioned significantly rose from Rs.19.0621 billion to Rs.883.591 billion whereas the amount disbursed improved from Rs.17.608 billion to Rs.560.522 billion showing 76% disbursement of the phased amount of Rs.737.3364 billion.

An amount of Rs.75 billion was disbursed to the National Rural Roads Development Agency [NRRDA] under the Bharat Nirman Component during 2008-09, taking the total disbursements to Rs.120 billion. Thus, as on 31 March 2009, the cumulative allocation under both components of the RIDF stood at Rs.980 billion.

The period of implementation of projects sanctioned under RIDF VIII and IX was closed as on 30 September and 31 December 2008, respectively. At present the projects under implementation pertain to those sanctioned under RIDF X to XIV.

Table No.2
Sanctions, Phasing and Disbursement as on 31 March'09 [Rs. Billion]

Trench	Corpus	No. of Projects	Sanctioned amount	Amount disbursed**
I [1995-96]	20	4168	19.0621 [19.0621]	17.6080 [92.4%]
II [1996-97]	25	8193	26.3608 [26.3608]	23.9795 [91.0%]
III [1997-98]	25	14345	27.3269 [27.3269]	24.5350 [89.8%]
IV [1998-99]	30	6171	29.0255 [29.0255]	24.8200 [85.5%]
V [1999-00]	35	12106*	34.3452 [34.3452]	30.5496 [88.9%]
VI [2000-01]	45	43168	44.8851 [44.8851]	40.7085 [90.7%]
VII[2001-02]	50	24598	45.8232 [45.8232]	40.5259 [88.5%]
Total#	230	112749	226.8288[226.8288]	202.7275 [89.4%]
VIII [2002-03]	55	20887	59.5019 [59.5019]	51.4175 [86.4%]
IX [2003-04]	55	19548	56.3851 [56.3851]	48.7036 [86.4%]

X	[2004-05]	80	17190	77.1747 [77.1747]	61.9838 [80.3%]
XI	[2005-06]	80	29875	83.0059 [83.0059]	57.2750 [69.0%]
XII	[2006-07]	100	42279	106.0095[106.0095]	57.7084 [54.4%]
XIII	[2007-08]	120	36948	127.4909[96.0083]	50.5714 [52.7%]
XIV	[2008-09]	140	85527	147.1942[32.4222]	30.1348 [92.9%]
Total		630	252254	656.7622[510.5076]	357.7945 [70.1%]
Total		860	365003	883.5910[737.3364].	560.5220 [76.0%]

* 100,000 Shallow Tube Wells sanctioned for Assam treated as single project

Figures in parentheses indicate Amount Phased & ** indicate percentage disbursement of phased amount.

RIDF I to VII tranches were closed as on 31 March 2008 & RIDF VIII to XIV are ongoing tranches.

Sector-wise Sanctions: Of the total amount sanctioned during 2008-09, projects for rural roads and bridges accounted for 46%, followed by irrigation projects [28%], social sector projects [18%] and others 6%. The share of irrigation sector in the amount sanctioned during 2008-09 as also the cumulative sanction [RIDF I to XIV] declined, while that of rural roads & bridges improved. Disbursements of Rs.560.52 billion against the total amount phased [RIDF I to XIV] of Rs.737.34 billion accounted for 76%.

Table No.3

Sector-wise Projects and Amount Sanctioned As on 31 March 2009 [Rs. Billion]

Purpose	RIDF I to XIII [Total]		RIDF 2008-09		Total	
Irrigation						
Number	131934	[47.2]	67105	[78.5]	199039	[54.5]
Amount	250.2085	[34.0]	41.4511	[28.2]	291.6596	[33.0]
Rural Bridges						
Number	11360	[4.1]	986	[01.1]	12346	[3.4]
Amount	70.1847	[9.5]	21.2933	[14.4]	91.478	[10.4]
Rural Roads						
Number	61321	[21.9]	6991	[08.2]	68312	[18.7]
Amount	245.4893	[33.3]	46.1638	[31.4]	291.6531	[33.0]
Social Sector						
Number	50406	[18.0]	8095	[09.5]	58501	[16.0]
Amount	83.8357	[11.4]	26.6748	[18.1]	110.5105	[12.5]
Power Sector						
Number	729	[0.3]	12	[0.01]	741	[0.2]
Amount	16.305	[2.2]	2.3174	[01.6]	18.6224	[2.1]
Others						
Number	23726	[8.5]	2338	[2.7]	26064	[7.1]
Amount	70.54	[9.6]	9.2938	[6.3]	79.8338	[9.0]
Total						
Number	279476	[100]	85527	[100]	365003	[100]
Amount	736.39	[100]	147.1942	[100]	883.5842	

Figures in parentheses indicate percentage share in the total

Sector-wise Disbursements: As on 31 March 2009 disbursement as percentage of phased amount was as high as 79.4% in case of rural roads & bridges and power sector, followed by irrigation [75.7%] & social sector [72.1%] whereas it was as low as 64.5% for other sectors.

