ASSESSMENT REPORT OF PMGSY – APPENDIX

(Volume -II)

WORLD BANK GROUP
Transport & ICT

Australian AID

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Contents

APPENDIX I
SUMMARY OF IMPACT ASSESSMENT STUDIES OF PMGSY

1.1 Purpose of the Synthesis

The Appendix on "Impact Evaluation Studies of the PMGSY Programme – A Synthesis" covers evaluations and other assessment studies undertaken from the period 2000 to 2016. The main aim of the synthesis was to provide inputs to possible road sector impact studies of on-going or completed road sector interventions and guidance while conceptualizing new road sector interventions, reviewing of existing road programmes.

A total of 13 evaluation and assessment reports have been identified. Table 1.1 gives a detail of the selected studies along with their objectives and conducting agency.

S.N.	Year	Title	Objective
1.	2000	Socio-Economic Impact study of Rural Roads in Two Indian States *Conducted by*: Centre of Studies in Social Sciences, Pune	To assess the impact of rural roads and transportation on social and economic development of rural life with special reference to aspects such as education, health, poverty and markets.
2.	2004	Impact Assessment of Pradhan Mantri Gram Sadak Yojana (PMGSY) *Conducted by*: Ministry of Rural Development (Monitoring Division)	To assess the overall socio-economic impact on the lives of the rural people as a result of enhanced rural connectivity provided through the PMGSY, and document the improvement or the changes brought about by PMGSY roads in the lives of the rural poor at the household level and village level. The specific focus of the study was on the following sectors: ► Agriculture and Allied Sector ► Employment ► Industry. Health ► Education ► Social Aspects ► Transport ► Urbanization ► Poverty Alleviation
3.	2005	Quick Concurrent Evaluation of PMGSY Programme *Conducted by*: Planning Commission	To make a qualitative assessment of the physical and financial performance of the programme and assess the impact of the programme on socio-economic condition of the residents of villages provided with road connectivity's under the programme. The report also identified constraints in

S.N.	Year	Title	Objective
			implementation of the programme and suggestions to modify the same.
4.	-	Study on Assessment of Socio-Economic Impact of Farm to Market Roads Under UPSLRP –II *Conducted by*: Indian Institute of Management (IIM), Lucknow	To assess the magnitude and distribution of the direct and indirect socio-economic impact of rural roads and travel characteristics of rural population. In addition, the study also carried out an economic analysis comparing the costs and benefits of the project roads to derive the ex-post economical rate of return.
5.	2009	Socio-Economic Impact Assessment Report in Madhya Pradesh & Chhattisgarh– Rural Roads Project *Conducted by*: Asian Development Bank (ADB)	The project related to analyze the socio-economic impacts of the construction/ improvement of about 5500 Km of village and Other District Roads (ODR) in Madhya Pradesh and Chhattisgarh, respectively.
6.	2010	Socio-Economic Impact Evaluation of Pradhan Mantri Gram Sadak Yojana in Madhya Pradesh *Conducted by*: M.P. Rural Roads Development Authority (MPRRDA)	To assess and measure the socio-economic impact of PMGSY roads on the lives of rural people in selected habitations/villages and find out the changes and improvement brought about by PMGSY roads at individual, family and village level. In addition, to narrate the incidents and anecdotes related to the aforesaid impact.
7.	2011	Impact Assessment of PMGSY – Andhra Pradesh *Conducted by:* Centre for Rural Management, Kerala	The objectives was to assess the impact of PMGSY roads on the local areas and on economic factors in general and in particular on (i) agricultural growth particularly in increasing market access for agricultural produce; (ii) Direct and indirect employment and income in the short run as well as in the long run; (iii) Access to healthcare, education and other facilities and the resultant outcomes; (iv) Gender empowerment and lifting up of socially and economically disadvantaged sections of the population; and (v) Poverty reduction.
8.	2012	National Level Impact Assessment And Road Users' Satisfaction Report *Conducted by*: M/s LEA Associates on behalf of Ministry of Rural Development	To understand the magnitude and distribution of impacts of PMGSY on the target population and to assess the satisfaction level of road users. The study also undertook assessment of the distributional pattern of socio-economic

S.N.	Year	Title	Objective
			impacts on targeted population and respective habitations where PMGSY roads are constructed in comparison with other habitations and the level of satisfaction derived in the use of PMGSY roads by the villagers against given set of indicators.
9.	2014	An assessment of distribution of PMGSY project benefits in three states by gender and ascribed social groups *Conducted by:* South Asia Sustainable Development Unit, The World Bank	This assessment focused on two aspects of the PMGSY program. First, the emphasis is on new/additional gainful employment and economic opportunities, as opposed to other forms of benefits. Second, the distributional concern related to whether women and members of scheduled castes (SC), tribes (ST) and other backward castes (OBCs) have been able to exploit such opportunities, and if not, what efficient measures promise to improve their chances of doing so.
10.	2015	Impact Assessment Study of the improved Rural Road Maintenance System under PMGSY *Conducted by*: International Labour Organisation (ILO)	To assess the impact of rural roads maintenance and to ascertain whether the benefits provided by the construction of the roads developed or not; and if the benefits do develop, whether these are sustained or not.
11.	2015	On the Way to Good Health? Rural Roads and Morbidity in Upland Orissa *Conducted by*: Department of Economics, University of Heidelberg	This study investigated PMGSY's effects on morbidity in upland Orissa with emphasis on episodes of acute illness, especially those of the infectious kind, which account for the lion's share of the overall burden of morbidity.
12.	2015	A Report on Impact Assessment Study of PMGSY Including Gender *Conducted by*: Birla Institute of Technology & Science, Pilani.	To conduct limited period survey to ascertain the impact of PMGSY programme and understand impact of PMGSY on improvement of Gender issues. The study also made recommendations on addressing and further recognition of social concerns through the programme implementation design of PMGSY.
13.	2016	Report on Impact of PMGSY Roads on Accessibility in Rural Areas *Conducted by*: Birla Institute of Technology & Science, Pilani.	The main objective of the study was to develop a methodology to quantify accessibility at regional level to all-weather roads and at a habitational level to health care by which inaccessible areas can be identified and appropriate measures can be

S.N.	Year	Title	Objective
			taken in terms of improving road network and setting up of new health care centers to improve the overall health care facilities in the area. In addition, the impact of PMGSY roads on overall accessibility at regional level and habitational level access to health and schools, was quantified.

The Synthesis has been structured to include major themes of significance to the road sector, some of which are highly interlinked. Section 2 presents findings and lessons learned in a generalised fashion, whereas Section 3 presents specific conclusions and recommendations that are consistent with the contextual framework for the rural road sector programmes.

1.2 Evaluation Studies' Methodologies

The documents selected for the synthesis of Impact Evaluations are either relating to entire PMGSY programme, or rural roads impact and its benefits to social groups, specific socio-economic impact covering several states or single state over a certain time span. Some of the evaluations are conducted by the implementing agencies itself, while others are joint evaluations undertaken on behalf of State Governments by independent consultants or think tanks/ NGOs/ Academic institutions. In addition, a few of the studies focus on one or more cross-cutting issue, such as Gender and ascribed social groups and other on specific distributional pattern of socio-economic impacts on target population.

A detail of the data coverage and methodology adopted under each study has been summarized in Annex-1.

All the selected documents aim to present findings and elaborate lessons learned to help improve identification, preparation, appraisal, implementation, review and evaluation of on-going and future transport/rural road sector interventions. One evaluation focuses on quick concurrent evaluation of the PMGSY programme by comparing physical and financial performance rather than the impacts resulting from the interventions. Another evaluation emphasizes especially the magnitude and distribution of impacts of PMGSY on the target population and satisfaction level of road users. Most of the evaluations use case stories. While some of the evaluations are based on desk studies only, the majority of the evaluations include field missions with site visits, in-depth interviews and workshops with key stakeholders, e.g. ministry representatives, funding agencies, beneficiaries, implementing agencies, and non-state actors. While some evaluations include interviews of road users, others did not. Some evaluations include literature reviews of academic studies and analysis of previous evaluations.

These studies have predominantly used both 'before project' and 'after project' or double-difference approach involving project as well as control groups. Depending upon the data generated these studies have applied various qualitative and quantitative techniques for impact analysis. Data were generated through appropriate methods including

household level and community level interviews, participatory approaches, focus group discussions etc.

SECTION 2: FINDINGS AND LESSONS LEARNED

The results showed that besides roads, there are several other socio-economic factors, which affect village level activities in the field of education, health, and economic aspects. These factors lead to a high degree of inter-village differences. Although these factors are affected by road, this effect is gradual and indirect. It is also seen that these and the variables related to health, education and economic development are interrelated among themselves.

2.1 Impact on Agriculture

The construction of PMGSY roads has led to certain interrelated changes of varying magnitude in the agricultural and allied sectors, which have economically benefited the villagers through better transport system increasing accessibility to markets resulting in better trade and increased profit. The impact of the accessibility to market for agricultural products has been huge in the states of West Bengal, Himachal Pradesh, Mizoram, Assam etc. In addition, use of motorized equipment's for cultivation has increased leading to a more efficient, time saving and profitable process of cultivation and usage of chemical fertilizers, seeds and pesticides has increased in Uttar Pradesh, Himachal Pradesh, and West Bengal.

In Uttar Pradesh, it was found that with better agricultural practices, the production of various crops had gone up. It was observed that average production of paddy, wheat and other crops like pulses (urad, moong, arhar) & sugarcane had increased over the project period. There was found to be increased surplus of paddy and wheat in the village areas and improved access to markets fetched remunerative prices leading to higher incomes for respondent farmers.

The IIT study on Madhya Pradesh discovered availability of fertilizers and pesticides have increased with opening of new shops in the village and better access to such shops in the towns. In addition, there is increased use of improved implements in farming. The villagers perceive nearly 75 % increase in use of tractors, 69 % increase in use of threshers and 66% increase in other implements. The study revealed that there is a 270 % increase in the number of tractors in the survey villages and 1400 % fall in the number of bullock carts. There is also a case of increased extension services offered by Agricultural Extension Officers and Gram-Sewaks to the villagers. Not only this, representatives of agrochemical companies and others who work in the area of factor inputs, be it, high yield seeds, micro irrigation, etc have now started reaching their clientele directly. A gradual shift towards adopting or increasing croppage of cash crops after the roads come as their returns to the huge investment won't go fruitlessly without proper Mandi contact was also noticed. There is a direct and all weather contact with the Mandi's throughout the year. Many villagers changed their Mandi to another more profitable nearer ones. There was also a shift from using warehouses as mode of storage to homes. Leading to savings in amount spent as commissions.

The Andhra Pradesh study revealed that how improved connectivity can change the cropping patterns. The results showed that the percentage of change in cropped area after PMGSY for

cereals is 8.9, for pulses are -6.17 and for vegetables and fruits is -4.76. In the case of cereals 4.4 percent of households reported increase in use of fertilizers and 3.11 percent of households reported increase in use of improved seeds, 16 percent of households reported increase in production. In the case of vegetables increase in fertilizer usage is reported by 3.33 percent of households, increase in planting high yielding seeds is reported by 3.07 percent of households and increase in production is reported by 8.4 percent of households. Increase in the quantity sold is reported by 49.55 percent of households growing cereals, 20 percent of households growing pulses and 37.27 percent of households growing vegetables. Increase in average realized price is reported by 2.23 percent of households for cereals and 14.29 percent of households for vegetables. Households reported increase in the number of assets is 80 percent for tractor, 84.62 percent for water lifting pump set and 60 percent for other farm machinery.

The study undertaken by ILO in 2015[1] concluded that improved road connectivity in the rural areas have the impacted the cultivation choices and improvements in cropping patterns. The study has not found any major lose however the farming households had shown their concern on poor maintenance of the roads. Activities such as livestock and use of modern agricultural equipments were better in the habitations where roads are maintained as compared to their counterparts having poor maintained roads.

2.2 Impact on Industry:

An indirect impact on the industries was found in terms of easy access to raw materials, availability of commercial vehicles to transport bulk product to the markets etc. leading to economies of scale particularly in the state of Assam and Mizoram, pottery and brick making industry of Orissa, cottage industries of Tamil Nadu, Handloom industry of West Bengal and Agro industry in Assam. In Madhya Pradesh, industry has gained in getting more local labour. The study noted that there was an increase of provision shops, Cycle repair shops, PCOs, stationery shops, fertilizer shops and construction shop in the village habitations after the road construction.

2.3 Industry on Health:

There has been an overall improvement in the health sector with better access to the health facilities like PHC's, sub-centres and district hospitals. There had been increase in accessibility to preventive and curative health care facilities; better management of infectious diseases and attending to emergencies due to faster access to health facilities and increase in frequency of visits by health workers. Better access to antenatal and post-natal care and institutional lead to reduced obstetrics emergencies and infant and child mortality rate also decreased especially in the states of Orissa, Madhya Pradesh, Himachal Pradesh, Tamil Nadu, Uttar Pradesh and West Bengal. In Madhya Pradesh and Chhattisgarh, the reasons for rise in the safe deliveries; and, reduction in the maternal / pre-natal deaths were a) partly attributable to the project roads and b) partly to the increased emphasis on the counseling undertaken by the health worker in the village. In Uttar Pradesh, it was found that on an average, 1.78 visits of PHC team per month were reported in the selected villages and people in the villages under study were able to receive medical aid or other health related facilities faster after construction of the roads. Before roads were constructed, on an average, it used to take around 74 minutes to

[1] Impact Assessment Study of the Improved Road Maintenance System, International Labour Organisation (ILO), October, 2015

receive medical aid which has come down to 47 minutes once the road was built leading to a saving of 26 minutes in getting treatment. There were significant number of deaths were reported in the villages in the year before road construction in the absence of timely emergency care as the patient could not be taken to hospital due to lack of road connectivity. The Janani Express and in few cases, mobile hospitals ply to the villages in a very high frequency in the State.

In Andhra Pradesh, it was reported that PMGSY roads became an instrumental in changing in health scenario in general and female health status in the sample habitations. All weather pucca roads are available to Public Health Centre (PHC) in 86.67 percent of habitations, to govt. hospital in 80 percent of habitations and to private hospital/nursing home in 76.67 percent of habitations. In the case of maternity emergencies there is reduction in travel time to reach the nearest health facility in 80 percent of habitations. In the case of serious physical injuries or accidents there is reduction in travel time to reach the nearest health facility in 76.67 percent of habitations. In the case of other medical emergencies reduction in travel time to reach the nearest health facility is reported in 80 percent of habitations. 89.19 percent of the women have received pre-natal care before PMGSY road and cent percent after PMGSY road. 36.11 percent of the child birth took place in home before PMGSY road and after PMGSY road it is reduced to 30.23 percent.

In an another attempt by the Centre for Social Science, Pune which conducted the impact of rural roads in Maharashtra and Gujarat with case-control methodology found that the degree to which illnesses received medical treatment increased with the improvement in Road Type. The impact on birth rate, death rate and fertility rate was also observed to be positive. The children immunization was found to be very high (more than 90 per cent) in all blocks, irrespective of road type, mainly because of special immunization campaigns effectively implemented by the State Government.

The PMGSY effects on morbidity in Odisha revealed that the probability of an individual falling sick at all was lower by 0.036 per km of road and an individual's expected number of days of sickness was lower by 0.46 per km. The direct connections of about 3 km, long on average, which implies that the inhabitants of such villages have enjoyed an 11 percentage point reduction in the probability of falling sick and each of them, on average, 1.4 fewer days of sickness.

In terms of road maintenance, it was found that Habitations where roads are not maintained reported that connectivity gets affected during rainy season and some of these habitations become completely unconnected. Visit of doctors and health workers was found more frequent and regular in habitations where roads are better maintained. Some critical indicators on mother and child health were also found poor in the habitations where roads are not maintained.

2.4 Impact on Employment Generation:

An improvement in the employment situation in terms of more job opportunities, more avenues for self-employment, on-farm employment increased in states due to shift from cultivation of grains to cash crops and multiple cropping particularly in the state of Tamil Nadu, Madhya Pradesh and Mizoram. Non-farm opportunities like opening of shops, small

business, cottage industries have increased in the states of Himachal Pradesh, Madhya Pradesh, Mizoram, Tamil Nadu and Uttar Pradesh. Besides, road connectivity has led to expansion of local industries, which in turn generated varying employment opportunities in the post road phase from state to state.

In the specific study on Madhya Pradesh, it was found that 14 villages reported large number of workers working in the city in both industry and commerce after the road construction. More shopkeepers had emerged significantly as an alternate career in two villages and option of being transport workers has been popular in four of the sample villages. Almost all villages had people getting into jobs outside the village.

In Andhra Pradesh, 53.33 percent of the households reported improved employment opportunities in their main occupations. Households reported increase in total days of employment is 54.27 percent. Out of that 22 percent of households reported increase in the number of days of employment up to 50 days, 23.2 percent of households reported 51-100 days, 4.93 percent of households reported 101-150 days, 2.53 percent of households reported 151-200 days and 1.6 percent of households reported above 200 days. 2.8 percent of households shifted place of employment. After PMGSY road become operative 1.07 percent of households change their occupations.

2.5 Education:

There has been an improvement in the accessibility to education facilities resulting in increased school enrolment and school attendance in all the states especially girl children in the states of Assam, Madhya Pradesh, Orissa, Tamil Nadu and West Bengal. Other noteworthy impact has been in terms of regular attendance of the teachers through-out the year and inclination of parents to send boys and girls for higher studies and college education. The results have shown that these rural roads have not only encouraged teachers' attendance as well as the school inspections resulting in improving the academic performance of the students in the states of Madhya Pradesh and Chhattisgarh. In addition, there has been increase in number of schools after the construction of roads is better in habitations where roads are maintained. The Pupil Teacher Ratio (PTR) was found significantly better in the schools in those habitations where roads are better maintained.

Madhya Pradesh study results revealed that there is an increase of 83 college students, 171 higher secondary students, 429 high school students and 339 middle school students from the 36 village habitations who go to institutions outside their villages and who use the PMGSY roads. A large percentage of this increase was attributed to PMGSY roads, because there was sudden spike in the number of both male and female students after the road construction in many villages. The time taken for students to go to college or school has come down drastically. Availability of cycles had influenced more girls to take up schooling in distant schools especially in Mandla.

The Andhra Pradesh study reported that the PMGSY roads have boosted school enrolment for both male and female students. Literacy among people has increased by leaps and bounds. Schools and teachers have multiplied. 23.33 percent of the habitations reported increase in number of anganwadi centers, 6.67 percent of habitations reported increase in number of schools, 10 percent of habitations reported sufficient number of teachers in the schools, 13.33

percent of habitations reported regular provision of mid-day meals for the students, Enrollment in secondary school after PMGSY road is cent percent for boys & 97.44 percent for girls and in 96.67 percent of habitations there is an increase in number of children going to school, increase in number of girls going to school and improvement in attendance of students in the nearby schools during all seasons.

Similar results were also found for Maharashtra and Gujarat that type of road was found to be positively associated with adult literacy, level of adult literacy, attendance in school (whether the school is located within the village or not), and the level of education attained by children among the school going children. This association was found for both genders and was present for both BPL and non-BPL households. The association was more in hilly areas than in the plains. Although, it was not always statistically significant for the factors mentioned above, the direction was always positive.