Table No.4

Approved Phase and Disbursements under RIDF as on 31st March '09 [Rs. Billion]

Sector	Sanctioned amount	Amount phased	Amount disbursed
Irrigation	291.6596	249.2349	188.7281 [75.7%]
Rural roads & Bridges	383.1311	322.9922	256.5320 [79.4%]
Social sector	110.5105	83.4636	60.2231 [72.1%]
Power	18.6224	15.4291	12.3037 [79.7%]
Others	79.8338	66.2066	42.7351 [64.5%]
Total	883.5842	737.3364	560.5220 [76.0%]

Figures in parentheses indicate percentage of amount phased

State-wise Disbursements: The State-wise analysis of percentage of disbursements to sanctions as per approved phasing under tranches VIII to XIV revealed that Nagaland topped with 112%, followed by Uttarakhand [100%], Sikkim and Mizoram [94% each] Tamil Nadu [81%], Punjab [80%], Haryana [79%], Gujarat [77%], Madhya Pradesh [76%], Himachal Pradesh [75%], Chhatisgarh [72%], Rajasthan and Jammu & Kashmir [71% each] and Andhra Pradesh [70%].

Backward Regions & States: The RIDF has indeed significantly supplemented the effort of the State Governments in bridging the gaps in the rural infrastructure and yielded rich dividends. During the period of 13 years of operation of the RIDF since its inception in 1995-96 till March 2008, at the national level under RIDF 2,77,935 projects in 28 States have been sanctioned. Loan disbursed was 61.6% [Rs.455.095 billion] of the loan amount sanctioned [Rs.738.4162 billion] with Government contribution of Rs.134.7575 billion [29.6%]. While projects for rural roads and bridges accounted for 46.4% of disbursements followed by irrigation projects [34.3%], social, power and other sectors constituted 19.3%. Irrigation potential created has been of the order of 13,430,184 hectares, rural roads and bridges constructed covered 434,758 km and 246,670 meters respectively, creating 6,783,254 person days of employment and 16,130 tons of food production.

More importantly, in relatively backward regions, such as North-Eastern [NE], Eastern & Central where potential for agricultural development has been quite high, which, however, could not be adequately exploited in view of severe gaps in the infrastructure, have now been showing signs of development. In these three regions, which comprise 16 States [including Sikkim] out of 28 in the country it is revealed that Central, Eastern & NE region accounted for 38.8%,17.3% & 2.6% of 13,430,184 hectares of irrigation potential created; 16.5%, 8.1% & 1.5% of 246,670 km of roads constructed; 23.1%,15.6% & 7.7% of 434,758 meters of bridges constructed and contributed 29.5%, 17.3% & 2.5% of 16,180 metric tons of food output as well as generated 13.6%, 18.4% & 1.8% of 6,783,254 person days of employment.

The share of Central, Eastern & NE region was 12.6%, 31.1% & 2.1% in 277,935 sanctioned projects; 19%, 15.5% & 4.3% in RIDF loan amounting to Rs.738.4162 billion; 15.1%,16.6% & 4% in Governments' contribution of Rs.134.7575 billion; 19.5%,12.6% & 3.8% in the loan disbursed amounting to Rs 455.095 billion.

In this process, as a result of focused attention paid by the district and regional offices of NABARD through effective coordination with State Governments in planning, implementing & monitoring the infrastructure projects particularly in backward States of Chhatisgarh, Madhya Pradesh, Uttar Pradesh [Eastern], Uttarakhand, Bihar, Jharkhand, Orissa & West Bengal the development has been significant whereas in States of Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura, & Sikkim the development has started in the right direction.

Table 5
State-wise Details of Projects, Govt. Contribution, Disbursement, Output Under RIDF-I to XIII
As on 31 March, 2008 [Rs.Crore: 10 Million]

State	No. of Projects	Irrigation [ha]	Bridges [meters]	Roads [km]	Govt. Cont.	RIDF Loan	Disbursement	Production	Jobs Created	% Achiev
Andhra P	20563	1296193	40977	27620	1994.1	9401.11	5991.13	1522	1817089	63.7
Karnataka	22263	401132	29004	30228	732.79	4247.88	2426.99	701	121887	57.1
Kerala	3090	178051	26281	3589	345.2	2108.13	1322.24	463	75051	62.7
Tamil Nadu	19039	270156	39846	27833	888.32	5466.75	3723.54	275	270786	68.1
Southern R	64955	2145532	136108	89270	3960.41	21223.87	13463.9	2961	2284813	63.4
Haryana	1648	624580	4665	2098	357.23	1875.2	1260.43	1244	138826	67.2
Himachal P	4147	75702	14710	6069	187.77	1812.49	1109.47	223	127564	61.2
J & K	3637	125020	5357	8157	324.83	2160.32	1243.46	168	94688	57.5
Punjab	3629	394524	7040	5455	528.13	2937.68	2014.60	628	171714	68.6
Rajasthan	19887	445708	1896	39692	1249.52	4298.11	2647.40	728	95289	61.6
Northern R	32948	1665534	33668	61471	2647.48	13083.8	8275.36	2991	628081	63.2
Chhatisgarh	2214	301468	31603	4417	160.87	1398.19	970.24	390	61547	69.4
Madhya P	2563	949692	28391	10252	998.22	5487.17	3379.16	1972	331757	61.6
Uttar P	29241	3901515	36568	22218	736.08	6219.16	3864.16	2296	508187	62.1
Uttarakhand	1144	64692	3685	3740	143.77	968.7	680.15	116	22205	70.2
Central R	35162	5217367	100247	40627	2038.94	14073.22	8893.71	4774	923696	63.2

Gujarat	34859	1166683	4346	11114	1428.31	6106.77	4405.70	1229	1319449	72.1
Goa	157	17485	706	258	53.38	94.03	50.07	45	5284	53.2
Maharashtra	17375	583980	38705	20167	564.52	4597.08	2967.44	975	253473	64.5
Western R	52391	1718148	44057	31539	2046.21	10797.88	7423.21	2249	1578206	68.7
Bihar	11074	490532	1997	2306	353.64	2396.06	747.31	697	197939	31.2
Jharkhand	4760	71325	593	4655	138.01	1283.51	607.87	204	85859	47.3
Orissa	45906	634961	49092	4251	681.86	3261.23	1648.23	983	241885	50.5
West Ben	24793	1130703	16185	8861	1065.07	4539.41	2733.38	915	722022	60.2
Eastern R	86533	2327521	67867	20073	2238.58	11480.21	5736.79	2799	1247705	50.0
Assam	812	316747	33613	444	235.92	1432.84	763.75	348	102400	53.3
Arunchal P	62	00	1632	759	89.78	542.62	295.93	00	00	54.5
Meghalaya	408	4151	3774	843	31.39	252.30	160.14	10	3171	63.5
Manipur	2677	17407	00	00	12.20	45.09	14.63	29	8383	32.4
Mizoram	205	2990	00	225	20.77	139.97	116.80	3	1976	83.4
Nagaland	461	7515	25	1198	49.43	200.88	142.5	8	3852	70.9
Tripura	561	5015	13317	00	83.94	469.33	146.94	6	367	31.3
Sikkim	760	2257	450	221	20.7	99.61	75.84	2	604	76.1
North East	5946	356082	52811	3690	544.13	3182.64	1716.53	406	120753	53.9
Grand Total	277935	13430184	434758	246670	13475.75	73841.62	45509.5	16180	6783254	61.6

Performance among six regions as well as among States within each region varies considerably in respect of number of projects sanctioned, achievement as percentage of disbursement to the RIDF loan amount sanctioned, irrigation potential created, roads & bridges constructed, employment generated and food output. Variance among six regions has been significantly high showing that while only one region [mostly Southern] accounted for a share as high as between 28.7% [RIDF loan] and 38.8% [irrigation potential created], the other one [mostly North-East] accounting between 1.5% [road construction] and 7.7% [bridge construction]. Similar was the extent of variance among States showing that top six States out of 28 had a lion share between 50.4% [RIDF loan] and 68% [road construction], leaving 22 States share among them between 32% and 49.6% in the total. Almost five States [Uttar Pradesh, Andhra Pradesh, Gujarat, Tamil Nadu and Madhya Pradesh] had a predominant share among 12 States, which represented top six.

Table No.6
Region-wise Share & Share of top Six States Under RIDF I to XIII Tranches [1995-96 to 207-08]

Particulars	Reg/State	First	Second	Third	Fourth	Fifth	Sixth	Total
Number of Projects.	Region	Eastern [31.1]	Southern [23.4]	Western [18.8]	Central [12.6]	Northern [11.8]	North-East [2.1]	[100]
	State	Orissa [16.5]	Gujarat [12.5]	U.P [10.5]	W.Bengal [8.9]	Karnataka [8.0]	Tamil N [6.8]	[63.2]
Government Contribution	Region	Southern [29.4]	Northern [19.6]	Eastern [16.6]	Western [15.2]	Central [15.1]	North-East [4.0]	[100]
	State	Andhra [14.8]	Gujarat [10.6]	Rajasthan [9.3]	W.Bengal [7.9]	M.P [7.4]	Tamil N [6.6]	[56.6]
RIDF Loan	Region	Southern [28.7]	Central [19.0]	Northern [17.7]	Eastern [15.5]	Western [14.6]	North-East [4.3]	[100]
	State	Andhra [12.7]	U.P [8.4]	Gujarat [8.3]	M.P [7.4]	Tamil N [7.4]	Maharashtrs [6.2]	[50.4]
Disbursement	Region	Southern [29.6]	Central [19.5]	Northern [18.2]	Western [16.3]	Eastern [12.6]	North-East [3.8]	[100]
	State	Andhra [13.1]	Gujarat [9.7]	U.P [8.5]	Tamil N [8.2]	M.P [7.4]	Maharashtra [6.5]	[53.4]
Percentage Achievement	Region	Western [68.7]	Southern [63.4]	Northern [63.2]	Central [63.2]	North-East [53.9]	Eastern [50.0]	[61.0]
	State	Mizoram [83.4]	Sikkim [76.1]	Gujarat [72.1]	Nagaland [70.9]	Uttarakhand [70.2]	Chhatisgarh [69.4]	[61.0]
Irrigation Hectares	Region	Central [38.8]	Eastern [17.3]	Southern [16.0]	Western [12.8]	Northern [12.4]	North-East [2.6]	[100]
	State	U.P	Andhra	Gujarat	W.Bengal	M.P	Orissa	