2.6 Social Aspect:

Positive impact was seen in terms of better implementation of various government schemes & programmes, increase in the visits of grass root level functionaries like health workers/AMN, VLWs and VAWs and improvement in accessibility to the banks and post and telegraph facilities and police services resulting in maintaining law & order situation. Further, in the states of Madhya Pradesh and Chhattisgarh, it was observed that the per capita income and expenditure has increased resulting in the increased ownership of the movable property, while the ownership of immovable property has increased marginally over the survey period. The accessibility to the facilities such as health and education has improved with enhanced availability and use of mechanized transport modes. In addition, the study reported that there was an increase in the prices of Tier 1 land at the rate of 192% and that of the Tier II land 239% in Madhya Pradesh. Here Tier I is a nomenclature used for lands closer to the road or which are irrigated or either while Tier II refers to the lands away from the road or unirrigated or both.

The study in Uttar Pradesh reported that the expenditure of respondents on various heads had also increased which was reflective of their better socio-economic conditions. For instance: on average the expenditure on asset creation and on clothing increased by 319% and 69.2% respectively after construction of roads.

On the other hand, ILO study revealed that roads have contributed an increase of income for many households engaged in farming, trading, transport and other services. Most of beneficiaries reported how the roads constructed and maintained have helped in higher returns for them and at the same time, in control habitations, where roads were not maintained, the respondents expressed their unhappiness and anguish. Livelihoods of some of these people were threatened. Data also reflects that socio-economic status and quality of life of people as compared to pre-road period has significantly improved in the habitations whereas in control habitations, a slightly less proportion has reported improvements. Awareness on not only consumer items from markets but also on toilets and sanitation was found better in habitations having better maintained roads.

The Madhya Pradesh study undertaken by IIT, Madras showed that there is a great difference in rural governance and services after the villages got integrated with the wider network.

There is a 160% increase in the number of visits paid annually to the habitations by the Block Development Officer, 206% increase in that of Agricultural Extension Officer, 93% increase in that of Veterinary doctor, 435% increase in that of Village level worker (Gram sewaks), 172 % increase in that of Health workers or ANMs and 230% increase in the visits of ICDS-Anganwadi Supervisors.

The Madhya Pradesh results also revealed that there is also increased usage of modern technologies and materials like concrete and steel in the housing constructions and repairs immediately after the construction of the PMGSY roads as materials got easily available than before. The social relations are getting stronger as people visit their kith and kin more often than before and boys from the survey villages started getting more matrimonial enquiries from outside villagers who use to avoid them due to the isolated status of the villages before the construction of the road. There was reporting of the elimination of the activities of middlemen in three villages after the road construction.

In the state of Andhra Pradesh, the study results showed that the delivery of services and governance has been improved due to be PMGSY roads. House building sector is blooming with sanitation, water supply and electricity. Habitations with well-lit streets have become usual. There is a growing interest in building sanitary toilets and it reduced open defecation to certain extent. The roads have made it easy to go to Gram Panchayat office, Block office, police stations or any one of the administrative offices. The roads have strengthened Public Distribution System (PDS). Materials (food grains, sugar, kerosene and other ration items) have come within the reach of local people. Rural electrification has increased and it has made an impact on agriculture and other self-employment enterprises. Families constructed pucca houses in cent percent of habitations. In 76.67 percent of habitations more families constructed sanitary latrines. Better connectivity is reported by 73.33 percent of habitations to gram panchayat, 76.67 percent of habitations to block panchayat, 80 percent of habitations to district headquarters and to local police station. 10 percent of habitations reported increases in number of ration shops and 13.33 percent of habitations reported increase in the accessing of ration shops outside the habitation. Increase in the number of electricity connection is reported by 80 percent of habitations for household purpose, 63.33 percent of habitations for agricultural purposes, 16.67 percent of habitations for industrial/ commercial purposes and 80 percent of habitations for street lights.

2.7 Transport Facilities:

It has a direct impact on the mobility of the people living along the road side habitations and movement of goods to and from the villages thereby influencing the development of the village economy. An overall improvement in transport and communication facilities was observed in all the states under study. There has been an improvement in the public as well as the private transport system in all the states under study. In Madhya Pradesh, the daily number of vehicles on surveyed roads was found to have increased substantially and number of public transport modes has increased more than the other modes of transport. There was 421% increase in the numbers of 2-Wheelers and an actual increase of 1263 more 2 wheeler vehicles in the 36 village habitations. There was also an increase of 30 vehicles among 3-Wheelers and 58 among 4-Wheelers. Also, significant is the increase of 263 tractors and 271% increase from the stage before the construction and an abandoning of nearly 1407 bullock carts.

On the other hand in Chhattisgarh, there was an increasing trend of private transport (motor cycles), including switch over from the traditional bullock led tilling to the tractor led tilling, as many regions closer to the Narmada and mahanadi rivers were experiencing good agricultural growth reflecting in high growth of wealth (in the form of consumer durables like tractors, motor cycles, TV sets, etc.).

The study in Uttar Pradesh reveals that number of vehicles plying in all three selected districts under study has increased after the roads were constructed. On an average, an increase of 549% over the baseline traffic count was observed in case of motorized vehicles. The maximum number was found in case of bus traffic. As per baseline survey, on an average there were only two buses plying on these roads daily which has increased to 59 today. This certainly has implications for social and economic activities of the rural communities.

2.8 Urbanization:

An immediate direct impact of providing road connectivity is the trend towards urbanization of the area and rapid changes and diversities from traditional to modern systems. Beneficiaries in all the states mentioned that a trend towards urbanization has set in after the construction/upgradation of PMGSY roads such as states of Mizoram, Tamil Nadu, West Bengal reported conversion of kuchcha houses to pucca houses, increased land prices adjacent to the PMGSY roads, thereby, increasing the sale of land for commercial purposes.

2.9 Poverty Alleviation:

The average household income in all states had increased with the improvement of on-farm and non-farm employment opportunities as well as self-employment. Thus, better connectivity can result in a very successful poverty alleviation strategy. The Madhya Pradesh study found that there is a 93.95 % increase in the annual incomes of the villagers who are active in some occupation in the four districts. The increase in incomes of the villagers can be attributed in different ways for entrepreneurs and laborers. Farmers and shopkeepers have increased economic activity after the road construction. There is an increase in the quantum of transactions in the town markets due to more participation from the villagers of PMGSY connected roads. There is an introduction of new shops in the villages. Labourers are able to access nearby cities centre markets and find better employment opportunities in the industry and commerce there. In addition, labourers and even Govt. employees increased their employment days, thanks to the availability of daily commutability. The regularity of teachers and other govt. employees has been increased for work. For the labourers who got to work in NREGS, especially women, they got successful stint in such works, largely due to the increased transportability when NREGS works used to happen in distant parts of the village or outside the village. Many could save the costs of availing accommodation in the city when they are traveling daily to and fro from the work place today.

In Andhra Pradesh, Households have better dwelling unit, access to better sanitation facilities, and an increase in ownership of consumer durables. PMGSY road encouraged people to migrate to other places in search of better employment opportunities. Number of sample households engaged in agricultural activities is 331 and after laying PMGSY road 9.97 percent of the households reported increase in income from agricultural activities. There has been increase in average annual income due to principal occupation is reported by 71.73 percent of

households, increase in total average annual income in all occupations is reported by 72.53 percent of households, income level of the people is increased in 96.67 percent of habitations after PMGSY road become operative. Out of the 750 households surveyed in Andhra Pradesh, 727 are BPL households. BPL households reported improvement in their economic status is 78.13 percent. 22.27 percent of households have better dwelling unit, 19.07 percent of households have access to better sanitation facilities, 36.4 percent of households reported increase in ownership of consumer durables and 1.87 percent of households reported reduction in the migration. New enterprise/industry is set up in 6.67 percent of the habitations. PMGSY road encouraged people in 26.67 percent of the habitations to migrate to other places in search of better employment opportunities.

Figure 2.1 Flowchart shows the income impact of rural roads

The study on Maharashtra and Gujarat found that with improvement in Road Type, there was improvement in housing, various types of assets and incomes from all sources, especially from self-employment and services for BPL families and from agriculture in non-BPL families. The provision of road did increase incomes of BPL families from diary and agricultural labor, but he impact on total incomes was more for non-BPL than for BPL Households, underlying the

necessity of special economic interventions for BPL along with road improvement. The regression analysis for income showed significant association with variables connected with Road Type, frequency of public transport and ownership of private vehicles in three out of the four blocks.

2.10 Dairy:

The IIT study on Madhya Pradesh showed that Dairy has become bigger in areas where dairy farmers is producing at a commercial scale and catering to the private milk traders. Many of them have shifted to active milk processing units especially Ghee and Kobe in remote villages and have been selling them to the cities. To add to this, there is a 93% increase in the number of visits per years of the Veterinary doctor.

2.11 Economic Analysis:

IIM, Lucknow also carried out an economic analysis comparing the costs and benefits of the project roads to derive the ex-post economical rate of return in the state of Uttar Pradesh. This economic analysis of the investment of rural roads revealed that when construction, maintenance and renewal cost and benefits from vehicle operating cost (VOC) and value of time savings (VOS) were considered, the overall ERR of all 35 selected roads worked out to be 27%. On the other hand, besides VOC and VOS, if benefits arising out of non-farm enterprises and from marketed surplus were considered, the ERR worked out to be 36%. Whereas, if increase in passenger fare were included along with other benefits, the overall ERR worked out to be 28%.

The CSS, Pune study also highlighted that the benefit cost analysis conducted for Maharashtra and Gujarat indicated the importance of benefits of education and health, especially in the hilly areas and relatively backward region in the plains. Both these sectors contributed significantly to improve the benefit-cost ratio. They, however, do not make the ratio favourable in extreme situation of a long hilly road, connecting a remote small settlement. Very broadly, the rough break-even population of such a settlement (or a group of settlements along a common road) for a road of 6 kms appears to be around 500. Alternatively, there need to be conscious efforts to bring in more economic development by promoting horticultural or livestock based micro or group activities.

2.12 Travel time and Distance:

In Madhya Pradesh, the average distance travelled by the road users was found to have reduced as compared to the baseline situation. The average fare per km was reduced by about 11.5%, whereas the same had increased by about 5% in areas with poor connectivity. The average monthly transport expenditure of the users on the selected Project Roads had reduced by about 12% and that of other users with poor connectivity has increased by 3.16% over the baseline figures.

On the other hand, the IIT study on Madhya Pradesh found that there was on an average, a saving of 152 minutes per habitation to travel to the district HQ, 116 minutes to travel from habitation to Block HQ, 93 minutes to hospital, 86 minutes to the main bank of the habitation, 79 minutes to the market for provisions, 110 minutes to the market for household assets, 92

minutes to the fertilizer-pesticide shops, 91 minutes to the veterinary hospitals and 60 minutes to the bus stops.

The study on Uttar Pradesh revealed that there has been increase in the number of trips of a household to various places in a day after construction of rural roads. However, this has been accompanied by average increase of Rs. 0.20 per km in travel cost. This increase is the result of increased number of trips and also due to shift in the mode of transport. On the other hand, this shift in the mode of transportation has resulted in savings in travel time which is 1280 minutes per household per month.

In Chhattisgarh, while the average distance traveled by the road users on the surveyed roads has increased by 5.18%, it has reduced by 0.55% as compared to the baseline situation. The average fare per km has increased by about 2.77%, whereas the same has increased by about 6.33% on other roads with no improvement. The average monthly transport expenditure of the users has reduced by about 0.32% as compared to the baseline figures.

The ILO study revealed that the gains related to savings in travel time and costs to reach markets were lost to a large extent in areas where roads were not maintained. There has been an overall increase in income of the farming households due to many factors however respondents in control habitations have opined that transport cost, travel time and efforts have increased due to deteriorated road conditions.

2.13 Non-farm activities:

The IIM study on the three districts of Uttar Pradesh showed that with the construction of roads in rural areas the number of non-farm enterprises (purchoon shops, pan shops, tea stalls, telephone booths, vegetable shops, cycle repairing shops etc.) has also increased reflecting heightened economic activities in the connected villages.

2.14 Level of Satisfaction:

In Madhya Pradesh & Chhattisgarh, the results reveal that, generally, the villagers living in the areas served by the surveyed roads are more satisfied than those living in other areas in terms of levels of facilities relating to transport, health, education, agriculture etc. With regard to 'transport', 'micro enterprise', 'poverty alleviation' under Government Programs & Services and 'agriculture' facilities, there seems to be higher level of satisfaction to the villagers as indicated by the Focus Group.

In Uttar Pradesh, the user communities strongly agreed with the fact that construction of rural roads has resulted in improved accessibility of health care facilities, markets, educational institutions, and government functionaries, better availability of farm inputs, and has also facilitated in agriculture operations. In addition, the study also highlighted that the road users mostly disagreed with the some of the negative impacts of the rural roads such as loss of cultivable land, road-side degradation, increase in accidents, consumption of liquor, noise pollution, nuisance/robbery etc.

2.15 Access to information and technology:

The IIM study on the three districts of Uttar Pradesh further revealed that one of the major impacts of rural roads is improved accessibility of farmers to information and technologies.

Also, visits of the agriculture extension workers to villages increased due to faster commuting. The increased awareness lead to better agriculture practices, increased usage of soil testing facilities, adoption of and awareness about IPNM and IPM, balanced use of fertilizer and use of organic manure.

2.16 Observations of the Planning Commission Study:

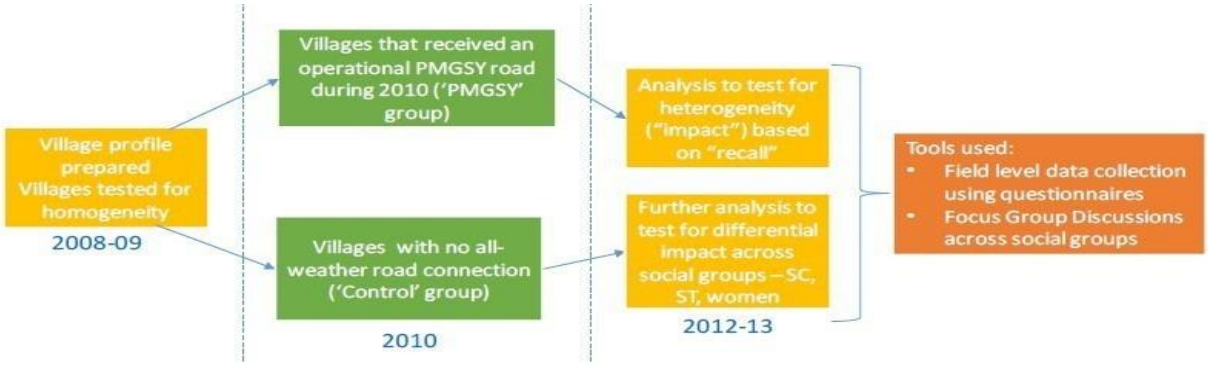
The study compared physical and financial performance of the selected states and the districts and the expenditure incurred per kilometer of road construction at the state as well as at the district level. The study also observed that estimates prepared under PMGSY are rather on higher side as these are not prepared on the basis of ground position of a particular road but usually on the basis of standard norms, available with the State Public Works Department and in some cases, estimates have been found to be higher than the actual expenditure.

It also found that the second tier of quality monitors i.e. SQMs were not effectively working in some of the states. The major reasons for shortfall included long procedural impediments passing through a number of channels for approvals, time consuming process and adjustment to new work culture for contractors, non-availability of land on time, non-involvement of local panchayats resulting in disputes especially in Uttar Pradesh, delays on account of Monsoons and due to adverse climatic conditions in the hill States like Himachal Pradesh; and scarcity of labour & material in Maharashtra and West Bengal respectively.

The study established that PMGSY has succeeded in providing connectivity to some of the most deserving habitations although the pace of implementation in most of the selected States is rather slow. Selection of these road works seem to be justified, unless one gives a high weightage to the opportunity cost in terms of road works forgone in other Districts/other States. The cost of providing connectivity for some of the habitations in States like Himachal Pradesh is very high due to difficult terrain.

2.17 Impact by Gender and ascribed Social Groups:

The Poverty and Social Impact Assessment i.e. "An assessment of distribution of PMGSY project benefits in three states (Jharkhand, Himachal Pradesh and Rajasthan) by gender and ascribed social groups" was undertaken by the World Bank in 2014. The assessment was focused on two aspects of the PMGSY program (i) emphasis on new/additional gainful employment and economic opportunities, as opposed to other forms of benefits, and (ii) distributional concern related to whether women and members of SC, ST and OBCs have been able to exploit such opportunities or not. The study adopted a quasi-experimental design approach shown below:



The key findings of the study are:

- **Effects on villagers' employment and occupational choices**:
  - New/ additional employment and business opportunities are being generated.
  - Time saving due to new connecting road is resulting in better access to employment and business opportunities.
  - There is a shift in distribution of primary source of income from cultivation and self-employment to unskilled wage labor.
  - There is a shift away from cultivation and livestock towards unskilled work in Rajasthan.
  - There is a movement towards 'specialization' in economic activities, i.e. a reduction in percentage of households reporting secondary and tertiary sources of income in both PMGSY and control villages.
  - There is a shift in cropping patterns in Jharkhand and Himachal Pradesh.

- **Extent to which these shifts yield higher or more regular income**
  - Easier travel was the most reported category in terms of main benefits.
  - Agricultural activities and unskilled labor followed by business opportunities ranked the most by PMGSY beneficiaries.
  - A majority in all three states reported higher but not more regular incomes than before.
  - In Jharkhand and Rajasthan, these gains in income were realized mostly through direct movements; but these played a much smaller role in Himachal Pradesh. There is also a role for complementary action, in the form of both private investment and public intervention, in how the respondents got access to, and were able to exploit, these opportunities.

- **Extent to which these shifts vary across groups (women, SC, ST and 'others')**
  - Female respondents had a comparatively dim view of new employment and economic opportunities in PMGSY villages at about 45 percent.

- Members of the SC group felt themselves excluded, and the rest concurred with their view.
- Focus group discussions revealed that `other castes' and `others' were the chief beneficiaries, and that SCs and STs the main non-beneficiaries.
- The majority of those who were female, members of the SC and `other' groups or with little schooling claimed not to have benefited themselves.

- **Enabling factors and main obstacles that prevent weaker groups from exploiting the more attractive possibilities and sharing more fully in the benefits**

  - Among those who benefited, females attributed complementary investment and local demand for enjoying the benefits whereas male household heads largely attributed it to direct movement.
  - The role of direct movement was prominent among OBC and ST groups.
  - The main reason for failure of non-beneficiaries to benefit from opportunities was the lack of complementary policies.
  - Women put the chief blame on their households' lack of productive endowments, naming especially the lack of skills.
  - The villagers' engagement in the planning and building of their PMGSY roads was weak though there were some differences among states.

- **Policy and programmatic alternatives that could shift the distribution of benefits in favor of these groups**

  - Respondents in the PMGSY villages emphasized the need for 'complementary policies', which need to be packaged and tailored to the situation of each state, and by gender and caste.
  - Complementary policy would help in improving access to credit, training, as well as opening up opportunities close to villages through sectoral policy interventions.
  - Better integration of existing schemes such as MNREGA and NRLM is needed to draw out the synergies between them.
  - Greater community participation and awareness building is needed regarding type of employment and economic opportunities triggered by PMGSY through for example better coordination between departments.