		[29.0]	[9.6]	[8.7]	[8.4]	[7.1]	[4.7]	[67.5]
Road length Km	Region	Southern [36.2]	Northern [24.9]	Central [16.5]	Western [12.8]	Eastern [8.1]	North-East [1.5]	[100]
	State	Rajasthan [16.1]	Karnataka [12.2]	Tamil N [11.3]	Andhra [11.2]	U.P [9.0]	Maharashtra [8.2]	
Bridge length Meter	Region	Southern [31.3]	Central [23.1]	Eastern [15.6]	North-East [12.1]	Western [10.1]	Northern [7.7]	[100]
	State	Orissa [11.3]	Andhra [9.4]	Tamil N [9.2]	Maharashtra [8.9]	U.P [8.4]	Assam [7.7]	
Production Tons	Region	Central [29.5]	Northern [18.5]	Southern [18.3]	Eastern [17.3]	Western [13.9]	North-East [2.5]	[100]
	State	U.P [14.2]	M.P [12.2]	Andhra [9.4]	Haryana [7.7]	Gujarat [7.6]	Orissa [6.1]	
Jobs person Days	Region	Southern [33.7]	Western [23.3]	Eastern [18.4]	Central [13.6]	North [9.3]	North-East [1.8]	[100]
	State	Andhra [26.8]	Gujarat [19.4]	W.Bengal [10.6]	U.P [7.5]	M.P [4.9]	Tamil N [0.4]	

Figures in parentheses indicate percentage share in the total

Public-Private Partnership: The State Governments alone cannot bridge the significant gap in rural infrastructure in view of their limited resources and organizational structure. In order to leverage private resources and its implementing capacity for rural infrastructure development, NABARD entered into Memorandum of Agreement [MoA] with Infrastructure Leasing & Financial Services [IL&FS] to develop products & services and fine-tune the design of innovative delivery mechanism. The MoA between NABARD and IL&FS aims at developing an integrated approach in planning for rural infrastructure across the country, based on shared concern and collaborative leadership structure, whose scope would comprise setting-up both program and project-based institutional arrangements, for taking up projects in commercially feasible/viable PPP format and achieving the same through conceptualization and implementation of workable frameworks and processes. This would include design, engineering, financing, procurement, constructions, improvement, operation and maintenance on Build, Operate and Transfer and any other appropriate forms of Public-Private-Partnership with defined roles for the parties, including project development and management of public system projects financed by NABARD, partly or wholly, under IRDF or otherwise. In order to implement this MoA, the NABARD and IL&FS will identify specific program/project areas in various States to take forward the objectives of the MoA. This MoA will enable NABARD to work out self-supporting and bankable formats for launching infrastructure projects relevant to agriculture and rural development and provide advice to Governments and agencies to leverage their budgetary resources for these programs.

Road Connectivity in India: In a study using macro data from 85 random selected districts in India to examine the role of rural roads, among other factors in agriculture investment and output, it was found that the road investment contributed directly to the growth of agricultural output, increased use of fertilizer, expansion of commercial banking operations, etc [Binswanger et al, 1993]. The study of six rural road projects in North and South 24 Parganas districts of West Bengal to assess the impact of roads on the living conditions of the benefited villagers showed that widening and strengthening of roads resulted in saving on vehicle operating costs, shift in mode of transport, increase in the frequency of travel, increase in the job availability of skilled and unskilled laborers in the near by towns. The field studies in four States of Gujarat, Punjab, Rajasthan and Tami Nadu with an overall objective of evaluating the impact of rural roads financed under RIDF on the actual cost of investment, changes in terms of economic benefits in terms of income and employment in the benefited villages in farm and non-farm activities showed that investment in rural roads is economically viable with a positive net present value in all the States. The economic rate of return [EER] of the investment calculated on discounted cash flow technique ranged between 20.3% in case of Tamil Nadu to 36.8% in case of Gujarat with an overall [ERR] at 26.1%. Net benefit per km of road was in the range of Rs.208,000 in Gujarat and Rs.287,000 in Tamil Nadu per year at reference year's price.

Employment generation was uneven not only across the States but also across the sub-sectors, depending upon the level of investment, potential available, availability of linkages etc. The percentage of man-days employment increase ranged from 35 in Punjab to 8 in Rajasthan.

The agriculturally backward eastern States have the poor status of rural roads as compared to economically progressive States of Punjab, Haryana, Gujarat, Maharashtra, Kerala, and Tamil Nadu. The financing of roads is plagued with a plethora of problems like, shortage of funds, non-utilization of available funds, overlapping of various financing schemes, regional imbalances in fund allocation etc.

Despite India's strong economic growth in recent years, longstanding inadequacies persist. One such challenge is poor rural road connectivity, with over 40% of India's population remaining outside the rural road network. The benefits of linking India's villages with a good road network are enormous and substantial public investments are obviously worthwhile. In addition to employment generation, such a road link yields socio-economic benefits like reduction in prices of agricultural and consumer products, access to markets, public transport, employment opportunities, and better education and healthcare facilities. A study by the World Bank makes the point that the retail prices of low value/bulk commodities are generally 10% higher in unconnected villages than in those with road access. The most important benefit, however, relates to poverty reduction. A 2007 study by the International Food Policy Research Institute, Washington found that investing in roads had the greatest impact on reducing rural poverty, performing consistently better than investments in agricultural research and development, and education.