- **How changes in policy are to be achieved in practice**

  - Investing in training programs for skills upgradation/awareness building especially for women to exploit new opportunities within the village, e.g. in preparing semi-finished goods, processing of agricultural outputs, etc. (supply side interventions).
  - Investing in creating local and nearest market centers, e.g. small towns, etc. (increasing local demand).

- Complementary actions to promote the availability of credit/insurance including credit to microenterprises (mainly from the private sector).
- Complementary actions to promote the availability of suitable infrastructure, e.g. infrastructure linked to agriculture equipment, infrastructure for grain storage, etc. (mainly from the public sector).
- Complementary action to support transport services.
- Using PMGSY as an 'integrator' of various schemes such as NRLM and MNREGA to better link the benefits of the scheme and promote community participation.
- NRRDA to take a leading role in improving co-ordination among the various departments by, e.g. inviting officers of the departments involved to take part in the transect walk.

In another study on Gender, it was found that PMGSY roads have empowered women to participate in decision making, live healthier and better life, and participate in social and political activities which were not possible earlier. These roads have contributed significantly in improving the overall lifestyle of rural people and they feel happier compared to the days when they lived without any pucca road in their village. The study has revealed that the PMGSY road has significantly contributed in women empowerment. The access to better education and medical facilities has enhanced their living condition. Women's participation in financial decisions has increased and it is reflected in their market accessibility. Now mothers from these villages have started even attending parent-teacher meets in their children's school and this has given them opportunity to be part of decision making related to their children's education.

Though the study did not attempt to quantify the direct financial benefit that women might have got in terms of employment, it is clear from the study that women believed that the PMGSY road has led to economic prosperity in the area and they are beneficiary of this prosperity.

2.18 Distributional Pattern of Socio-Economic Impacts

A detailed study to understand the magnitude and distribution of impacts of PMGSY on the target population and to assess the satisfaction level of road-users was undertaken for ten states such as Assam, Bihar, Himachal Pradesh, Karnataka, Mizoram, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal. The study also undertook assessment of the distributional pattern of socio-economic impacts on targeted population and respective habitations where PMGSY roads are constructed in comparison with other habitations and the level of satisfaction derived in the use of PMGSY roads by the villagers against given set of indicators.

The indicators assessed for the double-difference analysis included changes in the occupation profile of respondents, changes in the type of medical assistance received during child birth, accessibility to various types of vaccination for children, migration pattern to urban centres, dropout rates in schools and availability of various facilities within homestead, etc. The major findings of the double-difference analysis compiled for all ten states are as below:

Double-Difference Results for Major Indicators: All States:

Analysis of the compiled data of ten states showed that the percentage of population who were occupied in the field of *trade* and *business* had been comparatively higher in connected habitations. Similarly, the changes in the percentage of *agricultural labourers* in connected habitations were higher than that of unconnected habitations. The percentage of people who were unable to find a job also found to be decreasing in connected habitations till during the mid-term impact assessment period and afterwards a marginal positive change noticed in the percentage of unemployed population in connected habitations. Another major impact was observed in the access to and assistance from *private medical institutions* and *practitioners* during the time of child birth and also as a consulting place for usual treatments. Dropout rates in schools have been comparatively lower in connected habitations during the final-term impact assessment period. The availability of latrine facility within homestead, which is seen as a progressive development indicator, has been increasing in connected habitations (**Table 2.1**).

Table 2.1: Results of Double Difference Analysis: All States

[Situation in Habitations with Connectivity (Tyep1) with respect to Habitations without Connectivity; Figures in parentheses shows the situation in Type3 Habitations with respect to Habitations without Connectivity]

Indicators	Unit	2007-2009	2009-2010	2010-2011	2007-2011
Trade and Business	Changes in the % population	1.66	-0.59	-0.34	0.73
		(0.46)	(0)	(-1.0)	(-0.54)
Agriculture Labour	Changes in the % population	0.5	1.05	-0.32	1.23
		(-0.13)	(1.73)	(1.22)	(2.82)
Unemployed	Changes in the % population	-0.73	0.57	0.80	0.64
		(-0.02)	(-1.66)	(0.80)	(-0.88)
Assistance from private doctor during child birth	Changes in the % population	-1.2	1.7	-0.58	0.08
		(0.6)	(1.9)	(-2.34)	(0.16)
Assistance from village lady during child birth	Changes in the % population	-0.6	-1.9	0.48	-2.02
		(1.3)	(4.8)	(-5.86)	(0.24)
Children received BCG vaccination	Changes in the % children	3.14	12	-8.32	3.68
		(-7.74)	(8.53)	(-8.46)	(0.07)
Children received injection to prevent measles	Changes in the % children	2.99	10.98	-8.69	2.29
		(-9.19)	(7.31)	(-6.70)	(0.61)

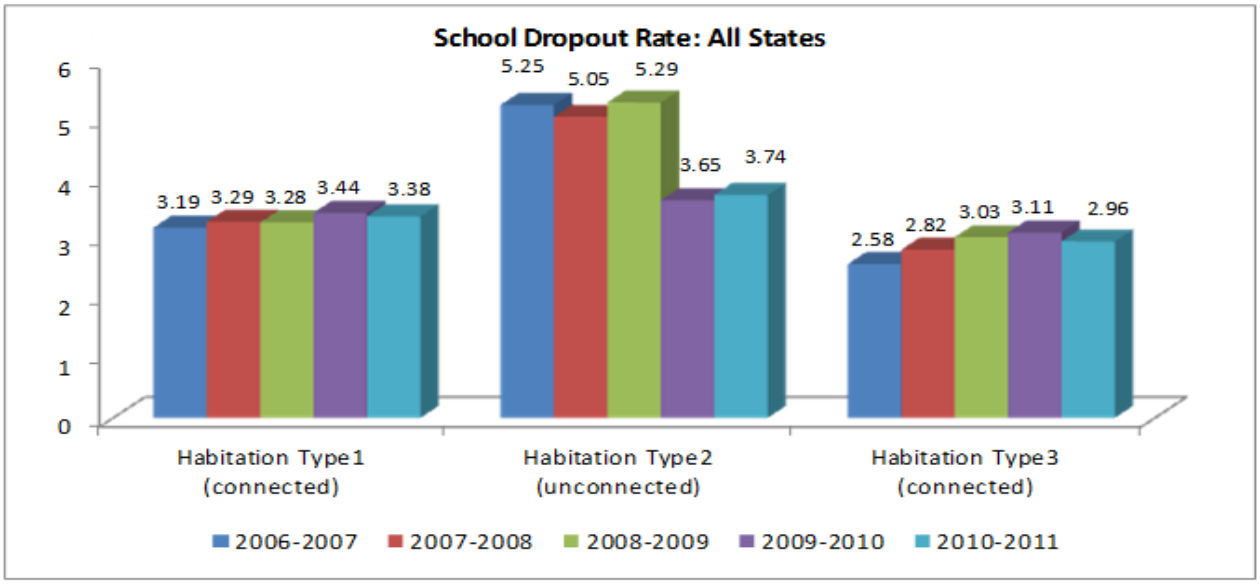
Indicators	Unit	2007-2009	2009-2010	2010-2011	2007-2011
Children received vaccination during pulse polio campaign	Changes in the % children	3.09	10.22	-6.89	3.33
		(-7.03)	(7.68)	(-12.46)	(-4.78)
Private medical institutions for usual treatment (female)	Changes in the % women	5.24	-0.48	-1.99	2.77
		(4.05)	(5.06)	(-5.92)	(3.19)
Dependence on traditional medical facility for usual treatment (female)	Changes in the % women	-0.44	0.61	0.46	0.63
		(0.15)	(-0.88)	(1.70)	(0.97)
Dropout rate (difference in % change)	Changes in the % of children discontinued to total number of children	-0.9	2.3	0.2	1.5
		(-0.3)	5.2	(-4.7)	(0.2)
Availability of latrine facility within homestead	Changes in the % households	1.77	-1.64	-0.6	-0.47
		(4.44)	(1.8)	(1.7)	(7.94)

Source: Estimates based on data provided by Development and Research Services Pvt Ltd (DRS)., GfK Mode Pvt Ltd (GfK)., AMS Consulting Research Training (AMS) and Santek Consultants Pvt Ltd (Santek).

Impact on Employment: During the mid-term impact assessment period (2010), connected habitations have witnessed a positive change in the percentage of employed population; 1.68 percent more people has been able to find employment for more than six months a year. During the survey period from 2007 to 2011, 0.73 per cent more population engaged in Trade and business 1.23 per cent more population engaged as agriculture labourer in connected habitations in comparison to habitations without all-weather connectivity.

Changes in School dropout rate: The data collected at village level from schools showed that the dropout rate (percentage of children discontinued in the age group 6-14 with respect to total number of children enrolled in primary schools) in schools was lower by 28 percent in the connected habitations type1 than that of unconnected habitations. The dropout rates in the connected habitations type3 has been lower by an average rate of 37 percent compared to unconnected habitations.

Figure2.2: Dropout Rate in Schools: All States (2007 To 2011)



Impact on Household Income: The data was analyzed to observe the mean, median and mode level of income in respective habitations for all the states. Analysis of the average monthly household income showed that the income level in connected habitations was not only higher but have grown faster than that of unconnected habitations. During the assessment period 2007 to 2010 (mid-term), the mean income of the household has increased by Rs.2541 in connected habitation type1 and that of connected habitation type3 has increased by Rs.1360, which is higher than the increase of Rs.793 in habitations without connectivity. The final-term assessment (2007 to 2011) showed that mean income of the household in connected habitations, type1 and type3 increased by Rs.2554 and Rs.914 respectively, while that of unconnected habitation increased by Rs.507 (Table 2.2). The monthly household income in connected habitation type1 increased by an average rate of 17 percent per year in habitations type1, whereas the same increased by 7 percent and 4 percent in habitations type3 and type2 respectively.

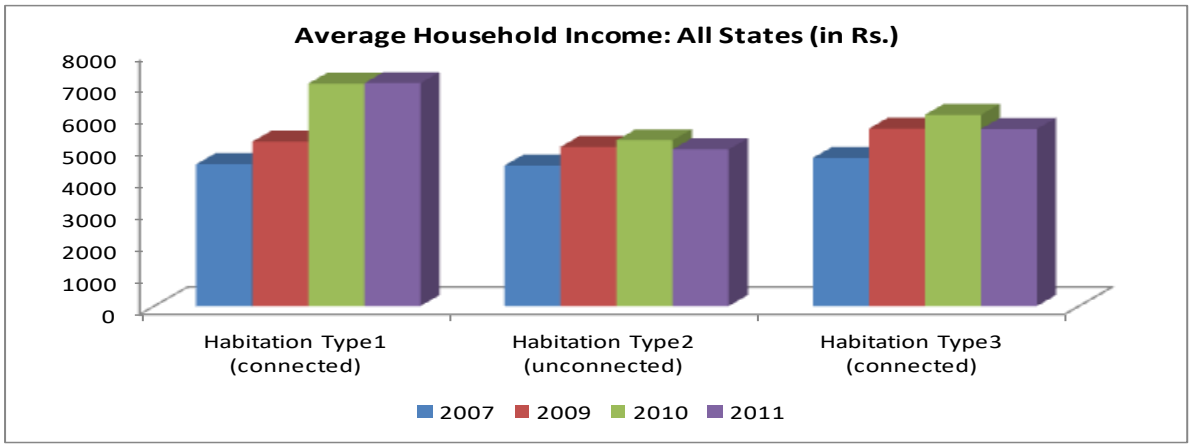
Table 2.2: Mean Median Mode Estimates of Monthly Household Income: All States *(in Rs.)*

Category	Habitation (Type-1)			Habitation (Type-2)			Habitation (Type-3)		
	2007	2009	Change	2007	2009	Change	2007	2009	Change
Mean	4466	5176	710	4428	5014	586	4663	5585	923
Median	3000	3500	500	3000	3500	500	3300	3600	300
Mode	3000	3000	0	3000	3000	0	3000	3000	0
Category	Habitation (Type-1)			Habitation (Type-2)			Habitation (Type-3)		
	2009	2010	Change	2009	2010	Change	2009	2010	Change
Mean	5176	7006	1831	5014	5221	206	5585	6022	437
Median	3500	4000	500	3500	3500	0	3600	3875	275
Mode	3000	3000	0	3000	3000	0	3000	3000	0

Category	Habitation (Type-1)			Habitation (Type-2)			Habitation (Type-3)		
	2007	2009	Change	2007	2009	Change	2007	2009	Change
Category	Habitation (Type-1)			Habitation (Type-2)			Habitation (Type-3)		
	2010	2011	Change	2010	2011	Change	2010	2011	Change
Mean	7006	7020	14	5221	4935	-286	6022	5577	-445
Median	4000	6000	2000	3500	4000	500	3875	4000	125
Mode	3000	5000	2000	3000	4000	1000	3000	3600	600
Change Observed During Mid-Term Impact Assessment Period (2007-2010)									
Category	Habitation (Type-1)			Habitation (Type-2)			Habitation (Type-3)		
	2007	2010	Change	2007	2010	Change	2007	2010	Change
Mean	4466	7006	2541	4428	5221	793	4663	6022	1360
Median	3000	4000	1000	3000	3500	500	3300	3875	575
Mode	3000	3000	0	3000	3000	0	3000	3000	0
Change Observed During Final-Term Impact Assessment Period (2007-2011)									
Category	Habitation (Type-1)			Habitation (Type-2)			Habitation (Type-3)		
	2007	2011	Change	2007	2011	Change	2007	2011	Change
Mean	4466	7020	2554	4428	4935	507	4663	5577	914
Median	3000	6000	3000	3000	4000	1000	3300	4000	700
Mode	3000	5000	2000	3000	4000	1000	3000	3600	600

Source: Estimates based on data provided by Development and Research Services Pvt Ltd (DRS)., GfK Mode Pvt Ltd (GfK)., AMS Consulting Research Training (AMS) and Santek Consultants Pvt Ltd (Santek).

Figure 1.3: Average Household Income: All States (2007 to 2011)



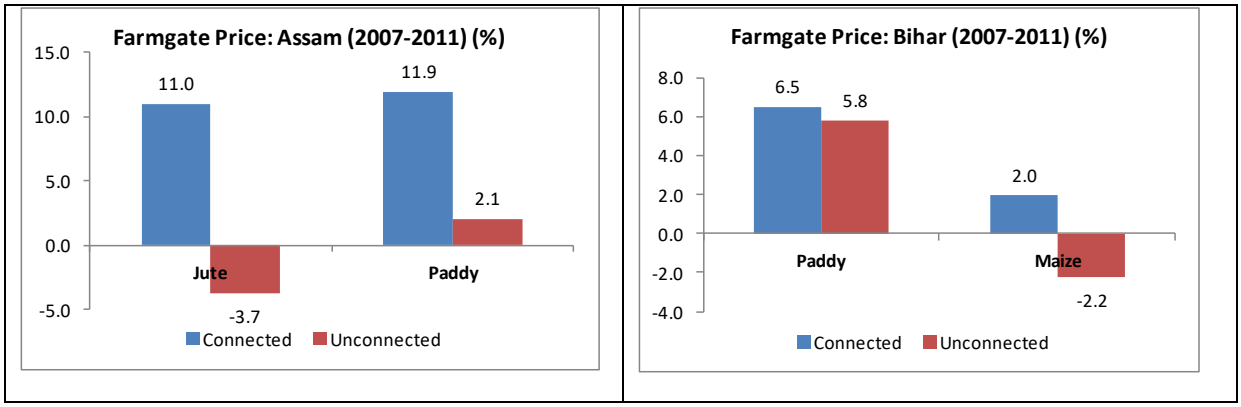
Source: Estimates based on data provided by Development and Research Services Pvt Ltd (DRS)., GfK Mode Pvt Ltd (GfK)., AMS Consulting Research Training (AMS) and Santek Consultants Pvt Ltd (Santek).

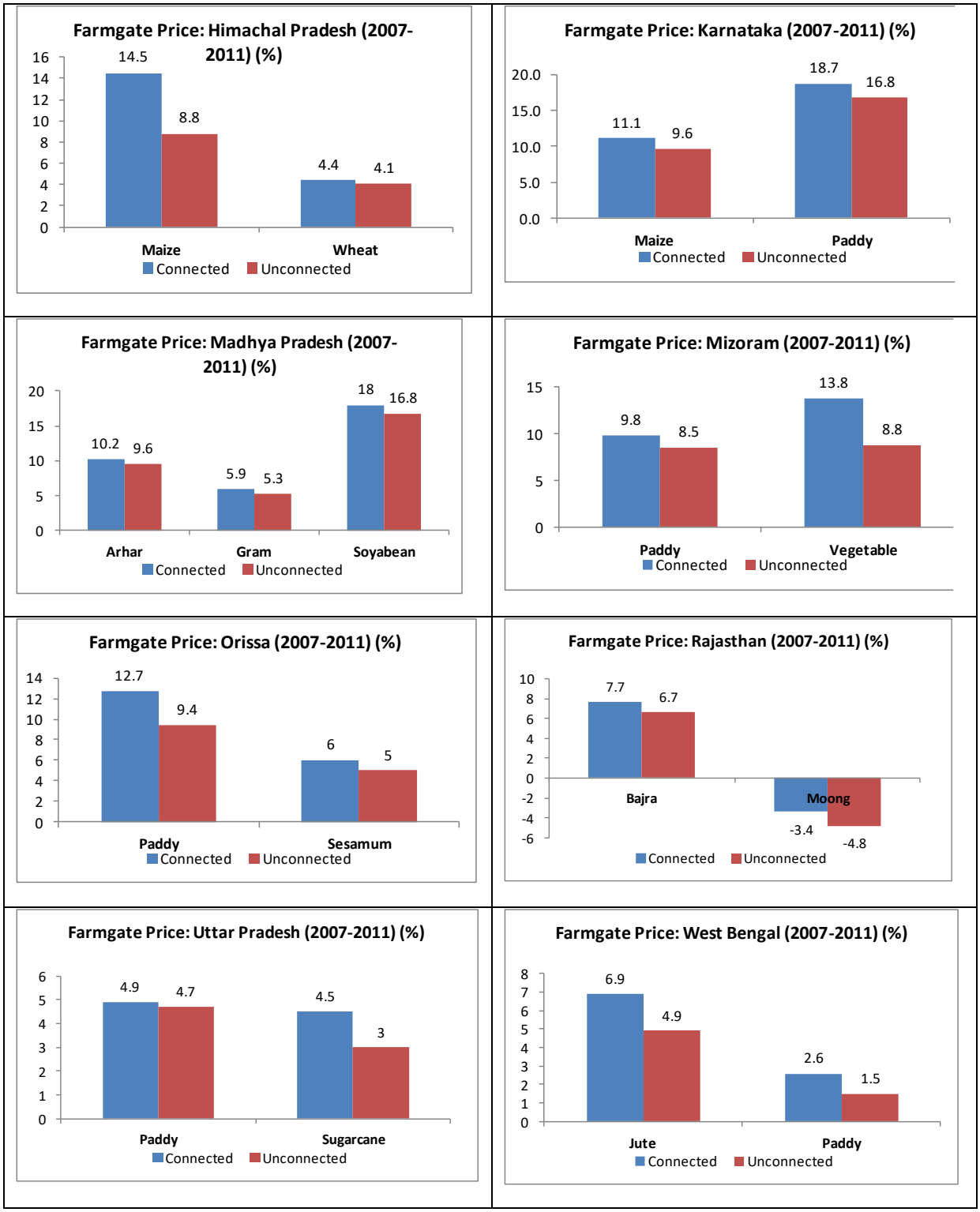
Medical assistance during child birth: The dependence on more progressive form of medical assistance was observed in the case of connected habitations, during the assessment period, 2007 to 2011. The percentage of population depending on private medical practitioners during the time of child birth was consistently higher in connected habitations. Final-term assessment data showed that in connected habitations type1, the percentage of population depended on private medical practitioners was higher by 16 percentage points compared to that of unconnected habitations; and in connected habitations type3 the same was higher by 64 percentage points compared to unconnected habitations. Moreover, the dependence on traditional medical facility has been decreasing in both the types of connected habitations.

Migration to urban centres: The extent of migration to urban centres for livelihood had undergone changes with the all-weather road connectivity. Temporary migration improved at an increasing rate in habitations with connectivity replacing the tendency of population to migrate permanently. During the mid-term impact assessment period (2007 to 2010), both the types of connected habitations in Karnataka and Madhya Pradesh and connected habitation type1 alone in states such as Himachal Pradesh, Orissa, Rajasthan and Uttar Pradesh, have shown a decreasing trend in permanent migration. The percentage of population who permanently migrated to urban centres was found to be lower by 2 percent (in Rajasthan) to 47 percent (in Karnataka) in connected habitations type1. The final-term impact assessment result showed a distorted trend; percentage of population temporarily migrated to urban centres reduced in all types of habitations.

Agriculture: The farm-gate price received for various agriculture crops in connected habitations was comparatively higher than that of unconnected habitations. Difference in the percentage points of farm-gate price for respective crops in 10 states has been presented in Figure 2.4.

Figure 2.4: Farm Gate Price in Habitations With and Without Connectivity





Source: Estimates based on data provided by Development and Research Services Pvt Ltd (DRS)., GfK Mode Pvt Ltd (GfK)., AMS Consulting Research Training (AMS) and Santek Consultants Pvt Ltd (Santek).

Major Observations: Road User Satisfaction: The level of satisfaction in using the road was assessed on the basis of four major factors, viz., reliability, transit time, connectivity and user-friendliness. These factors are subdivided to form various positive and negative statements

which included indicators representing road characteristics as well as non-road characteristics. The satisfaction level was assessed basically on three levels, viz., 'low', 'medium' and 'high'. Gradation of the indicators of user satisfaction was done using ANOVA test. The test results showed that the reduced transit time perceived in terms of road characteristics remained to be the most favoured aspect in both the types of connected habitations throughout the assessment periods. User friendliness (non-road) has been observed to be the next best aspect of user satisfaction throughout the survey assessment periods except in 2007 for connected habitation type3. This implies that there has been consistent improvement in the number of service vehicles plying through PMGSY road and revealed the satisfactory record of road maintenance. Another major aspect of user satisfaction such as reliability (road) conceptualised assimilating the all-weather feature of the road had scored third rank in most of the assessment periods in both the types of connected habitations. This implies that in the later years of connectivity the roads require additional attention in order to retain the all-weather feature as originally conceived for the programme.

2.19 Impact on Accessibility in Rural Areas:

In Rajasthan, the findings of the study on accessibility revealed that at the regional level, accessibility varies with population density. Higher the population density, higher the accessibility and in contrary for less population density regions accessibility is low. Total road length required for connecting habitations and the population density were inversely related, i.e., if the population density was high, lesser length of road construction was required to connect the habitations. Block-wise analysis of all the five districts showed that the construction of PMGSY roads has substantial impact on improving over-all accessibility ranging between 9.1 to 32.07% where as the District-wise analysis showed that the impact is ranging between 17.81 and 21.16%. From the individual travel behavior, it was observed that people walk if the distance is less than 2.5 km. If the individuals travel for more than 2.5 km to reach health care they use car, taxi or public transport and sometime cycle. From travel data collected to reach high schools it has been observed that the maximum distance travelled to reach a high school in Alwar district is 5.3 km and Bikaner is 11.9 km. It was also observed that with distance the number of patients visiting a health centre decreases gradually

It has been noted from the study that PMGSY roads have high construction and maintenance quality when compared to other village roads. The construction of PMGSY roads based on population criteria as used in PMGSY programme lead to the overall increase in accessibility in region. However, the impact was more in areas with high population density.

2.20 Negative Impact:

The Madhya Pradesh study also revealed some of the negative impacts of the roads on people and environment in the form of increased sand mining, severe deforestation and one case of drainage problem in a road side habitation. In Mandla, villagers noticed more cutting down of the trees and illegal sand minding of their rivers after road opened up roads for the people from outside to plunder their natural resources.

Based on perception of respondents, impact of construction/upgradation of roads on different sectors in ten states is summarised at Annex-2.

SECTION 3: CONCLUSION AND RECOMMENDATIONS

Whereas Chapter 2 mostly presents generalized findings and lessons learned, this Chapter presents specific conclusions and recommendations within the over-all contextual framework of the Synthesis Report.

3.1 Conclusions

The overall study has explored the socio-economic impact of PMGSY road connectivity on the inhabitants of respective habitations. There is evidence that with respect to many socio-economic parameters such as, travel time, occupation pattern, access to formal medical assistance, migration to urban centres, access to and possession of various household amenities and development of local amenities, habitations with all-weather connectivity are in a relatively advantageous position. It is also noticed that during the final-term impact assessment period (2011), the intensity of impacts are relatively less compared to previous assessment periods. This is mainly attributed to the upcoming of and increased accessibility to all-weather connectivity in habitation type2 (unconnected) scenario.

Heidelberg Study (2015): It was found that the provision of all-weather roads reduces morbidity and mortality, provided the sick receive moderately competent treatment upon arrival at a PHC or hospital. However, longer term effects on morbidity may deviate from the current estimates in the study. More frequent visits for preventive care, such as immunisation, is one hope; better nutrition from higher incomes is another; and over the long haul, there is the prospect that girls will reach motherhood better educated.

BITS, Pilani Accessibility Study (2016): It recommended that policy decision makers may use the quantification techniques proposed in study before making any major investments for enhancing accessibility in a region. The priority list obtained using PMGSY and IDA indicators may be used for improving accessibility in less accessible regions. The need-based approach developed for connecting habitations with small population can help policy makers to achieve total accessibility with optimized cost. It also suggests the kind of surface to be provided for each link. The study also identified areas for further detailed investigation including:

- Accessibility to all the sectors to which rural individuals travel to meet their needs couldn't be quantified and a composite level of accessibility for each habitation separately.
- Indian rural health care infrastructure system comprises of three tier system includes Sub-center, Primary health care center and Community health care center. A composite accessibility for health sector may be determined.
- A sensitivity analysis could be undertaken by considering the threshold distance with respect to development and geographical characteristics of the region.
- The need based approach developed has been applied to the plain terrain area. There is scope to study the applicability of this method in hilly regions, to check its robustness.

PMGSY has ushered in all round development in rural areas of almost all states studied.

3.2 Recommendations

MPRRDA (2010): The villagers in Madhya Pradesh suggested convergence of PWD and SGRY Roads with PMGSY, so that the former two does not make the mission of PMGSY roads incomplete. There is also demand from villagers to connect more roads among PMGSY roads and PMGSY roads connecting villages lying in the border of two or three districts, blocks or Tehsils. In addition, a strong need of providing public transport connectivity was highlighted including tax and permit exemptions for share autos plying to the habitations and encouraging more four wheeler ownership in the habitations.

BITS, Pilani study on Gender (2015): The study suggested that people's participation at the planning level should be ensured to assess the utility of the road and local population should get employment opportunity during the construction and for maintenance of the road. Local people's satisfaction on the quality of construction should be made a part of assessment before the final payment is made to the contractor. In addition, Regular maintenance of the road should be certified by a village committee and this may be made a pre-condition for the release of fund.

It recommended that where ever the road passes through the village and it is made concrete, pavements should also be made pucca to add life to the road and avoid any accident. Drainage system should also be created alongside the road inside the village. Trees should be planted alongside the road and maintenance responsibility should be given to the villagers. Rural transport mechanism should be evolved with the help of state transport department or cooperative transport system may be encouraged. Drinking water facility and toilets may be provided in populated area.

Planning Commission (2005): To overcome the constraints in implementation of the programme, the study recommended the following:

- Suitable cash compensation package under PMGSY to ensure timely availability of land for providing new rural roads connectivity to unconnected habitations
- Speedier Identification of Unconnected Habitations with population norms under PMGSY to complete the targets
- Need for constitution of Vigilance Committees in all states to ensure effective working of the monitoring system
- Periodic updating of online information in all states
- To maintain the prescribed limit fixed under PMGSY for incurring expenditure on roads to be upgraded
- Complete involvement of Panchayat Institutions and conduct of transect walks
- Enhancement of Time Limit for Completing Projects due to onslaught of monsoon and hostile weather in hill States
- Need for Centralised Tendering System
- Project Reports/Proposals to be Prepared Meticulously and due diligence by the approval authorities.
- Multiplicity of Agencies to Be Avoided to avoid time and cost overruns.
- Exclusive Staff Deployment for PMGSY
- Need for Recruiting Local Labour
- Need for Lowering the Construction Cost of Roads

South Asia Sustainable Development Unit, The World Bank (June, 2014): The study suggested that for inclusive growth, public infrastructure projects would require policy and design alternatives through complementary interventions by both public and private sector. It also highlighted that given the strong links between small towns and rural areas, it is important to ensure small town growth and policy biases (such as access to basic infrastructure) which in turn will subsequently help in increasing potential earning options for connected village populations.

ILO Study (2015): The study recommended development of a strategic framework to help guide the State Governments for investing in maintenance to take advantage of the potential of rural roads development to accelerate social and economic development of rural areas in a sustained manner. This framework shall consist of many critical areas for strategic interventions. Effort should be made to involve the Gram Panchayats for management and maintenance of rural roads. This will not only develop ownership of the road assets but will also make them more responsible and accountable. Involvement of local communities and strategic interventions by the States will not only secure the assets but also multiply the positive impacts of rural roads and unleash the potential of rural India to harness their power for developing a strong nation.

ANNEX-1 (TO APPENDIX-I):

METHODOLOGY ADOPTED BY IDENTIFIED STUDIES

S.No.	Publisher	Data Coverage	Methodology
1.	Centre of Studies in Social Sciences, Pune	The study was conducted in two states of Maharashtra and Gujarat. Two blocks from each of the two states were selected and each block having 110 villages on an average and a village has an average population of 1800 (about 350 households)	Adopted case-control methodology. Along with review of existing literature, the study also collected primary data through households surveys, individual interviews and focus group discussions at the village level as well as at the household level. On the basis of this information, indicators of development were prepared for each village and group of villages. The relationship among these indicators and road connectivity was established. All villages are grouped into three Road Types: "No Road", "WBM Road", "BT Road". For each block, for each indicator, the arithmetic means are calculated for each of the three Road Types. The differences among the three means for each indicator were then, examined for statistical significance with Analysis of variance (ANOVA) using F-test. As the four block varied among themselves significantly, the analysis was conducted separately for each block, with statistical tools of analysis of Variance and Regression analysis. Further, the road connectivity was also defined by considering the four related variables- Road Type,

S.No.	Publisher	Data Coverage	Methodology
			Distance from Town, Frequency of Public Transport and Number of Private Vehicles in the villages. Since all these four variables are related with each other, they were combined in two "Factors" by using Factor Analysis with varimax rotation which was conducted separately for each block. Some of the aggregate indicators on education and economic aspects were then regressed on these factors and other independent variables.
2.	Ministry of Rural Development (Monitoring Division)	Assam, Himachal Pradesh, Madhya Pradesh, Mizoram, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. The study was to be conducted in two to three habitations along each selected road. Among them, one of the habitations should have at least 1000 population in case the road lies in the plain area, 500 population and above in case of hilly areas and at least 250 population in case of desert areas.	Data / information were collected by using both qualitative and quantitative research methods. The research methods / tools were focus group discussions (FGDs), Case Studies, In-depth Interviews (IDI) and Structured Schedules /Checklists.
3.	Planning Commission	The study covered ten states i.e. Tamil Nadu, Karnataka, Rajasthan, Maharashtra, Himachal Pradesh, Uttar Pradesh, West Bengal, Madhya Pradesh, Haryana and Punjab and a total of fourteen districts one in each of these states was selected for the micro-level study.	The evaluation methodology included a combination of collection of data from primary sources through designed set of questionnaires, secondary data from various reports and articles and interview of the beneficiaries of rural connectivity and concerned officials. The study compared physical and financial performance of the selected states and the districts and the expenditure incurred per

S.No.	Publisher	Data Coverage	Methodology
			kilometer of road construction at the state as well as at the district level.
4.	IIM, Lucknow	The study covered three districts – Kanpur, Raibarelly and Pratapgarh of Uttar Pradesh and household surveys were carried out on a sample of 35 roads, total of 72 villages and 541 households.	Apart from household survey, user opinion survey, focus group discussions and traffic count formed part of the data collection exercise. Using structured questions, the respondents' perceptions regarding 20 dimensions of rural roads were measured on 5-points Likert Scale.
5.	Asian Development Bank (ADB)	State of Madhya Pradesh and Chhattisgarh through ADB funding of Rural Roads Project I	The study involved multi-year surveys over a period of three years i.e. 2005-06 to 2007-08 using before-after-with and without approach by conducting baseline surveys and monitoring surveys after implementation. The assessment was undertaken through the use of six Survey instruments i.e. first two (traffic census count and transport user survey) were used to assess transport related impacts; the 3rd (village perception), 4th (village primary data –key informants) and 5th (village primary data – community self-monitoring) instruments concerned village level information/ data; and the 6th instrument (change process) monitored the change process at the 'sample house hold' levels.
6.	M.P. Rural Roads Development Authority	The process of impact evaluation of PMGSY Roads in Madhya Pradesh was undertaken during the period of June-July 2010 in 36 habitations along 32 roads, which were	The process involved holding Focus Group Discussions, filling Household based Individual Response Schedules and collection of relevant Economic Data from authorities and villagers. Discussions with 10 -25 villagers for every

S.No.	Publisher	Data Coverage	Methodology
	(MPRRDA) undertaken by IIT, Madras	completed in 2008 and 2009, belonging to 17 blocks spread in 4 districts. The objectives of the study were (i) to assess and measure the socio-economic impact of PMGSY roads on the lives of rural people in selected habitations/villages, (ii) to find out the changes and improvement brought about by PMGSY roads at individual, family and village level; and (iii) to narrate the incidents and anecdotes related to the aforesaid impact.	habitation, few individual interviews for collecting household based data and consultation with Patels, Sarpanchs and others in the presence of villagers to get actual economic data were held.
7.	Centre for Rural Management, Kerala	In Andhra Pradesh, two districts, Cuddapah and Vizianagram, were selected. From each district, 15 sample habitations and 5 control habitations are taken and a total of 750 households from sample habitations and 250 households from control habitations are covered.	Four types of schedules are applied and they are (1) Sample habitation level schedule (2) Control habitation schedule (3) Sample household schedule and (4) Control household schedule. 'Before and After' & 'With and Without' (Sample & Control groups) approaches commonly used in impact assessment studies have been applied. There has been a specific reference period for the study. The average of three years before the actual year since when the PMGSY road was operative and the period till the current year from the year of operation was taken for the purpose of comparison of before and after the PMGSY road was operative.
8.	LEA Associates	The study has covered ten states such as Assam, Bihar, Himachal Pradesh, Karnataka, Mizoram, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal. The baseline,	The present note is the outcome of analysis carried out based on four sets of data collected respectively in 2007 (pilot study), 2009 (baseline study), 2010 (mid-term study) and 2011 (final-term study) in ten states. The study has

S.No.	Publisher	Data Coverage	Methodology
		mid-term and final-term survey had covered total 11490 households within 750 habitations across 33 districts of the 10 states. Five each districts were surveyed in Uttar Pradesh and Karnataka; four each districts were surveyed in Bihar and Madhya Pradesh, three each districts were covered in Orissa, Rajasthan and West Bengal. Two each districts were covered from Assam, Himachal Pradesh and Mizoram. The coverage of sample habitations was equal (82) in all the states except Himachal Pradesh (61) and Mizoram (33). During the pilot survey, a total number of 10943 households have been surveyed from 731 habitations from the same 33 district in 10 states.	followed the Double difference approach developed to assess the socio-economic impact assessment of rural roads as well as the level of user satisfaction. Consequently, information from field surveys have been collected in four time periods, as mentioned above. The study has collected information at household and village level from three sets of habitations, such as ▸ Habitation (Type-1) – Habitations where PMGSY road construction is in progress and construction works are expected to be completed within next 3-6 months (at the time of stage-1 survey); ▸ Habitations (Type-2) – Habitations which are not connected and not likely to be connected in next 1-2 years; and ▸ Habitations (Type-3) – Habitations which are already connected through PMGSY road. All the three sets of habitations were revisited during stage-2 (2009), stage-3 (2010) and stage-4 (2011) and information collected from same set of sample population.

S.No.	Publisher	Data Coverage	Methodology
9.	South Asia Sustainable Development Unit, The World Bank	The World Bank undertook a Poverty and Social Impact Assessment i.e. "An assessment of distribution of PMGSY project benefits in three states (Jharkhand, Himachal Pradesh and Rajasthan) by gender and ascribed social groups.	The study adopted a quasi-experimental design approach.
10.	International Labour Organisation (ILO)	The study of the improved road maintenance system was conducted in four States of Bihar, Jharkhand, Rajasthan and Uttar Pradesh. This assessment provided a national picture covering 17 States, 50 districts, 748 habitations and 18655 households therein.	In each of the selected districts 10 control habitations were selected, 5 connected through PMGSY and 5 through other rural roads but have not been maintained and were identical to the sample habitations in various social aspects. Data analysis was using software having proprietary database and spreadsheet functions.
11.	University of Heidelberg	Data from 279 households was drawn from 30 villages in Orissa. The households were surveyed in 2010 and 2013, yielding an unbalanced panel of 1580 individuals, 1076 of whom were present in both years.	The studies used various statistically techniques including Pearson's Chi-Square test, Kruskal-Wallis tests, correlation, regression and Fisher's exact test for data analysis.
12.	BITS Pilani study on Gender	Information was collected from five panchayats belonging to two different districts- 3 from Jhunjhunu district and 2 from Churu district-of Rajasthan where PMGSY roads had been constructed in last two to three years. A total of 621 families and 623 women were surveyed belonging to these five panchayats.	Information was collected through questionnaire survey from head of the family, who normally happens to be a male member of the family as well as one female member of the family separately. The information was also gathered through focus group meetings (20) and interactions with elected representatives of the selected panchayats.