Prime Minister's Gram Sadak Yojana: There is a close link between Rural Connectivity and Growth, Employment, Education and Health care. States with poor connectivity are also States that reflect poor socio-economic indices. A nation-wide network of All-weather roads in the rural areas is a critical link for progress. Rural road connectivity is not only a key component of rural development by promoting access to economic and social services and thereby generating increased agricultural incomes and productive employment opportunities in India, it is also as a result, a key ingredient in ensuring sustainable poverty reduction. Notwithstanding the efforts made, over the years, at the State and Central levels, through different programs, as on 31st March 2000, around 40% of the Habitations in the country were not connected by All-weather roads. It was well known that even where connectivity was provided, the roads constructed were of such quality [due to poor construction or maintenance] that they could not always be categorized as All-weather roads. With a view to redressing the situation Government launched on 25th December 2000 Prime Minister's Gram Sadak Yojana [PMGSY] to provide All-weather access to unconnected Habitations. The PMGSY is to provide connectivity by way of an All-weather road [with necessary culverts and cross drainage structures, which is operable throughout the year], to the eligible unconnected Habitations in the rural areas in such a way that all unconnected Habitations with a population of 1000 persons and above can be covered in three years [2000-03] and all unconnected Habitations with a population of 500 persons and above by the end of the 10th Plan period [2007]. In respect of the Hill States [North-East, Sikkim, Himachal Pradesh, J&K, Uttarakhand] and the Desert areas [as identified in the Desert Development program] as well as the Tribal areas, the objective would be to connect Habitations with a population of 250 persons and above. About 160,000 Habitations were to be covered under this program, with an anticipated investment of Rs.600 billion. This program is entirely funded by the Government of India. The Central Government formulates the policy guidelines, which insist upon construction of good quality roads through better planning, obtaining clearance of road works, better methods of execution, time bound implementation and quality control. The States carryout the planning and execution of road works.

India's efforts to improve rural road connectivity, which gained a fresh impetus with the implementation of the PMGSY need to be substantially stepped up. The task, however, is immense. According to the Planning Commission's Working Group on Rural Roads for the Eleventh Five Year Plan [2007-12], there are over 3,30,000 rural habitations with no road connection. The PMGSY, which has since 2005-06 a part of Bharat Nirman Program aimed at improving rural road infrastructure between 2005 and 2009. It initially proposed to give road connection to 66,802 eligible habitations but subsequently scaled down the target to 59,536 habitations. The achievements, however, have fallen short of the target, with the coverage limited to 35% up to 2008. The second component of the plan, which is to upgrade 190,000 kilometers of rural roads, also fell short of the target. As financial resources are a major constraint, the Planning Commission's suggestion to look for alternative financing models, including a public-private-partnership at the local level, for instance, with sugar mills, merits serious consideration. However, the Government should continue to play the lead role in improving rural connectivity, which is vital for the economic and social inclusion of a

Breeder seed					66460*	68654	73829	91960	100000
Foundation					690000	740000	796000	822000	969000
Certified					11.31	12.674	15.501	17.905	19.0
Rural Branch	1833	3063	15105	34494	32895	32073	30754	31210	31210
Farm Credit		1675	5244	16494	62045	180486	229400	254658	287149
Population	432.5	538.9	675.2	832.6	1014.8	1102.8	1119.8	1136.6	1153.1

Area in million hectares; Production in million tons; Irrigated area in million hectares; Fertilizer nutrient production & consumption in thousand tons; Electricity % share in total consumption; Livestock: Production of milk in million tons, eggs in million numbers & fish in thousand tons; Net availability of cereals & pulses per capita per day in grams; Procurement as % of production; Breeder & Foundation seeds in quintals & certified seed in million quintals, Rural branches in number; Population in million.

Herculean Task Ahead: With the implementation of the IRDF not only the infrastructure projects that were found languishing for want of adequate financial resources at the level of State Governments are now getting implemented but also several new projects encompassing over 30 activities are being implemented in thousands of villages where rural households now feel a sigh of relief and comforts. However, the utilization of the Fund has been low in comparison to sanctions largely due to [i] difficulties in identifying relevant projects as also delay in administrative and technical approval by some of the State Governments [ii] inadequate required matching budgetary support [iii] delays in the completion of formalities for drawal of funds [iv] delays in completing preliminary work in respect of irrigation projects, where land acquisition and tendering procedure is required [v] delays in obtaining necessary clearance from appropriate authorities, such as Ministry of Forest & Environment [vi] delays in obtaining power connection, cost escalation and lack of coordination among the implementing departments. This calls for creating awareness among stakeholders to address issues of mutual concerns. Also, the established administrative, technical & legal procedure that delays implementation needs to be reviewed, simplified & made people-friendly. While there is urgent need now than before to [i] make the most efficient use of existing infrastructure already created at a huge cost and strengthen them and [ii] continue to build additional infrastructure to bestow prosperity to rural households, following areas should be accorded priority.

Irrigation: According to the 9th Five Year Plan [1997-2002], the ultimate irrigation potential has been assessed at 140 million hectares, which includes 59 million hectares from major and medium irrigation projects and 81 million hectares from minor irrigation projects. The latter includes 17 million hectares from surface water minor irrigation schemes and 64 million hectares from groundwater resources.