S.No.	Publisher	Data Coverage	Methodology
13.	BITS Pilani study on Accessibility in Rural Areas	The study was conducted in five districts namely Alwar, Jhunjhunu, Tonk, Bikaner and Churu of Rajasthan, India.	The travel friction was calibrated in all the five districts using the function fitted between frequency of travel of villagers to CHC and the distance of travel. A village level participatory survey was conducted to quantify accessibility at village level. Further, to find aggregated perception of the villagers on the quality of the health service provided at CHC and also to find mobility of the villagers, fuzzy aggregation method was used as parameters or indicators considered were linguistic in nature. The weightages on the importance of the parameters considered for the study were also found through questionnaire survey. Geographic Information System (GIS), MS Excel, SPSS, Curve Expert Professional and MATLAB were used to execute the methods. To verify the accuracy of the accessibility values obtained using three methods, a survey was conducted by asking habitants about their satisfaction on the present accessibility level to CHC. Finally, predicted or calculated accessibility values from the three methods were compared with the observed accessibility values. To check the statistical validity paired sample t-test has been conducted. And mean absolute percentage error (MAPE) was also calculated to measure accuracy of the method.

ANNEX-2 (TO APPENDIX-I)
IMPACT OF CONSTRUCTION/UPGRADATION OF ROADS ON DIFFERENT SECTORS

	Assam	Himachal Pradesh	Madhya Pradesh	Mizoram	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
Agriculture and allied									
Increased accessibility to markets for agricultural products	√	√	√	√	√	√	√	√	√
Increase in motorized agricultural vehicles and equipments	√	√	-	-	-	-	√	-	√
Increased use of chemical, fertilizers, seeds and pesticides	√	√	√	√	√	√	√	-	√
Change in cropping pattern from food grains to cash crops	√	⚜	√	√	-	⚜	√	-	√
Increase in dairy/ poultry production/ rearing of sheep/ goats for commercial purpose	√	√	√	√	√	√	√	√	√
Employment									

	Assam	Himachal Pradesh	Madhya Pradesh	Mizoram	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
Increase in on-farm employment opportunities due to increase in cropping intensity	√	√	√	√	√	√	√	⚜	√
Increase in employment opportunities outside the village due to greater mobility and accessibility of nearby towns	⚜	√	√	√	√	√	√	√	√
Industry									
Improvement in access to market for finished products	√	⚜	√	⚜	√	√	√	-	√
Changes in technology and designs	-	⚜	⚜	⚜	⚜	⚜	⚜	⚜	⚜
Changes in employment pattern	-	⚜	⚜	⚜	⚜	⚜	-	⚜	⚜
Health									
Improved access to PHCs, sub centres and district hospital	√	√	√	√	√	√	√	√	√
Increase in number of visits of health workers	√	√	√	√	√	√	√	√	√

	Assam	Himachal Pradesh	Madhya Pradesh	Mizoram	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
Greater availability of vehicles or mode of transport to hospitals	√	√	√	√	√	-	√	√	√
Decrease in incidences of major disease/ illness like malaria, diarrhoea etc	-	√	√	-	-	-	-	√	√
Increase in the number of institutional delivery	-	-	-	-	√	-	√	√	√
Increase in child immunization	-	√	√	-	√	-	√	√	√
Decrease in infant mortality	-	√	√	-	√	-	√	√	√
Education									
Increase in the number of boys going to middle and high schools	√	√	√	-	√	√	√	√	√
Increase in the number of girls going to school for middle and high school education	√	√	√	√	√	-	√	√	√
Increase in the availability and number of teachers in school	-	√	-	-	-	√	-	-	√

	Assam	Himachal Pradesh	Madhya Pradesh	Mizoram	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
Social aspects									
Increased frequency of visits of Govt. functionaries	√	√	√	√	√	√	√	√	√
Improved post and telegraph services and better accessibility to banks	√	√	-	√	√	√	√	-	√
Improved police patrols around the village	√	√	√	√	√	-	√	√	√
Marriage alliance with far-off habitations	-	√	√	-	-	√	√	√	√
Transport									
Increased ownership of bicycles/scooters etc. in the village	√	-	-	-	√	√	√	√	√
Improvement in public transport service	√	√	√	√	√	√	√	√	√
Increase in commercial vehicles or share jeeps	√	√	√	√	√	√	√	√	√
Urbanization									
Increase in land prices	√	√	√	√	√	√	√	√	√

	Assam	Himachal Pradesh	Madhya Pradesh	Mizoram	Orissa	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
Conversion of *kuchcha* housesto *pucca* houses	√	√	-	√	-	√	√	√	√

Appendix II
Creating a durable local roads network

1. Introduction:

The Pradhan Mantri Gram Sadak Yojana (PMGSY), a 100% Centrally Sponsored Scheme was launched on 25th December, 2000 by Government of India to provide all-weather access to eligible unconnected habitations. This scheme is implemented by States through an institutional framework laid down in the PMGSY guidelines. Each State has created a State Rural Roads Development Agency (SRRDA) or a similar agency for the planning and executional management of the programme. The Ministry of Rural Development (MoRD) has similarly created the National Rural Roads Development Agency (NRRDA) to lay down the technical and management standards and oversee the programme.

In the last 15 years, over 3,12,695 km of rural roads have been constructed under PMGSY and another 1,60,000 km of unserviceable or poor quality rural roads have been upgraded to PMGSY standards. As a result, significant technical and engineering resources have come up for the programme, both in-house and outsourced through consultant firms for designing and project supervision. The contracting community has also massively grown in size and capacity to meet the construction needs, and has brought in new machinery and equipment. Not only that, many stakeholders have developed commitment to the various aspects of the programme, including Technical Academic Institutions and local governance and community and civil society organizations interested in the poverty reduction outcome.

Not only has the programme generated many learnings and deepened the expertise available to the sector, the high technical standards and the vast scale of the programme and the multiple interactions among the stakeholders has created a capacity of a width and depth that can transform the entire rural roads sector. The reason is that while PMGSY was aimed at providing the "last mile" connectivity to unconnected habitations, the technical and management standards of the programme are in fact applicable to all rural roads particularly low volume rural roads. The success of the PMGSY has led to a widespread realization that these standards should, and can, now in fact be taken to the entire network.

As a result of PMGSY (now called PMGSY-I because of a follow on programme already launched), investments are now flowing into construction and renovation of rural Through Routes under NABARD's RIDF scheme and into construction of such of the Link Routes as are necessary to provide single connectivity to habitations of population of 100 persons or more in several States of the country, which are not eligible under PMGSY. Once PMGSY-II implementation starts in earnest, attention will also be paid to the upgradation of Through Routes to meet the increasing volume of traffic as a result of upsurge of economic activity over the years. All this is likely to have a reinforcing positive impact on rural economic activity.

2. The Network approach

As is being realized by policy makers, the road network consists of several segments, each with a distinct socio-economic function, which need to be addressed as part of the

comprehensive poverty reduction strategy, even though some of them may not fall within the rigorous framework of PMGSY. In fact, since PMGSY-I has substantially strengthened the Core Network, the primary categorization can be between the Core Network Roads and the other rural roads of the District Rural Roads Plan(DRRP).These latter roads may collectively be called the "local roads network" and should share the common characteristic that they are engineered assets, with design based on local conditions of traffic, weather and drainage, using local or marginal materials and of a quality that can be and should be maintained. The roads of this network may be categorized as comprising:

- *Category I*: Single all-weather motorable connectivity to habitations not eligible under PMGSY, but at a standard that enables upgradation to PMGSY standard in due course (either due to increase in population and eligibility for PMGSY, or because of higher traffic). The roads may be sealed (including gravel sealed), or may even be unsealed.
- *Category II:* Single "near all-weather" non-motorable or partly motorable connectivity to remote locations where motorable connectivity may be too costly given current traffic or even foreseeable (as per norms to be laid down). The connectivity may be by a paved path with a smaller width or higher gradient in some parts, and may include bridges and causeways, and even boat services.
- *Category III:* Inter-habitation and Link Roads of socio-economic importance but not included in the Core Network on account of being multiple links (including link roads creating closed loops in remote locations such as LWE areas and hill areas), or being within the radius of 500m/1.5km or which have small populations; they would normally be unsealed unless there are special reasons(e.g. in LWE areas);
- *Category IV:* Intra-village paths of villages of high population and displaying or likely to display urbanized characteristics; these would be CC or cement block paved; and
- *Category V:* Arterial habitation-to-field paths ("farm net roads") made motorable to enable easier transportation of bulk inputs and farm machinery to farms and farm produce from farms to storage or marketing centers.

This categorization may be further subdivided or elaborated based on local requirements. For purposes of some analysis, it may be more convenient to divide these roads into "local external roads" and "local internal roads". While Category I and II roads would fall in the former category, Category IV and V roads would fall in the latter category. Certain Category III roads may be internal (inter-habitation roads) while the rest would be external (link roads outside the Core Network), and thus a subcategorization into Category-IIIA and Category – III B may be appropriate.

In many States, there is already a felt need for constructing the roads of the "local road network" under the MGNREGS or special State programmes such as Mukhya Mantri Gram Sadak Yojana (MMGSY). Convergence Guidelines were issued under MGNREGA on 7th November 2013, which in relation to the Category V roads of the Local Road Network stated as follows:

"2.3 MGNREGA FARM-NET ROADS UNDER MGNREGA WITH TECHNICAL ASSISTANCE FROM THE AGENCY IMPLEMENTING PMGSY IN THE AREA. *All the kuchha roads linking farm production points to the existing/upcoming PMGSY roads will be demarked, digitized and frozen by the PO (MGNREGA) in consultation with PMGSY unit. All rural connectivity*

works under MGNREGS will be taken up only from these works. All these roads may be completed with gravelled or metalled road standards. Engineers of the line department implementing PMGSY in the area will assist the MGNREGS engineers at the block level in preparing projects and constructing the Farm-net roads."

However, this facility is yet to be used in most States. Part of the reason is perhaps that it inventories the farm-net in relation to the PMGSY roads rather than the entire Rural Road Network or DRRP. In some cases, the connectivity actually needs to be provided to existing non-PMGSY roads. Possibly the corresponding strategies on the road sector side to take advantage of the convergence guidelines were also not put in place. This document attempts to address the situation. It also attempts to address the perception that assets built under MGNREGA are not durable, by detailing out the technical, quality and maintenance requirements necessary to ensure that the roads are of sufficiently good quality in relation to their function. The ***Annexure*** to this document contains an extract from a Report titled "Managing Local Roads Network "which reports its findings in the case of Rajasthan, from which it is clear that technically sound construction of rural roads cannot be left to chance, and needs the emplacement of a competent agency to supervise, monitor and control the design, execution and quality aspects.

One of the major issues likely to confront any attempt to inventory, much less construct or renovate roads that comprise this local network is the legacy of multiple wage labour-based roads and paths constructed under food for work, rural employment and drought relief programmes of the State Govt. In most cases, the old "roads" no longer exist, except perhaps as pedestrian paths along the formation cutting or raised embankment. Since these were constructed with labour based methods, with manual compaction and no subsequent maintenance, it needs to be clearly specified as a Policy that all such roads constructed, say, more than 10 years ago can be "fully reconstructed as engineered assets" as per need and while doing so , the alignments can be changed as per technical requirements. Needless to say, there must be much better maintenance of the reconstructed for the future.

3. Planning:

Planning has to start by inventory of the network such as it is. Attempting to use the official records of expenditures under different schemes may not be the most practical way of proceeding since many of the older works may have been done in an *ad-hoc* manner with sketchy records, which may be distributed in a number of offices below the District Collectorate and may not even be available after such a long period. Instead, it would be better to start the inventory on the ground by sketching out the alignments on Panchayat level maps (or perhaps using the village cadastral map which is on 1:4k scale), and verifying and recording the conditions on the spot as the inventory proceeds. Important parameters for the purpose are:

- The start and end points, which may be coded from a Habitation master for inter-Habitation roads, and listed for intra-village roads/paths and field paths of the farm-net. Where the link joins a DRRP road at an intermediate point the road code should be used (with the chainage point being recorded).

- Road/path length and road/path visual condition and other relevant data including alignment and CDs, and the volume, nature and seasonality of traffic
- The year of original construction and scheme if available, based on local population recollection, and verified if possible from official record.

Rather than devising a separate ad-hoc procedure, the Convergence Guidelines issued by MGNREGA Division of the Ministry should be used as the starting point and the elaborate MGNREGA mechanisms (detailed below) already in place should be used for planning, funding and management processes to the extent permissible. Once the Panchayat level maps are made, they should be subjected to a participatory rural appraisal (PRA) in a Gram Sabha, and a prioritization and desired standard should be recorded. For this purpose, "desired standard" should be categorized into two or three alternatives based on traffic and local conditions. Percentage caps may be placed on the different standards to prevent perverse categorization.

The Panchayat level maps, along with the data and PRA results should be computerized, with a GIS visualization facility which should also function to visualize work progress and current road/path condition in due course, for future PRA purposes.

4. Basic approach:

In order to create a uniform and institutionalized framework for managing the local road network, it is best to start by leveraging MGNREGA which in para 1B of Schedule I to the MGNREG Act provides for taking up of works of *"rural connectivity to provide all-weather access, including culverts and roads within a village, wherever necessary"*. MGNREGA has inbuilt provisions for planning, funding, supervising and monitoring of the works which, properly utilized, provide an excellent starting point for the creation of durable and productive assets. However, MGNREGA has the limitation of materials component and some restrictions on use of labour displacing machinery. It is best if MGNREGA itself comes out with detailed all-India Guidelines with regard to funding the creation of the local road network ("the local road Guidelines"), and essentially the Guidelines should incorporate the following:

- Creating the internal technical capacity among the various levels of the PRIs; for example, the District Panchayat needs the services of an Executive Engineer to handle issues of planning, design, supervision, monitoring, quality and maintenance management etc. The Intermediate /Block Panchayat/ Cluster needs the services of one or more Assistant Engineers to supervise the work of the Junior Engineers (ideally in the ratio of 1:4); and the Gram Panchayat should be able to avail the services of a Junior Engineer.
- Providing for SRRDA to bear the cost of the senior personnel (i.e. AEs and EEs), since the MGNREGA administrative expenses may be overburdened with prior commitments.
- Planning, including inventory and prioritization of the various categories; and the use of local materials and appropriate construction methodologies
- Detailed Estimate for construction/upgradation of an unsealed engineered road/path comprising formation cutting, earth work for embankment including compaction, CDs and protection and base course using local materials; and wearing course with local materials where possible.

- Routine maintenance and funding thereof, including the process of creating the management capacity for the purpose (as explained below in para 9.
- More detailed Quality management procedures, based on analogous procedures to be put in place generally for MG NREGA works. As in the case of senior technical personnel, the costs may be borne from the SRRDA side.

One of the drawbacks of MGNREGA where creation of durable assets is concerned is that since it is mainly a wage labour programme so as to provide a safety net for those in immediate need of assistance, there is a restriction on the proportion of funds that can be spent on materials, which cannot exceed 40%. Incase on considerations of traffic or climatic conditions, the road needs to be sealed or built to a higher standard, and this entails a higher materials component and construction to a more exacting specification, or the need to use Contractors or sophisticated machinery at high hiring cost, rather than using MGNREGA for part of the work, the entire work should funded under another programme such as the Mukhya Mantri Gram Sadak Yojana (MMGSY) or local area development programmes of the State Govt, or the RIDF facility of NABARD.

It is crucial that the implementation arrangements be clearly spelt out, with the responsibilities of the Project Implementing Agency (PIA) properly laid out, the role of the PRIs also laid out where they are not the PIA, and a seamless process put in place where the work is jointly executed for different stages by a PIA such as a Line Department and
a PRI.

5. Leveraging the given MGNREGA implementation infrastructure:

- At the Gram Panchayat level, the NREGA personnel are the Gram Rozgar Sahayak (GRS) and the Mate or Work Site Supervisor (WSS). The salary of the GRS is charged to the administrative expenses of NREGA and the wages of the WSS are work charged at semi-skilled rates to the material component of the work.

- Two Diploma Engineers are to be deployed per 6000 rural households (per 3000 rural households in the case of NE and Hill states). In areas affected by left-wing extremism (LWE), MG NREGA strongly recommends the creation of a District cadre of staff, including a Panchayat Development Officer (PDO) and a Junior Engineer at Panchayat level.

- For each cluster of GPs or for a Block, there is a Programme Officer, assisted by a Technical Assistant. A Cluster Facilitation Team (CFT) is envisaged to mobilize the local communities, with 3 CFTs per Block.

- A Block Resource Centre (BRC) is envisaged at Block level to provide technical inputs for planning, and ensure convergence between NREGA and other schemes so that assets created under NREGA can be productively used by the poor to enhance their incomes.

- At the District level there is a District Programme Coordinator or DPC (who may be the Collector or CEO of the District Panchayat), assisted by a fulltime Additional DPC. The shelf of Projects prepared at Panchayat level by the different Project

Implementation Agencies (PIAs)are examined in a District level Technical Committee (DTC) which recommends the projects to the DPC for technical sanction. PIAs consist of the Gram and Block and District Panchayats, Line Departments of the Government, etc.

- The DTC also approves the Schedule of Rates (SoR). The SoRs for use in MGNREGA have to be based on the fact that the tasks are performed by unskilled labour. Since the SoRs in the case of NREGA are District specific, they can take into account the local climate and topography.

- Under MGNREGA, the projects need to emerge from an integrated plan for local development, which is prepared as follows:

  - Identification of needs
  - Identification of resource envelope
  - Prioritization based on needs matched with resources
  - Approval by Gram Sabha
  - Annual Plan of GP approved by Programme Officer
  - Consolidation at Block level into Block Plan, including inter-Panchayat and Block level projects
  - Approval of consolidated Plan for District after including inter Block and District level projects
  - Administrative approval by the District Programme Office (DPC).

Whether the PIA is the Panchayati institution or a line department, the Local Road Network scheme has to align itself to the above processes, ensure that there is adequate capacity for planning and execution, and that institutional gaps are adequately addressed by other means, clearly and in an institutionalized manner. The Local Road Guidelines will need to address the issues within the MGNREGA framework to the extent possible, but may need to leverage the SRRDA infrastructure to a certain extent.

6. Filling the gaps:

One of the major issues in this regard is that since MGNREGA is "demand driven" , works are taken up as and when there is a demand, and the work stops , even if incomplete , if demand evaporates , as would be the case if there are timely rains in an agricultural area. In order to ensure that assets partly created under MGNREGA do not erode due to temporary abandonment, it is necessary to have a mechanism that completes the work to a level that is relatively stable and capable of being maintained at economic cost. In case there is a District or Block level rural road maintenance contractor for instance, he could be on a 'retainership" for the purpose, and could quickly mobilize to complete the unfinished work based on measurements. It may even be possible to be able to construct a contract which enables such a contractor to complete those portions of the work which cannot be taken up under NREGA because of the adverse wage: materials ratio. In the alternative, the State Department concerned with rural roads should have a scheme in place that enables them to tender out the

balance work to local contractors. In either case, the SRRDA would be the best agency to ensure the transition and should be provided with a separate budge for the purpose.

Another major issue is identification of the Project Implementing Agency (PIA). In the case of the local road network, it is highly advisable that the Panchayati Raj Institution (Gram or Block Panchayat as the case may be) is the PIA, except possibly for Category I roads, which may need to be taken over by the line department at some subsequent point. Instead of ruling out the Panchayat on grounds of inadequate technical expertise, it is necessary to lay out a path and a mechanism that gives the Panchayat access to such expertise. This issue is explained in para 9.

7. Technical Standards for design and construction:

Category I roads would obviously have to conform to geometric, carriageway width and drainage standards of PMGSY. It would be preferable if these works are taken up as an integrated project with a DPR, so that upgradation to PMGSY standards can be undertaken in due course.

Category II roads would be built to specific needs, and can be done under MGNREGA subject to the materials component being within limits.

Category III roads should conform to PMGSY standards to the extent possible except possibly in roadway/carriageway width, which may be 3m/6m.Category III B roads (multiple links) should only be taken up by engineering PIAs, since traffic is likely to be higher than for Category II roads.

Category IV roads would need to conform to specifications for good CC roads or cement block or any similar alternative design, with provision for functional drainage, and in case of a high materials ratio, may not be feasible under MG NREGA, unless given specific exemption under the local road guidelines.

Category V roads would need to conform to need, based on likely use of farm machinery and movement of farm produce, but would be constructed with local material and unsealed, with functional side drains and simple Hume pipe cross drains. Such works are likely to be feasible under MG NREGA

The Gravel Roads Manual (IRC: SP-77:2008) and the Rural Roads Manual (IRC: SP-20:2002) would be the standard for Category I and Category III roads.

8. Use of Local materials:

The local road network (including Category–I roads) must use local materials, particularly local gravel or similar materials without exception for three reasons:

- Given the nature of these roads, local materials are likely to be acceptable; particularly as maintenance will have to be done by the local community-based institutional systems.
- Risks arising from failure are likely to be perceived as being significantly lower.

- Since execution is a largely a local arrangement, there is likely to be some local knowledge on use of these materials.
- Issues of maintenance can also leverage local knowledge

As such, the design, technical standards and SoRs will need to be customized to this segment as a separate category. The Operational Guidelines of MGNREGA allow the development of SoRs on a localized basis as follows:

"7.7.8 There is a need to develop a simple and accessible template of SoRs, which could be used by the GPs, Gram Rozgar Sevaks and mates during execution of works. This template could be developed at two levels: one, with rates for the simple and often repeated tasks and the other with rates for more complicated tasks. The SoR for common tasks may be developed at the level of the district whereas the SoRs for the complex tasks may be developed for a group of districts within the same agro-climatic region. The template should also allow for regional variations and include special works to be taken up in the hills region, coastal regions, deserts, water-logged and flood-prone plains and saline areas."

9. Providing access to technical expertise:

One of the problems with MGNREGA is the variability of technical inputs at the time of design as well as execution. It is generally acknowledged that in PMGSY, the innovation of developing independent State Technical Agencies from amongst Engineering Colleges of repute has added enormously to the technical quality of the programme and prevented it from degenerating into a mere funding activity. The reputation for quality in turn has provided the rationale for a strong maintenance regime which is crucial to achieve the poverty reduction objective, given the long gestation period involved in getting local institutional structures and mechanisms aligned for the purpose. A similar logic prevails in the case of the local road network as well, and the rationale as well as the economics of maintenance requires the local road construction also to be enriched by appropriate technical inputs, by providing the PIA assured access to locally available technical expertise.

Though not generally recommended, some States may want to use MG NREGA funds to execute a part of the work (to reduce the application of State resources), and then hand over the site to the Line department to complete the balance work which may involve use of materials and workmanship of a higher order of quality. In such cases, the technical expertise available with the Department should be brought to bear at the earlier stage also, by assisting the PIA (Panchayati Institution) in preparing its Estimates and in advising it on the use of appropriate materials and practices. Such a situation is most likely in the case of Category I roads.

Local Road Works that can be executed by the Panchayati Institution purely as a MGNREGA work are likely to be large in number, small in size (less than 2km in length) and spatially distributed. The nature of technical expertise required may not be of a high order, but it is important to have a system of independent technical advice so as to ensure an assurance of uniformity of standard in practice, which is key to continued access to maintenance funding. The following options may be leveraged:

- A Standard Template for Estimate of the work should be formulated and circulated and used. The Estimate should be based on the various ratios of local and transported soil, with various lead distances, both for construction and for maintenance (including replenishment of gravel and restoration of shoulders).
- A retired Engineer (of the level of EE) with rural road expertise may be designated as a Block Technical Agency (BTA), and paid a Retainer by the SRRDA to check the design and estimate.
- Where the MGNREGA workload is high, a Graduate Junior Engineer may be provided at the Cluster level for the local roads by the SRRDA out of its resources and he may be provided training under the Rural Roads Training Framework.
- Where possible, a Technical Institution, either an Engineering College or ITI may be identified as a "District Technical Agency(DTA)", and associated, along with the BTA, with the development of technical capacity development of the JEs at the Panchayat/Cluster level.

The DTAs and BTAs can also function as resource persons to do capacity building for the personnel involved in execution. The association would be at the level of the MGNREGA Programme Coordinator, with the PIU/SRRDA providing technical advice to the District Programme Coordinator (DPC) and the District Technical Committee (DTC) for the purpose of empanelment of DTAs and BTAs.

Where the Line Department of the State Govt. is the PIA, the Training Framework of the Rural Road Programme as separately devised should be used to the full extent without deviation or exception.

10. Maintenance management:

There is no doubt that the approach to maintenance is the key to the entire programme; on the one hand it is necessary to define and enforce technical standards for the construction which is capable of being supported through local maintenance efforts. On the other hand, a workable maintenance regime is the best justification for what is likely to be a more detailed and elaborate system for technical and quality management of the construction phase.

MGNREGA does allow maintenance activities in the same way as the main work, provided the volume of work is adequate. The work can be taken up in respect of even those assets which were not originally created under MGNREGA, in terms of the following provision of the Operational Guidelines:

*"**7.3.7** The maintenance of assets should generally be undertaken only for those works and assets that have been created under MGNREGA. In case MGNREGA funds are to be used to rehabilitate assets created from schemes other than MGNREGA, the full details of previous work done along with date, copy of estimate and measurement book should be placed as part of the MGNREGA work record before administrative approval is granted. It will be the duty of the agency that has executed these assets to provide all required details and documents to the GP. PO will ensure that an entry to this effect is made against each such work in the list of works placed before the GS. He will ensure that copies of documents*

are also made available to the DPC before administrative approval is accorded and details are made available to the implementing agency along with the work order."

In case the local roads have been planned and constructed with good community participation, there is a reasonable expectation that some sense of ownership may reside with the Gram Panchayat, and to that extent the Panchayat may include maintenance projects with a high priority in the GP level Annual Plan. The problem is that since in most cases, the area of the Gram Panchayat is quite small (Kerala and Andhra Pradesh etc. being the exceptions), maintenance at Gram Panchayat level may not constitute viable projects for purposes of issue of Muster Rolls. Clearly, in such cases, the next higher level, the Intermediate/Block Panchayat, has to be the level for projectisation of routine maintenance under MGNREGA. MGNREGA provides for a Programme Officer at Block /cluster level, and for the Block Panchayat to add works under MGNREGA for approval while consolidating the Block Plan in the Annual Programme. Inclusion in "the local road Guidelines" of the modalities for packaging maintenance works for clusters of Gram Panchayats (to be done by the Block Panchayat in consultation with the Gram Panchayats),would provide the necessary facilitation to the Gram/Block Panchayats to access funds for routine maintenance of local roads on a systematic and viable basis through institutional cooperation between the Gram and Block Panchayats for working out the scope of the work on the basis of the lists of roads supplied by the Gram Panchayats.

Under MGNREGA, 25 % of the materials component of the work is to be given as State Contribution, which amounts to roughly 10% of project cost. In order to instill maintenance discipline and to reinforce the ownership principle, the Guidelines may specify that the contribution would be collected by Gram Panchayats from local residents/households (which would be empowered by the State Govt. for the purpose in terms of the Eleventh Schedule to the Constitution for the purpose).

The main issue with operationalization of the above arrangement is the availability of skilled human resource to be able to supervise the conduct of routine maintenance to an acceptable standard. While the transfer of responsibility to the Block/Cluster Panchayat would address the issue of viability, the arrangement of issuing NREGA Muster rolls for the maintenance would need to be spelt out in the "local road Guidelines" and would need to incorporate the following:

- The issue of a Muster Roll for a skilled/semiskilled workman to perform maintenance tasks requiring some skills and who would also supervise the unskilled maintenance work for a Cluster of Panchayats, so formed as to provide about 100 days' work in a year. This workman will be the Mate or Work Site Supervisor (WSS) as provided under MGNREGA.
- There would be a norm for number of days of skilled work (including supervision) per km of different types of local roads, based on work output studies. The skilled worker would need to be of an acceptable standard, and should generally be a person who has qualified the Aajeevika /DDU GKY Skill programme for the discipline. Continuity in subsequent years should be preferred.
- There would be a norm for number of days of unskilled work per km of different types of local roads. Muster Roll for the unskilled labour would be issued in a way that would

enable 100 days labour, with a clustering of contiguous Panchayats for the purpose. Continuity in subsequent years should be preferred.

- Unskilled workmen who have worked satisfactorily for 3 or more consecutive years should be facilitated to obtain skills under DDU GKY if eligible.
- Skilled workmen who have worked satisfactorily for 3 or more consecutive years should be facilitated in obtaining higher skills under DDU GKY enabling them to participate in PMGSY maintenance.

Roads constructed by Line Department would also need to be maintained, and it would be best that the pattern of back-to-back contracting of the paid routine maintenance for 5 years at least is done on the same pattern as PMGSY, in order to incentivize quality in construction. However, subsequent paid maintenance should be farmed out to the Panchayat maintenance system, which would by then have developed some expertise. This would then enable the achievement in due course of the vision of the Rural Roads network being maintained by Panchayati Institutions.

11. Incorporating Road Safety issues:

Road safety issues in the last mile and beyond (e.g. arterial field tracks), are an important but neglected aspect because of the fact that operational issues predominate over the design issues, and the executing agencies such as PIUs lack the field presence necessary to be able ensure that management of operational safety is adequate. Such issues include:

- Plying of farm machinery, including trailers, over tracks in stretches with pedestrian and animal movement
- Primary school in the vicinity, with unsupervised small children
- Variability in driving skills for operating farm vehicles, particularly of young and inexperienced drivers
- Driving under the influence of alcohol and/or drugs
- Overloading with farm produce
- Night driving particularly in poor road conditions and /or poor visibility etc.

Because of the feedback cycle between maintenance and road safety, it is necessary to club the issues together for operational purposes, and ensure that the local stakeholders, i.e., Panchayats and community institutions (including the local School Committee) are adequately sensitized and empowered to improve road safety. The Cluster Facilitation Teams (CFTs) envisaged under MGNREGA can be leveraged for the purpose.

12. Quality Management System:

The Operational Guidelines of MGNREGA lay down a fairly elaborate process for quality management which is quite suitable for road construction and maintenance related works and is in fact reasonably well aligned with the Quality Management framework for PMGSY. Since there will be cases where incomplete works under MGNREGA will need to be completed under MMGSY or other State Scheme, it will in fact be advantageous to extend the basic features of this arrangement to such scheme as well, preferably from the PMGSY side. The

main features of the MGNREGA quality management framework (given in Chapter 14 of the Guidelines) as applied to the current context are as follows:

Quality Management:

The first aspect of quality management is internal, and consists of skilling, experience accretion and material-quality measurement systems etc., mainly in the nature of "quality consciousness". The second aspect is external, consisting of "supervision" which is a concurrent process by or on behalf of stakeholders with a sense of ownership over the asset; and the third aspect is "monitoring" where it is clearly an external process and the ownership is not at asset level but at outcome level. Quality always has a cost attached to it and the objective is to optimize on this cost, by appropriately defining objectives, life cycle for the asset and an opportunity cost of losing the asset. Since quality management costs are lower at execution and supervision stage, they should be preferred to investing heavily in monitoring.

Capacity Building:

To ensure that the project design, selection of materials and the workmanship are of the requisite quality, people involved in these decisions have to be appropriately trained and equipped. Suitable training programmes covering the following aspects need to be designed by SIRDs. Training could be in the form of classroom training and on worksite, and can be conducted by SIRD's District Training Centres and the Peripatetic Training Units thereunder, using DTAs and BTAs (see para 8 above). It would be best to incorporate this into the Rural Roads Training Framework already under development.

Internal Quality Management: Supervision

The Technical Assistant at GP level, technical staff at the block and district level of Intermediate and District Panchayats and that of line departments will constitute the internal quality supervision team. The State Govt. (SRRDA) will prescribe roles and responsibilities of the Technical Assistants at GP level and the technical staff at Block/ District level.

Site visits will be followed by a detailed note of inspection which will also be uploaded in NREGASoft and will be available for public viewing along with other work details. The gist of visit reports, prepared by the SRRDA will also be presented by the NREGA State Directorate to the State Employment Guarantee Council (SEGC).

External Monitoring:

Quality monitoring will comprise the State Quality Monitoring Unit with State Quality Monitors (SQM) for each district in the State and a Nodal Officer of the rank of at least Superintending Engineers, at the State level. A Nodal Officer of the rank of at least Superintending Engineer to be designated as Director (QM) will coordinate the work of all SQMs in the State. The Director (QM) should be independent of implementation machinery. The inspection/ measurement and analysis of works w.r.t. technical aspects will be done by engaging separate SQM for each district.

Empanelment of SQMs:

- As provided in the MGNREGA Operational Guidelines, SQMs will be selected through a transparent process which will include issuing an advertisement, shortlisting, written test and interview. Individuals holding degree in agricultural/ civil engineering with sufficient work experience will be eligible for appointment as SQM. Based on an objective assessment of the track record of applicants, past experience, technical qualifications, competence and other factors, the selection will be made by a Committee, comprising of Experts, to be constituted by the State Govt.

  (SQMs deputed for Local Roads inspection will need to be shortlisted based on qualifications and experience.)
- As the State Quality Monitors are expected to have good experience and expertise, their services will be utilized not only for fact finding and work evaluation but also for providing professional advice to the agencies engaged in the implementation of the local roads scheme.
- Once empanelled, the SQM may remain on the panel for a period of three years, subject to annual review. An SQM may, be removed/ delisted because of non-satisfactory performance, etc. at any time by the State.

For effective quality monitoring by external monitors it is necessary that:

- State Quality Monitors selected be given one-day intensive orientation/training at State/ district level. During the training, the concept of quality monitoring and how to fill up the format developed for monitoring will be explained in detail. Director (QM) will prepare the training content.
- No SQM be allotted her/his home district.
- Visit schedule of the SQM be sent to the District Programme Coordinator in advance who will ensure availability of the relevant records, concerned technical personnel, Work Site Supervisor, Gram Rozgar Sahayak etc

Functions of the SQM:

- Prepare a visit plan, based on the list of works/ sites finalised by Director (QM), required to be visited by the SQM.
- Visit the site for inspection on the appointed date.
- Prepare visit report work wise, the framework/chapter-plan/core tables and format for which would be made available by Director (QM). This report should include immediate counter measures required to be taken to rectify/ correct deficiencies identified as a result of the inspection.
- At the end of every three months' period, a consolidated report for the district shall be prepared by the SQM and submitted to State Government (SRRDA) through Director (QM). This report should include measures to be taken to prevent recurrence of deviations in planning, designing, selection of worksites and execution of works and supervision thereof. This would be in the nature of long term measures and would include areas

identified for training. This report will also contain a deployment strategy for the suggested measures. A summary of the report shall also be made by the SQM bringing out the Action Points.

The Director (QM) is tasked to take corrective measures through the DPC and shall publish on the NREGA website, the SQM-wise list of works visited and Action Points emerging therefrom. The Director (QM) also monitors the corrective action and needs to upload the action taken status quarterly till such time that action is complete. Action taken by the State Government on the reports and suggestions of SQMs will be reviewed by the SEGC and will also be a part of the agenda item for discussion for labour budget.

Quality Grading of Works:

- Different aspects of work design and execution will be graded objectively by the SQMs, for each work visited by them in the following particulars.
- Quality grading will be entered in NREGASoft and will be visible in public domain along with other work details, in a searchable format Panchayat/nature of work-wise.
- State Governments (DPC/PIU) will undertake appropriate capacity building measures to gradually eliminate "U" and "RI" categories. If despite adequate measures, the works associated with any individual continue to get graded as "U" or "RI", the State Government (DPC) will take action against the delinquent functionaries.
- The intention of quality grading is to assess the quality of NREGA/Local Road works as a whole and to identify measures needed to improve quality. It is essential; therefore, that the number of works inspected and state of these inspections ensures that grading is representation of the entire population. As such the endeavour should be to ensure that at least 5 % of the works are inspected within one year of completion, so as to assess asset quality and utility and maintenance aspects and at least5 % work are inspected while they are still in progress, so as to assess process quality aspects.

SQM expenses:

As provided in the MGNREGA guidelines, SQMs will be paid remuneration and allowances as decided by the State. The expenses on State Quality Monitoring should normally be borne out of funds provided by Central Government to meet administrative expenses for MGNREGA. However, in some States, because of their small size, or prior commitment of the administrative expenses to other MGNREGA works, the funds may be inadequate and it would be best if the SRRDA deputes the SQMs for local roads from its own resources and makes additional budgetary provisions for the purpose if needed.

Testing

Any testing of materials that may be required should be got done at the PMGSY's PIU Laboratory.

Even where the entire work is executed by the Line Department out of the Scheme budget, the above mentioned framework can be used, with minor modifications.

13. Data Management in case of MGNREGA funded works:

MGNREGA works are required to be managed through the programme website, www.nrega.nic.in which is built around a work-flow based application "NREGASoft", which covers project selection, generation of estimates, approval, management of Muster Rolls, Payments and execution monitoring. A complexity that was arising in certain types of 'convergence" where NREGA funds were used along with departmental funds, and under a departmental programme, was the issue of accounting for the asset as well as for the expenditure and managing the subsequent maintenance. In these guidelines as has been made clear, if the work was started using MGNREGA funds, the work is a "NREGA work", and as such will need to be managed through the NREGA programme website. Where a separate Estimate is prepared for the balance work, the NREGA work will first be shown as part-closed, and the new work taken up separately as per the Department's SoP. However, it would clearly be in the larger interest to link both works, and it is recommended that the Department's Estimate should mention the NREGA work number, and this should also be recorded as such in the Department's website if there is one.

In cases where after execution of the Estimate by the Department, it is proposed to include the work under NREGA again for maintenance purposes, the provisions of para 7.3.7 of the NREGA Operational Guidelines referred to above should be appropriately invoked. It would be best if the SoP for the purpose is laid out in the NREGA "local road Guidelines". In case the work has been transferred for maintenance to NREGA, appropriate record should be made on the Departmental database.

14. Role and capacity building of SRRDA and PIUs:

The long term vision is that the rural road network would form a continuum from the arterial field track to the Through Route, so as to realize the objective of "farm to market" connectivity. At the same time, it is important to ensure that the potential for the sense of local ownership should be encouraged rather than superseded through the desire for simple centralized management systems. Motorable roads likely to be upgraded to PMGSY standards due to traffic or socio-economic considerations should fall within the purview of the SRRDA, but other roads and tracks should remain at most of district level importance. In the former type of roads, the District level PIU of the SRRDA would have nodal responsibility for construction, maintenance and renovation/upgradation, but in the latter type of roads, the Panchayats would need to take ownership from the start (and to an extent determined by the nature of the intervention; for instance road safety would clearly involve the Gram Panchayat for the field tracks and intra-village roads, and perhaps some inter-habitation roads; and the Cluster/Block Panchayat for the other roads), and the PIU would need to be positioned more to offer technical advice and help in capacity building of the District and Block Panchayat, and enable them to build the capacity at the Gram/Cluster Panchayat level.