The exploitable potential is 21.4 million hectares that is about 37% of irrigation potential from major and medium irrigation projects. Of this 13.4 million hectares are locked up in a large number of projects in the pipeline. Another serious problem relates to underutilization of irrigation potential already created because of lack of field channels, other minor investments etc.

Total irrigation potential created under all types of irrigation structures was 94 million hectares till the end of ninth five-year plan [2002], which increased to 102.8 million hectares up to the end of 10th five-year plan [2007].

Area of serious concern has been that [i] of the total potential created only 87.2 m ha is actually utilized, leaving 15.6 million hectares currently unutilized and [ii] out of assessed potential of 140 million hectares, 102.8 million hectares of irrigation potential has been so far created leaving still 37.2 million hectares yet to be developed. Against this, during 11th plan period [2007-12] irrigation potential of 16 m ha is proposed.

Use of improved Seeds: Improvement in crop yield, which is key to long-term & sustained agricultural growth, depends significantly, among other factors, on the use of standard quality seeds of high yielding varieties of crops and their timely availability. Besides, high yielding seeds should be developed through continuing research process, such as application of bio-technology & irradiation technology. The seed development program in India includes the participation of Central and State Governments, the Indian Council of Agricultural Research, State Agricultural Universities, the cooperative and private sectors. There are 15 State Seed Corporations besides two national level corporations, namely National Seed Corporation and State Farms Corporation of India. The Ministry of Agriculture is implementing the Central sector Development and Strengthening of Infrastructure Facilities for Production and Distribution of Quality Seeds Scheme. The aim of the scheme is to make quality seeds of various crops available to farmers on time and at affordable price. The major thrusts under the scheme being under implementation from 2005-06 are on improving the quality of seeds & to enhance seed replacement rate, boosting seed production in the private sector and helping public sector seed companies to contribute to enhancing seed production. During 2008-09, 52 seed infrastructure development proposals were sanctioned for boosting

seed production in the private sector. Despite such a good infrastructure network in India, more than four-fifths [80%] of the farmers rely on farm-saved seeds leading to a low seed replacement rate.

Considering the vital importance of seeds sector in promoting agricultural growth, it is proposed to replace the existing Seeds Act 1966 by suitable legislation. The new Act is expected to [i] create a facilitative climate for growth of the seed industry [ii] enhance seed replacement rates for various crops [iii] create a conducive atmosphere for application of frontier sciences in varietal development and for enhanced investment in research and development. The Seeds Bill was introduced in the Parliament in 2004 and awaits approval since the Parliamentary Standing Committee on Agriculture recommended several improvements in 2008. Effectiveness of infrastructure already in place needs significant improvement and publicly elected legislators need to respond quickly to amend the Seed Act, pending since 2004.

Judicious Use of Fertilizers & Pesticides: The consumption of fertilizers in terms of nutrients per hectare has increased from 105.5 kg in 2005-06 to 128.6 kg in 2008-09. However, improving the productivity of soils still remains a challenge. This requires increased application of major & minor nutrients in appropriate proportion, based on soil analysis.. A new scheme, the National Project on Management of Soil Health & Fertility has been introduced in 2008-09 with a view to establishing 500 new Soil Testing Laboratories [STLs] and 250 Mobile Soil Testing Laboratories [MSTLs] and strengthening of the existing State STLs for nutrient analysis. In order to ensure adequate availability of fertilizers of standard quality to farmers to regulate trade, quality and distribution, fertilizers have been declared an essential commodity as per Fertilizer Control Order 1985. To encourage balanced use of fertilizers a new concept of customized fertilizers has been introduced. These fertilizers are soil specific and crop specific.

Since several years farmers, in view of provision of subsidy for nitrogenous fertilizers, have been indiscriminately using nutrients in a disproportionate ratio, which they should use according to soils & crop needs based on soil analysis & recommendations of the agricultural universities.. Similarly, most judicious use of pesticides through effective campaign & training to prevent enormous loss of farm produce is necessary. Thus, effectiveness of agricultural extension services for promoting use of high yielding seeds & judicious use of nutrients & pesticides should be improved.

Gaps in Production: India can increase wheat production by 30 million tones or around 40% and double paddy production at current levels of technology. This can be achieved by bridging the existing gap between the actual crop yields at field level and the potential yields. Various studies, based on the data recorded in 2003-04 and 2004-05 on yields realized with improved agronomic practices and the existing actual average yields in different States, sharply pinpoint the need to exploit this potential. The National Development Council's sub-committee on agriculture and related issues has incorporated these results in its report presented to the Planning Commission in May 2007. The Annual Report [2007-08] of the Indian Council of Agricultural Research also points to the available exploitable production potential that can be gainfully harnessed to boost overall grain production. Existing infrastructure comprising agricultural extension services at the level of State, district, tehsil & group of villages should have adequate concern to implement the package of agronomic practices along with seed, fertilizer & irrigation technology as recommended in May 2007 to bridge this gap in the production..

The State-wise percentage of yield gap between the production potential yield & actual yield at field level in case of wheat, rain-fed upland rice, rain-fed [shallow low land] Boro rice and irrigated rice has been as under.