As such capacity building efforts should be directed towards enabling the:

- SRRDA (and the PIUs thereunder) to plan for the motorable local road network as an adjunct to the Core Network, and to incorporate these roads into the DRRP.

- PIU to build capacity in the PRI system for the works that can be taken up under MGNREGA, including the maintenance regime,
- PIU to seamlessly plan and execute those portions of the work for which a separate Estimate or DPR is required on account of high materials component or higher complexity, and the work is funded by other Schemes (outside MGNREGA).
- PIU to build capacity in the MGNREGA administrative system, including the Programme Officers and Technical Assistants, for planning, management and supervision and monitoring including quality monitoring.
- The head of the PIU as the "District Rural Roads Safety Officer (DRRSO)", to emerge as the nodal figure for road safety issues of the local road network

15. Training and capacity building in MGNREGA machinery:

At the Gram Panchayat level, the NREGA personnel are:

- The Gram Rozgar Sahayak (GRS).
- The Mate or Work Site Supervisors (WSS), who are skilled or semi-skilled.
- Two Diploma Engineers to be deployed per 6000 rural households (per 3000 rural households in the case of NE and Hill states).
- A Panchayat Development Officer(PDO) and a Junior Engineer at Panchayat level in the case of LWE areas
- A Programme Officer, assisted by a Technical Assistant at Cluster/Block Panchayat level
- A Cluster Facilitation Team (CFT), with 3 CFTs per Block
- A Block Resource Centre (BRC) to provide technical inputs for planning, and ensure convergence between NREGA and other schemes
- A District Programme Coordinator (DPC), who may be the Collector or CEO of the District Panchayat, assisted by a fulltime Additional DPC.
- A District Level Technical Committee (DTC) which recommends the projects to the DPC for technical sanction.

Training and capacity building for all these personnel needs to be conceptualized within an integrated framework so as to address issues of:

- Planning
- Design (including transect walk)
- Execution
- Supervision
- Quality management
- Maintenance and road safety
- Integration of the local road network as an infrastructural resource into developmental planning.

Given the wide range of activities involved (including the issue of capacity building of PRIs discussed below), it is best if the SIRD training infrastructure is strengthened at the District level (through District Training Centers) and perhaps extended to the Block level on an institutionalized basis, (on analogy with the PMGSY Training Framework which accesses STA resources for the purpose) and used to provide the capacity and technical knowledge, in collaboration with the PIUs and ITIs and local engineering colleges, and experienced retired Engineers . Some details in this regard relating to "DTAs "and "BTAs" have already been given in para 8.

16. Capacity building in PRIs and local community:

Capacity development of PRIs and the local community institutions is far more important than is often realized, because:

- the devolution of functions to Panchayats in the Eleventh schedule is not taking place on the specious ground that PRIs do not have the "capacity" for the purpose
- where functions have been entrusted to PRIs without adequate capacity building, the experience is often expectedly poor, reinforcing the view that PRIs should not be entrusted with such work
- Govt. agencies by nature cannot have the extensive local presence and deep stake in the outcome necessary to ensure delivery of certain types of services. This is an immutable fact; capacity shortfalls in PRIs on the other hand are remediable shortcomings.
- Capacity creation of PRIs is a cross cutting issue and no line department wants to take on the responsibility for what is a medium term and continuing engagement, particularly when it comes to laying down the training and capacity development infrastructure. Only the Rural Development Department of the State Govt can understand the longer term benefits, and make the necessary investments.

The issues relating to capacity building would be more or less the same as that for the MGNREGA functionaries, for the respective level, i.e. Village/Cluster, Block and District. Capacity building for PRIs would however be more in the nature of workshops, discussions, field visits (to see works–in-progress from a technical and management perspective, and to understand best practices) etc. The Peripatetic Training (PT) Teams conceived under the PMGSY Training Framework would probably be the best mechanism of conducting the exercise. In order to bring the entire capacity building into a unified framework, the SIRD infrastructure has been identified, as discussed in paragraph 9.

17. Leveraging the Local Road Network for poverty reduction:

The impact of PMGSY roads has by now been well documented, and they include:

- Direct Farm related benefits such as:
- Improvement in farm incomes as a result of better quality at market and faster delivery at lower cost
- Improved labour mobility, increase in off-farm incomes

- Changes in cropping patterns in favour of cash crops and vegetables in response to better extension outreach and availability of inputs
- Better availability of mechanized farm vehicles etc.
- Indirect benefits such as:
  - Higher school enrolments, less drop outs, particularly girl children
  - Better attendance of students as well as teachers
  - Better access to health care
  - More institutional deliveries and less childbirth deaths and infant mortality
  - Better service delivery of governmental services and essential services
  - More personal vehicles, particularly four wheelers
  - Better public transport services
  - Easier access to services such as banks, post offices, administrative offices etc.
  - Better availability of consumer products and better quality
  - Higher penetration of white goods
  - Increase in non-farm incomes due to easier availability of raw material and better access to markets
  - Improvement in quality of social relationships

The likely impact of the various categories of the local road network is bound to vary depending on the category. *Category I and II roads* are likely to have results similar to PMGSY. *Category III roads* are not likely to have as pronounced an effect since they do not provide the basic connectivity, and their impact may be more marginal. However, this is still desirable since in many cases such marginal impacts may have a disproportionately high significance for the poorest of the poor, e.g. in terms of reduction in public transportation cost or access to new employment or market opportunities or to raw materials. *Category IV* roads are likely to have benefits primarily in terms of improvement in quality of life (particularly sanitation and public heath) in an urbanizing situation. It is perhaps the *Category V* roads which have the highest potential for a qualitative impact, including in respect of the following:

- Improving agricultural productivity through use of modern agricultural machinery: this may however have labour displacing impacts which can be partially addressed by improving machinery handling and repairing skills, and improving opportunities for downstream income generation in handling, transportation, storage and processing.
- Changes in cropping patterns: the ability to be able to move transportation vehicles closer to the field has important implications for switch to delicate higher value crops which may require more specialized handling and quicker transportation.
- Growth of local infrastructure for handling, storage and processing: The junction of the arterial field path with the all-weather Rural Link weather PMGSY or not) and consequently the junction of the Rural link route and the Through Route are likely to see substantial increase in activity and will develop into transshipment points, sorting yards, markets, storage and processing centers etc. Rational planning for these infrastructural facilities will need to be done, perhaps by the Block Panchayat and the District Planning machinery.

Planning for these eventualities has the potential to make the farm-to-market connectivity as envisaged in PMGSY a reality. The challenge lies in being able to build capacity at the local level for a participative process. The key lies in the Block/Cluster Panchayat institutional framework.

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Extracts from the report on Rajasthan's local road construction programmes titled:
"Managing local roads network"
By P.K Lauria and S.S Singhvi

4.3 It (Rajasthan) has about 60,000 km of earth and gravel roads which provide road access to smaller habitations not covered under PMGSY or other government programmes. These roads are mostly owned by local government viz. the Panchayati Raj Institutions. They are in poor condition due to long neglect, under-investment, and lack of maintenance. Improvement of these tracks is a priority of the Government and significant progress is being made to improve many of these roads utilizing the Funds available under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA).

Box 1: Situation Analysis of Local Roads in Rajasthan under MGNREGS

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5. Quality of Construction: During visit of some roads, it was noticed that they have deteriorated fast. Lack of compaction is a major cause of concern to ensure durability of such roads. Unfortunately, this deficiency cannot be rectified later under the scheme. There is currently very weak system of ensuring quality during execution. The JTOs are generally inexperienced. Moreover, they are overburdened with several activities like preparation of estimates, measurement of works to release payments of wages, etc. Hardly any time is devoted to quality control checks and tests as in PMGSY. The Assistant Engineer (AE) and Executive Engineer (EE) posted in Panchayat Samiti are also from soil conservation department, they have little experience of execution of road works. Besides, there is no system of third party audits.

6. Maintenance: There is no maintenance of these local roads on the ground and no grants for this purpose are provided to the Panchayats thus the asset created deteriorates threatening the sustainability of benefits of access to the rural population served by the roads. Proper upkeep would call for maintaining the embankment profile, shoulders and camber, and ensuring quick draining of water runoff, cleaning of side ditches, filling depressions, vegetation control, clearing inlets and outlets of culverts, repair/replacement of damaged road signs. Recently, Central Government has permitted using a part of MGNREGA funds for maintenance but it has not yet been possible to put it into practice including the visited blocks due to inadequate capacity among local Governments to conceptualize, prepare maintenance estimate, detailed project reports, implement and monitor such projects. Project management skills are yet to be attained. Generally, after completion of a road, the accounts are closed and Panchayats are not authorized to incur any expenditure on that road.

7. Current condition: These roads are in poor state due to poor design, poor quality during original construction and lack of routine maintenance since construction. The shoulders have worn off, resulting in reduction of width of embankment. Even on the existing rural roads / tracks, there has been some loss of material from carriageway due to animal drawn or other vehicles plying on these unpaved roads. Most of these roads, many covered with a layer of gravel are in poor condition and need upgrading or regravelling. It is important to carry out condition survey of each of these roads…….

8. Institutional capacity: Clearly, the PRIs undertaking such works lack both management and technical capacity to ensure proper planning and quality execution of these roads.

6. Key Issues:

Some issues which need to be attended in order to improve the quality of construction carried out under MGNREGA are as under:

6.1 **Staff in Panchayats**: Presently, there is one JTO to look after work of 4-6 Panchayats. He is responsible for all technical works in a Panchayat. He gets little time for thorough visits of the sites, checking of works etc. It has been observed that estimates of the approved proposals for the road works are prepared by the JTO without visiting the site and he finds very little time to inspect the works during execution. There should be one exclusive JTO for each Panchayat and an Assistant Engineer to mentor five or six JTOs. There should be an exclusive whole time clerk LDC for one Panchayat to keep record of day to day activities. Present LDCs are on contract basis and owns no responsibility.

6.2 **Preparation of estimates: It is important to carry out inventory of existing roads, list out priorities, carry out condition surveys, and frame estimate** of the work. At present the JTO does not go to the site to take stock of the site conditions and just fills up the quantities in a sample estimate. In the absence of a site visit prior to preparation of estimate, alignment of the road is not proper, height of embankment is taken arbitrarily, items for CD works are not taken as per actual need at the site etc. This is happening as there is only one JTO among 4-6 Panchayats and there are deadlines for the submission of the estimates. In addition, the JTO is required to prepare Muster rolls at the end of every month, prepare bills of the suppliers and do inspection of works. These duties cannot be performed by one JTO for 4-6 Panchayats. An exclusive JTO for every Panchayat is essential.

6.3 **Construction Methodology**: After the inspection of some sample roads it is observed that roads are lacking in essential parameters like grade, camber, super elevation etc. Even the alignment of some roads is not proper and settlements have been observed on roads constructed 3-4 years earlier. The supervisory staff like mate has minimal knowledge of these parameters and roads constructed are thus badly lacking in these. The exclusive JTO for a Panchayat will be able to spend more time during the execution of road work and can guide the mate as well as labour at various stages. Training at regular interval needs to be imparted to the JTO and other related staff of the Panchayat and Panchayat Samiti for the various aspects of construction. Inspection by the officers of line department at some interval is essential.

(i) **Design Parameters - Formation** width is generally found to be 4-5 meters as against 6 meters. With the passage of time this gets eroded/ gets damaged, movement of traffic becomes difficult and the road becomes unsafe. In the absence of proper guidance labour tend to make formation of 4-5 meters as they believe that for a carriageway width of 3.75 meter, a width of earthwork up to 4-5 meters is sufficient. There is also a tendency to keep the ditches for excavation closer to avoid the use of land. **At the stage of earth work frequent visit of the supervisory officers can ensure proper width of embankment.**

(ii) **Compaction:** During field visits it has come to the notice that compaction of earth work is not done while constructing these roads. This is a major cause of the settlement of the roads. Many roads constructed 3-4 years back were found to have settled. Panchayat people informed that while approving technical estimates DRDA does not allow for the compaction item. These gravel roads are ultimately upgraded to BT roads under various schemes, (from time to time) lacked compaction of earth work at the initial stage, leads to the poor condition of the future BT roads. This deficiency in the road can never be rectified at a later stage hence it should be mandatory to compact the earth work while making new gravel roads. DRDA should insist on and permit the compaction of earth embankment in the estimates and should ensure compliance during execution.

(iii) **Shoulders:** It is noticed that generally shoulders are not constructed and this damages the road surface. In the absence of shoulders traffic cannot overtake conveniently particularly tractors and buses. This problem is very grave during the rainy season. Gravel laid on the carriageway gets spread over entire width and required crust is not available. Due to this condition undulation develop on the road surface. Technical support and hand-holding by the PWD is required from time to time. This can be achieved by organizing training workshops at the Panchayat Samiti level. Generally, there is one Assistant Engineer of PWD in one Panchayat Samiti who can impart necessary training for all items related to the construction of road.

(iv) **Side slopes:** During our visit of the gravel roads it was noticed that side slope in the earth work for the formation is not maintained. In fact, the people involved in the construction of these roads are ignorant of the importance of side slopes. The formation gets damaged in single rain and the width of the embankment of the road gets reduced. On the roads constructed 3-4 years back formation width was found to be just 3 to 4 meters due to the erosion of the bank.

(v) **CD Works:** The site is not visited by JTO at the time of the preparation of the estimate and generally CD works are not included in the estimates. In some cases, CD works are included but there is no system in place for basic design, selection of CD work is not as per the site requirement, and the width of CD works is less than the formation width. In case of pipe culverts, the size of pipes is taken arbitrary, generally 1000 mm dia. pipes are proposed without ascertaining if it is feasible to provide 1000 mm pipe at site. The result is big humps at the site and lack of cushion on the pipe. Reduced width of CD Works was noticed at number of places. This is a serious safety issue**.** People involved in preparation of the estimates need to be trained from time to time. At the same time the sanctioning authority, while sanctioning the estimate, should ensure that the estimate has been prepared inclusive of all necessary items and parameters.

6.4 Procurement of Material:

(i) Gravel and other materials: Gravel is procured through tendering. The process of tendering gets delayed due to inexperienced staff in Panchayats. Tenders are processed through a committee consisting of accounts personnel from Panchayat Samiti. Sometimes they take help of the PWD officials. Panchayats take the supply of gravel from the nearest source without ascertaining the quality of gravel. The process of tendering can be eased by awarding annual rate contract at the level of Panchayat Samiti for each Panchayat to make the construction faster. Quarries for suitable gravel in a block should be identified in advance on the basis of quality control tests.

(ii) Material for CD Works: Pipes, Cement, Sand, Rubblestone etc. are procured through tenders but generally suppliers have no interest in small supplies. Often materials supplied are of inferior quality. Further payments to the suppliers are made by Panchayat Samiti and get abnormally delayed. There are no proper accounting systems. The construction methodology is also an issue. Due to these reasons many Panchayats are not inclined to construct CD Works. PRIs may consider award of construction of cross-drainage works to small local contractors on work order basis but he should be bound to employ local labour.

(iii) Drainage: Drainage is a big issue on village roads. Basic requirements such as proper slopes, outfall points etc. are not taken care of during the construction. As a result, drains are mostly found clogged and water stagnating on road surfaces. Furthermore, there is no cleaning system of drains. Panchayats do not get funds for the maintenance of road.

It is suggested that funds should be allocated to the Panchayat for the annual maintenance of the roads.

(iv) Location of Hand Pumps: Hand Pumps installed on the road sides at many places do damage to the roads. The location of hand pumps should be carefully decided by the concerned department in such a manner that no water comes on the road.

(v) Land issue: At many places the roads constructed were found incomplete. There were missing links of 100 to 200-meter length and the work account had been closed a long time back. The reason was non availability of land. Generally, alignments are selected as per existing revenue tracks which are shown as Govt. land in the revenue record but there are encroachments at site. Panchayats are unable to remove the encroachment in the absence of revenue record. It is suggested that Land issues should be resolved by the district administration on regular basis before the start of the work. Local Patwari/ Tehsildar of the area should be made responsible for this.

(vi) Training: The observations noted during the field visits need to be addressed for sustainable and better quality roads. Though there is technical staff available at the Panchayat Samiti level but they have little knowledge of road construction. Training to the staff involved in preparation and checking of the estimates and execution of works is essentially required. This can be provided by giving technical support of the line department i.e. PWD. Officers of PWD should extend technical support by organizing workshops at Panchayat Samiti level.

APPENDIX III
SKILLING FOR MAINTENANCE
(RRM using DDU GKY Framework)

The Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU GKY), the successor programme to Aajeevika Skills aims to skill rural youth who are poor and provide them with jobs having regular monthly wages at or above the minimum wages. It is a part of the National Rural Livelihood Mission (NRLM).

The skilling programmes are implemented in PPP mode by Project Implementing Agencies (PIAs) who engage with the State Government under the DDU GKY framework of Ministry of Rural Development (MoRD). The MoRD has laid down the basic guidelines and provides 75% of the funding (90% in case of NE States, and 100% in the case of J&K). Skilling and placement under ASDP involves eight distinct steps:

- Awareness building within the community on the opportunities
- Identifying rural youth who are poor
- Mobilising rural youth who are interested
- Counselling of youth and parents
- Selection based on aptitude
- Imparting knowledge, industry linked skills and attitude that enhance employability
- Providing jobs in the formal sector that can be verified through methods that can stand up to independent scrutiny, and which pays above minimum wages
- Supporting the person so employed for sustainability after placement

MoRD's strategy is to further build capacities of State Governments for implementation of the programme and to focus at the Central level on improving the quality of design and delivery of the skilling process. For this purpose, States will be required to prepare Annual Action Plans (AAPs) for Skill Development and Placement as a separate component of their overall NRLM AAP. In due course, the AAPs would be prepared within the framework of a State Perspective Implementation Plan (SPIP) for skills. Once the AAP has been approved by the Empowered Committee (EC) of MoRD, specific project implementation (through PIAs) and monitoring would be done by the States.

MoRD actively partners with States to build their capacity. At present, the capacity to implement this programme is not uniform across States. Availability of an implementation mechanism at State, district and sub district levels will enable States to engage with this challenge in a structured and effective way. Funding for capacity building activities is available to State Rural Livelihood Missions (SRLMs) from the programme budget of MoRD at the rate of up to 3 % of the total annual budget of the programme, and should be fully leveraged. SRLMs will also be able to access MoRD programme funds to meet administrative expenses including staff costs and office expenditure at the district and state level. This will be at the rate of 5% of the total annual skill programme spending of the SRLM. It is expected

that the SRLM will use these funds to deploy a dedicated full time team for the skill programme in the state and districts.

The skilling capacity of training partners i.e. the PIAs also has to be augmented on a priority basis. Only then can the programme reach out to all those who need it, irrespective of geography and formal education. New training service providers need to be nurtured, and their capability developed. To this end States need to facilitate the creation of relevant pool of trainers, enable PIAs to access to government infrastructure, get bank loans and handhold new and old training institutions.