Table No.9

State-wise percentage of yield gap between the production potential yield & actual yield at field level

Wheat Crop	% Yield Gap	State	% Yield Gap	State	% Yield Gap
State		West Bengal	19.40	Jharkhand	105.30
Maharashtra	155.50	Punjab	6.10	Uttar Pradesh	67.20
Bihar	104.80	Paddy Crop		Irrigated Rice	
Himachal P	89.60	Rain-fed Upland		J & K	285.80
Madhya P	84.30	Chhatisgarh	157.00	Uttar Pradesh	222.40
Uttrakhand	80.50	Uttar Pradesh	86.40	Bihar	2220.10
Uttar Pradesh	50.50	Jharkhand	35.20	Gujarat	195.30
Gujarat	50.50	Rain-fed Shallow lowland		Chhatisgarh	169.40
Rajasthan	41.30	Assam	194.70	Uttarakhand	98.20
Haryana	19.80	Chhatisgarh	144.20		

Agricultural Research: The share of research expenditure in the GDP for the agricultural sector was 0.55% in India as compared with 2.39% for the developed countries in 1991, which was grossly inadequate & continues. The 11th Five Year Plan [2007-12] provides the benchmark as the targeted spending on education at 6% of GDP. Data, however, exhibited that unlike public expenditure on Research & Education, the expenditure on Education & Training was already low in 1960-62, 1970-72 and 1980-82 and it has declined steadily since 1991.. Public support for expanding the knowledge base for agriculture is shrinking since 1991 precisely when the need for it is rising.

Infrastructure Deficient States; Following States have been predominantly deficient in infrastructure, particularly gross irrigated area, road density, electricity and Posts & Telegraph.

- Gross Irrigated Area: Maharashtra, Madhya Pradesh, Kerala, Orissa, & Assam
- Road Density: Madhya Pradesh, Rajasthan & Uttar Pradesh
- Electricity: Assam, Orissa, Bihar, Rajasthan, Uttar Pradesh, West Bengal, Meghalaya
- Posts & Telegraph: Arunachal Pradesh, Bihar, Rajasthan, Uttar Pradesh & Meghalaya

Food Processing: Problems of processing industries continue since Food Processing Ministry was established in 1988 and despite committees and two Groups of Ministers were set up in last five years. About 40% of farm produce in the country is wasted due to inappropriate storage, lack of primary processing facilities and inefficient procurement. Food worth Rs.580 billion is wasted annually as the country processes just 2.2% of the fruits and vegetables as against 23% in China. There has to be a seamless flow from fields to procurement, processing, storage, transport and retailing.

The new model Agricultural Produce Marketing Committee [APMC] Act enacted in 2007, allows the setting up of private markets and direct purchase centers where farmers can sell their produce directly to industry at remunerative prices. They can also enter into contract with corporate houses to grow the required crop in return for a good price. However, out of 28 States only 15 States have adopted the model law and its implementation is tardy. States like Bihar do not have the APMC Act at all.

India needs additional 10 million tons operational cold storage facilities. Warehousing Development and Regulation Bill, 2007 was supposed to encourage companies to provide warehousing facilities through larger private investments but inability to sort out problems prevents establishment of modern warehouses. Regulatory hurdles experienced under the prevailing Essential Commodities Act, needs to be removed as it hinders transportation of a range of specified products across their respective State borders. This increases the logistics costs of small-scale players, who cannot afford to set up their own cold storages.

Food Grain Storage: According to Annual Report 2007 of the Food Ministry, total space to store food grains is 50.9 million tons comprising 21.741 m t [12.948 m t owned & 8.793 m t hired] of the Food Corporation of India, 9.818 m t of Central Warehousing Corporation and 19.342 m tons [13.333 m t owned & .6009 m t hired], which needs to be increased appreciably since million tons of food grains are stored on plinth & covered in absence of adequate storage facilities & most inefficient food management policy & system. In this case, China's system of food production, procurement, storage & handling is interesting & worth studying. The Chinese storage capacity has witnessed a quantum jump under the State Administration of Grains [SGA]. It employs state-of-the-art, multi-nodal [ship-to-track, rail, barge and ship-to-ship], automated grain transmission capable of handling 2000 tons per hour. The highly mechanized provincial granary in Guangzhou, with temperature-controlled and fumigated 100,000-ton storage, is a proof of China's intensive infrastructure upgradations, funded by taxes, World Bank assistance and trade surplus. The investment ranges from farm-based scientific storage to state-of-the-art standardization laboratories in Beijing. China has positioned a 176,000 trained & dedicated extension workforce in its grain-producing areas to educate farmers on storage practices. Granaries are effectively managed at near full capacity and storage costs are built into cost of grain at the consumers' end. The system is facilitated by public sector operations in all the phases of farm-gate to home-gate grain movement.

China, in view of its high demand of food on account of double-digit growth, produces annually about 520 million tons of wheat & rice and continues to be supplemented by import arrangements. China annually procures and stores 150 to 200 million tons. It procures grain selectively from high productivity provinces and State prices are only available to provinces, which excel in productivity and not as a rule. Procured grain is cleaned, packed and marketed by about 3000 private sector companies, most of which have State support or party guidance, at market rates. Price control exists at procurement and wholesale points.

For managing the system it has the Chinese State Administration of Grain [SAG], the State Grain Laboratories and the Grain Standards Organization, all located in Beijing. The system comprises the state-of-the-art commodity exchange in Dalian, the Beiliang Corporation handling logistics, the Guamano Grain Storage Engineering Company and the provincial storage godowns of Shanghai & Guangzhou.

Rural Poverty: Infrastructure to promote agricultural development & growth is obviously an integral part of the rural infrastructure. Other components of rural infrastructure should also simultaneously be planned & implemented in order to achieve inclusive growth & rural prosperity and bridge rural-urban divide. In this effort, following issue needs to be addressed forthwith.

- According to Multidimensional Poverty Index [MPI] worked out by UNDP & Oxford University in July 2010, about 645 million people or 55% of India's population are poor. As compared with 410 million MPI poor in 26 of the poorest African countries there are as many as 421 million such poor in just eight of the poorest Indian States of Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh & West Bengal. The MPI is like a high-resolution lens, which reveals a vivid spectrum of challenges facing the poorest households. MPI considers 10 pinpointing indicators under three important components of rural life, such as [i] Education [child enrolment & years of schooling] [ii] Health [child mortality & nutrition] and [iii] Standard of living [electricity, flooring, drinking water, sanitation, cooking fuel & assets.
- In 1992-93, 52% of infants under the age of three years were underweight, which were 47% in 1998-99 & 46% in 2005-06, according to National Family Health Survey data. At this rate of decline, the Millennium Development Goals targets will be attained in 2043 instead 2015, according to Prof. Lawrence Haddad, Director, Institute of Development Studies, Sussex University, a specialist in poverty, food security & malnutrition who has done extensive field research in India.
- From 1993 to 2006, the GDP per capita went up by 53% while malnutrition among children declined only by 12.5%, when international comparisons suggests the decline should be closer to 30%. While India will have a long way to achieve Millennium Development Goals in combating malnutrition China, Thailand, Vietnam, Ghana & Brazil have managed to do it successfully.
- According to National Sample Survey round in 2004-05, 41.8% of rural population lived on a monthly per capita expenditure of Rs.447. In urban areas, the BPL population was 25.7% living on a monthly per capita expenditure of Rs.578.8. It was as high as 57.5% in Orissa followed by 55.7% in Bihar & 53.6% in Madhya Pradesh. The per capita expenditure norms for estimating poverty are abysmally low and some economists call it the 'starvation line' rather than poverty line.
- According to NCAER, the top 20% of India's population had 53.2% share of the national income in 2009-10, up from 36.7% in 1993-94. The bottom 60% had a mere 27.9% share in total income in 2009-10, down from 38.6% at the start of the reform process.
- The financial inequality is great; urban consumption is 63% higher than rural consumption. Per capita consumption was the lowest among the agricultural laborers in rural areas.
- India's farm sector has been in quite an appalling state for several years now. National Crime Records Bureau statistics said that more than 150,000 farmers committed suicides between 1997 & 2005, because they were terribly indebted, cyclically poor and seriously credit constrained.

Comprehensive Program: Efforts so far made in the last six decades, since independence, have been piecemeal and a fraction of the total needs. Government launched in 2005-06 Bharat Nirman program for building rural infrastructure and providing basic amenities in rural areas focusing on six components, namely rural housing, irrigation potential, drinking water, rural roads, electrification and rural telephony. It is no doubt an important initiative for reducing the gap between rural and urban areas and improving the quality of life of people in rural areas but it cannot address comprehensively the total rural infrastructure needs as envisioned by rural households. Achievements under these programs are as under.

- Under the Rural Electrification Program 69,963 villages have been electrified and 8.88 million Below Poverty Line households have been given connections up to 15 January 2010
- Under the Water Supply scheme, number of habitations provided drinking water were 54,589 among uncovered habitations, 383,106 were among slipped-back habitations & 752,827 among quality affected habitations as on 23 December 2009.
- Under Rural Sanitation Program since 1999 over 60.1 million toilets have been provided to rural households under the Total Sanitation Campaign. A significant achievement has been the construction of 937,000 school toilets and 295,000 Anganwadi toilets. The number of households being provided with toilets annually has increased from 621,000 in 2002-03 to 11.5 million in 2008-09. From 1 April to 22 December 2009 more than 6.2 million toilets were provided to rural

households. The cumulative coverage is 61% as against 21.9% rural households having access to latrines as per Census 2001 data.

- Under the Rural Housing scheme, 7,176,000 houses were constructed during 2005 to 2009.

It is now opportune time to have a theme of the ensuing 12th Five Year Plan [2012-17] devoted to “Rural Infrastructure for Rural Prosperity” and immediately Rural Infrastructure Commission should be appointed to deal with all critical issues of rural infrastructure & formulate a road map to complete the development by 2020. Rural Infrastructure Development Company may be incorporated to plan, implement and mobilize financial resources from within the country as well as from the World Bank, Asian Development Bank, attracting Foreign Direct Investment, Foreign Institutional Investors etc. .

Conclusion: *It is time that rural households identify their needs for infrastructure and place demand as a matter of right on elected representatives; Governments must allocate adequate resources in their annual budgets and implementing agencies including banks must have concern, commitment and accountability to put in place infrastructure in each village in a time bound program. Performance of each and every program/scheme should necessarily be available to the public every month through local print and electronic media, as a part of right to information.*