Training poor rural youth in Routine Road Maintenance (RRM) activity is currently not specifically included as a skill mainly because the demand has not been conceptualised and projected. Including this activity as a skill under DDU GKY and developing the training modules and developing partnerships with willing PIAs and developing new PIAs can provide an easy way of providing Routine Road Maintenance (RRM) services all over the country over time, with Gram/Intermediate Panchayats and Self Help Groups (SHG) acting as the platforms for launching the service. In the context of RRM, there will be an additional need of developing a "local group" concept around the trained youth, and treating the local group as well as the Panchayat/SHG as the "employer" of the youth for the purpose of the scheme.

While a substantial part of this initiative will come from growth and capacity development of existing PIAs, the development of new PIAs by encouraging institutions engaged in rural development, education and large employers to take up skilling as a new or supplementary venture will need to be given a specific thrust. It would therefore be advisable to designate a few institutions of excellence as State resource institutions for RRM Skills. These institutions can then be used both as technical support centres and as training centres. Third party certification/Independent certification can also be developed to ensure that RRM Skills pass outs are of an acceptable standard.

DDU GKY already provides for a coordination committee headed by the District Collector and head of departments of key line departments, and this can be the institutional mechanism at the district level for bringing convergence in implementation in the various State Departments owning rural road assets.

The Unit Training Costs for courses of different duration are as follows. RRM courses may be appropriately designed for both wage employment (3-month training) and self-employment (6-month training, including Group development, management and leadership).

Duration of Course (months)	***3 months***	***6 months***	***9 months***	***12 months***
Training cost inclusive of transportation and Food expenses @ Rs. 50 per day	16800.00	26200.00	34660.00	41893.00

Duration of Course (months)	*3 months*	*6 months*	*9 months*	*12 months*
Post Placement Support @ Rs. 1000/- per month for 6 months	6000.00	6000.00	6000.00	6000.00
Cost for day scholars	22800.00	32200.00	40660.00	47893.00
Cost for boarding facilities @ Rs. 116/- per day	10440.00	20880.00	31320.00	41760.00
Cost when lodging facility is also provided	33240.00	53080.00	71980.00	89653.00
Minimum salaries for placements in India	Minimum wages	25% above minimum wages	50% above minimum wages	25% above minimum wages

APPENDIX IV
A TRAINING AND CAPACITY BUILDING FRAMEWORK FOR RURAL ROADS

(i) **Preliminary:** In this Framework, "Training" is to be used in broad sense, so as to include cooperative learning, knowledge sharing, capacity building, problem solving etc., and in fact any human resource development process which improves the outcomes of the PMGSY programme. The following paragraphs spell out some of the features. Since the idea is to be better prepared for the future as it evolves, a sectoral vision has to be the underlying basis.

(ii) **Training Vision:**

a) Training for all:

- **All institutions connected with rural roads, not merely PMGSY**: MoRD and NRRDA are evolving into a role which covers the entire rural roads sector, because the network is indivisible. The universe of stakeholders is also the same, whether PMGSY roads or all rural roads. It makes sense to accept the natural unit of "rural roads", and clearly take responsibility for policy, standards, and national level management, so that there can be better synergy at State level. This is particularly important from the "poverty reduction" focus and the management of urbanization which is a concern in the future. The launching of PMGSY-II by MoRD is a clear signal of the direction in which the sector is evolving.

- **All stakeholders:** Some stakeholders vary from State to State, but broadly the key stakeholders include the planning, financing, executing, and managing agencies, the user agencies (like transport, agriculture etc), local government (Panchayati institutions), communities, etc. Other stakeholders include those involved in the construction of the roads (including the contractors, technical consultants etc.), and in the services provided by the roads. The importance of identifying all participatory stakeholders cannot be underestimated. PMGSY is not merely a civil engineering programme requiring the imparting of technical and techno-management knowledge. At its heart, it is a social enterprise, connecting those left out of the mainstream and facilitating access to socio-economic services which enable people to rise above poverty; it is about national integration and inclusive growth.

- **Role based, need based training:** The nature of training will depend on both the "role", which will be common across States for corresponding stakeholders, and the "need" which will be based on the current state of knowledge, which may be highly fragmented within a stakeholder class in some cases. The intervention will thus need to be based on classification in terms of both "role" and "need", so that the training is relevant and can be absorbed. The "need" can be a basis for prioritization (selection) and management (homogeneity) purposes.

- **Comprehensive training delivery:** Most stakeholders play multiple roles, and normally the training emphasizes only the "core" role, which is quite subjective and perception-based. It is important to ensure that the "knowledge improvement" addresses as many dimensions of his role as possible, both the current and the future role, including the technical, managerial, regulatory, developmental, and social dimensions.

- **Informal as well as Institutional:** Given the disparate mix in the stakeholder universe, the range of training interventions needs to be diverse, taking advantage of events and occasions to deliver knowledge improvement capsules even where a structured or planned format may not be possible or useful. This may be particularly relevant in the case of multi-stakeholder training where the varied backgrounds, knowledge base and roles make structured training complex if not impossible. Peer-to-peer type interaction will probably need to be the main transactional mode, particularly in informal settings.

- **Planned training at institutional as well as individual levels:** The training intervention will need to be conducted within an institutional framework that enables delivery of training services with regularity, quality, professionalism and convenience. The training should address the demands of knowledge development of the individual along his career path on the one hand, and of the team of which he is a part, on the other. This calls for an institutional structure with a permanent presence at the national, State, District and sub-District levels, with the ability to access the expert resources in the diverse fields that will be required for the various elements of the stakeholder universe.

(iii) **Training for all institutions in the sector:**

a) **PMGSY–related institutions such as SRRDA and PIU:** Though training for PMGSY-related institutions has been done on an ongoing basis, it has been sporadic and supply-driven. With the passage of time and as the programme expanded in size, the personnel who underwent training have been supplemented or replaced very substantially with personnel who have not been exposed to training. The result is that standard procedures are no longer enforced with sufficient vigour and knowledge gaps in the technical and management aspects are seriously affecting the quality of execution. Training has to focus intensively on personnel in these institutions, not only because they are directly responsible for the PMGSY component, but also because they will be expected to provide an exemplary role-model and a knowledge-resource pool for other stakeholders.

b) **Non-PMGSY rural works/public works institutions:** In many States, there are Departments who construct rural roads outside PMGSY, whose field units may (or may not) be executing PMGSY works as PIUs under the programme. States need to take a policy decision to adopt PMGSY management practices uniformly and MoRD and NRRDA need to advise States accordingly. In order to facilitate this process, knowledge sharing events with these institutions at Department level are clearly necessary. Where field units of the Department are engaged in PMGSY as PIUs under

the SRRDA/Nodal department, the nature and extent of the interaction can and must, be much more intensive.

c) **NABARD's RIDF roads**: NABARD is directly financing States through it's the Rural Infrastructure Development Fund (RIDF). The roads constructed under this programme are expected to meet the engineering standards prescribed in the IRC Manuals for Rural Roads. However, NABARD lacks the technical and management outreach to ensure that the roads are constructed to the requisite standards, and relies mostly on the State Government machinery. In 2013, in consultation with MoRD/NRRDA, NABARD took a decision to align its programme more closely with PMGSY, and use its QM and online management systems. NABARD's institutional mechanisms, including project appraising systems, as well as the State Government departments concerned, need to be brought into the training framework in order to ensure that the RIDF investments (which exceed Rs. 17,000 crore annually) deliver adequate returns to NABARD and are properly integrated into the District Rural Roads Plan for developmental purposes.

d) **State initiatives such as MMGSY**: Several States have started new initiatives based on the PMGSY, often targeting villages not likely to be taken up under PMGSY (e.g. villages with population less than 500/250).States leverage existing Central programmes such as MGNREGS and BRGF and top up from State Plan funds to provide components like black topping .It is important that such programmes synergize with the overall rural roads system, and form part of the DRRP for management and maintenance purposes. It is equally important that the roads are built to a geometric and engineering standard that enables their upgradation to PMGSY standards in due course, as population and traffic rises. Training programmes are particularly complex here as they will need to recognize the constraints imposed by the funding sources such as MGNREGA, adapt the planning and execution and technical standards accordingly and then develop training modules that address all stakeholders including those in the funding programmes. In other words, capacity building here will need to be preceded by laying down of standard operating procedures and technical standards.

(iv) **The primary stakeholders:**

a) **NRRDA**: Though NRRDA, due to its position at the apex is seen as the standard setting and enforcing institution and to that extent, a repository of wisdom, changes in personnel over time, and expansion of activities and new initiatives make it necessary that NRRDA personnel undergo both induction training and refresher training, the latter more in order to ensure that NRRDA continues with its role as ideator and innovator. Clearly the induction training will need to be in an informal setting; in fact, the refresher training will need to be even more informal, almost in seminar and workshop modes, so as to facilitate ideation and innovation.

b) **State Nodal Department, State Planning and Financing Departments:** As the three Departments primarily concerned with "good governance" and value-for-money, their inclusion in the larger training/"knowledge improvement" framework is

needed, not least, to correct a long standing neglect that manifests itself in inadequate budgeting, delayed releases, poor outlays for maintenance, non-creation/non-continuance /non-filling up of essential monitoring and supervision level posts and poor outlays for purchase/ maintenance of equipment etc.
Now that PMGSY funds are being routed through the State Consolidated Fund and PMGSY-II requires release of a State share, the importance of enlarging the Training Framework cannot be overemphasized.

c) **User Departments such as Agriculture (and related sectors), transport, mining, etc.:** The three main issues here are firstly; managing expectations; secondly, ensuring sensible usage practices (e.g. avoiding overloading or use of nonstandard vehicles etc.) and thirdly, developing models to ensure that share of the revenues goes back to building and maintaining infrastructure.

d) **Urban development, rural infrastructure and poverty reduction related Departments:** India is urbanizing, not merely in its mega cities, or even State Capitals and District headquarters, but in so-called census towns, which are expected to grow by leaps and bounds. From 2001 (when PMGSY started) to 2011, the number of such towns has gone up three-fold, from 1,362 to 3,894 and this growth will continue, even accelerate. Design of rural roads in and around these and other Growth Centers must provide for and even include features that can help in the transition, rather than emerge to be the main bottleneck. The training framework should facilitate knowledge accretion by urban and peri-urban area management authorities as well as rural infrastructure/road planners, to enable development of standards and practices and planning processes.

e) **Executing agencies like SRRDA**: What applies to NRRDA applies equally well to SRRDAs, perhaps more so. In many cases under PMGSY-I, SRRDAs were principally conduits for flow of funds and information of the programme, and since PMGSY was seen as a programme with a limited time span (7 years initially, and then 13 years), States did not invest in institution building, with clear adverse implications for the quality of the programme in the State. Now, consequent to PMGSY-II, since rural roads as a sector will continue to be overseen by MoRD as part of the poverty reduction strategy, and NRRDA, and SRRDAs need to become permanent, with technical and management capacity to plan and execute programmes on an ongoing basis, training and capacity building has to focus on the long term as well as the short term.

f) **PIUs:** As PMGSY commenced, States designated District level PIUs through a variety of means; in some cases, the PIUs continued to do PMGSY as well as non-PMGSY works; in some other States, PIUs were actually part of other Departments engaged in civil construction, and were nominally under the SRRDA for operational purposes. Training and continuous interaction did improve their capacity to execute PMGSY works, but as workload increased, in many States, the PIUs consisted of an increasing proportion of newly recruited personnel, or personnel from Departments with little experience in road construction; today, the inability of PIUs in many States, particularly those with a large backlog of works, to supervise survey and design,

contract management, quality control and project management for timely completion is a matter of utmost concern. Intensive training and orientation needs to be ensured through:

a) Structured Induction training
b) Refresher training
c) Periodical workshops at State level, and even at NRRDA level during Regional Reviews in a State.
d) Close interaction with STAs during design phase
e) Mentoring interaction with SQMs and NQMs during execution
f) Repositioning the Superintending Engineer into the PMGSY system and empowering him so that he can ensure capacity building at the Executive Engineer level, which may not be possible through the STA or even SQM mechanism. (In turn, the SEs after retirement can feed the SQM system and make it much more effective).

While this will address the "knowledge improvement" issue in the PMGSY set up, particularly the PIUs, improvement in the other institutions in the Rural Roads space cannot be left to chance and the osmotic process of personnel getting transferred or promoted. As such *the induction and refresher training process* must be made more inclusive, and decentralized to District or Circle level in order to ensure participation. SRRDA may either create the infrastructure at this level (funded by MORD/NRRDA), or use the SIRD network of District Training Centers by executing an MOU defining the scale and scope, enabling the SIRD to put in place the necessary infrastructure. The SE would clearly be the best person to locally coordinate the decentralized training facility on behalf of SRRDA.

g) Project Consultants: In many States, in response to the need to step up pace of execution, and given the capacity constraints in relation to the quality and number of PIUs, Design Consultants and Project Implementation Consultants (PIC) have been engaged to work with PIUs. The result in most cases has not been very satisfactory for reasons analyzed elsewhere, but there is clearly a need to improve capacity of the Consultant Community, and enable this community to grow sustainably and improve the quality and reliability of its services.

Perhaps the best way to start would be to build in the induction training of Consultants into the Hiring Contract. A major problem however is the availability of institutions to provide the requisite training. STAs would be the best institution for training of design consultants, but the arrangement for the purpose needs to be institutionalized. In the case of PICs, the range of subjects being much larger than what can be handled by the STA, the SIRD or some other training institution may be better able to access the specialized resources for the purpose. In case PIUs are also being trained through the SIRD network, long term capacity development of SIRDs and the DTCs for the purpose may be highly advantageous, including Peripatetic Training (PT) while on the job (this issue is elaborated a little in the context of

Contractor personnel). Since STAs have excellent laboratory facilities and have expert technical resources which should be available to SIRDs, a tripartite MOU between the SIRD, STA and SRRDA would seem to be the overall institutional architecture to be developed, and NRRDA may circulate a Model MOU.

h) **Contractor personnel:** Training of Contractor personnel was recognized at the beginning of the PMGSY programme itself as a critical activity and some effort was in fact made. It however lapsed partly because of the excessive emphasis on sanctioning large Annual proposals, despite contractors of adequate quality not being available; and partly because PIUs were unable to supervise effectively and thus develop the pressure necessary for the training.

The cumulative effect has been that in some States, because of poor technical and management practices by contractor personnel, contracts are not getting completed in time (and with the requisite attention to quality). As a knock-on effect, in new proposals, packages have to be retendered many times, and sometimes repackaged; bidding capacity calculations are being shaded to ensure adequate response; package sizes are being reduced on grounds of non-availability of contractors (despite the fact that the programme has been in operation for over 10 years and must have built sectoral contracting capacity enormously); and unofficial subcontracting is rife.

Sub-contracting is now officially being allowed, in order to systematically improve upon the capacity that has come up through unofficial and poor quality subcontracting, and to put the contracting industry into a sustainable growth path. However, training of Contractor and sub-contractor personnel is essential to address the problems mentioned above.

Given the nature of the sector, clearly there are limits to how much training can be given to contractor personnel after award of work, given the pressures of time. Training only personnel of contractors with contracts may also delay improvement in the larger universe of contractors, and encourage poaching. A two-level approach consisting of pre-scheduled training and certification of personnel of all registered contractors/sub-contractors (perhaps on a subsidized cost basis), followed by refresher and on-the-job training of personnel at work site and laboratory (as part of the contract conditions) would be the best approach for the long term growth of the sector. The on-the-job training should cover the skilled workmen, laboratory personnel as well as the engineers. The pre-scheduled training can easily be organized by the SIRD/DTC, since they would be covering almost the same subjects with PIU and Consultant personnel. On-the-job training is a little trickier to organize, but essentially the requirement would be for a Peripatetic Team (PT) attached to the SIRD/DTC. The PT would need to collaborate with a local ITI or Polytechnic for training of skilled workmen. In case such teams can be developed by the SRRDA using the SIRD or STA, it would have enormous value for not only knowledge development of Contractor personnel but also Induction Training for PIUs and Consultants, on the one hand and local Panchayati institutions and local communities on the other.

i) **Panchayati institutions:** "*Roads, culverts, bridges*…" are subjects in the Eleventh Schedule of the Constitution that can be devolved onto Panchayats. Most States have not fully developed their policies on the devolvement, as a result of which the identification of roles in the 3 levels constituting this group of stakeholders is a major problem. However, in view of the clear programme framework in respect of PMGSY, which is likely to be adopted for all rural roads, it can be assumed, at least for purposes of training and capacity development under this Framework that the roles of the 3 levels will generally evolve in the following directions:

   a) *Local Gram Panchayat:* local planning, alignment selection, routine maintenance, feedback on road-related services and services on controlled width, local road safety and encroachment prevention
   b) *Intermediate (Block) Panchayat:* Local network-level planning, batch- routine maintenance contracting, service standard complaint management, network-level road safety
   c) *District Panchayat:* Planning/contracting for renovation and upgradation, provision and coordination of road-related services, road safety systems: preventive and regulatory management.

   Training and knowledge improvement of members and officials of local and intermediate Panchayats will need to be done locally using Peripatetic Teams, augmented to deal with the appropriate range of issues. Training of District Panchayat members and officials is clearly best done in the DTC, by accessing the appropriate resources including local Engineering Colleges.

j) **Academic institutions (Engineering colleges etc.):** Institutions other than STAs are not immediate stakeholders. However Civil Engineering Departments in these institutions can be accessed for resource persons by DTCs. SIRDs need to establish institutional linkages with such institutions and arrange for Induction events, to be followed by Training of Trainers (ToT) events in order to develop the resources for the DTCs. Some of these institutions may in due course develop the capability to become STAs and add further value to the programme.

k) **SQMs and NQMs:** Though SQMs and NQMs are senior retired engineers, collaborative learning is necessary at this level for a number of reasons. PMGSY standards are not generally prevalent in all States, and as such the SQMs and NQMs, unless they have retired recently from a Department executing PMGSY, may not be aware of the specifications, standards and processes for the programme. Standards and systems also vary from State to State and experience sharing enables identification of best practices for general adoption and not-so-good practices to be alert about. Workshops and Colloquiums are perhaps the best mode for the interaction.

l) **STAs:** STAs being academic institutions of higher quality, may not require training as such; however, as in the case of NQMs there is scope for collaborative learning

(v) **The main training areas:**

a) Project management, contract management and supervision: Currently, problems of time overrun and quality erosion are caused by a combination of indifferent project management by the contractor, poor contract management by the PIU and inadequate supervision by supervisory mechanisms. Training modules need to address all these issues, both for the "core "of the issue and at the interfaces between the issues, and identify the stakeholders accordingly and influence and change their attitude appropriately. For example, the interface between project management by contractor and contract management by the PIU can be addressed so that there is a reorientation from adversarial management to collaborative management.

b) New cost effective technologies and practices: It is absolutely necessary to build the capacity of various stakeholders in mainstreaming of the existing technologies which are not currently being practiced, and for promoting new materials and technologies being developed by the industry. The CRRI or IAHE may be the nodal agency for this purpose, and the other existing training centers should also be utilized, such as IAHE, NIRD, NAC, IITs, and other academic institutions including the PTAs/STAs in this task.

Visits of PIUs/SRRDAs/PTAs/STAs should be arranged to good practice projects both within India and outside, to create awareness and raising their benchmark. A record of such site visits to the demonstration projects should be maintained on PMGSY website, along with the details of technology used. Some of the new technologies have already been tried on pilot basis in PMGSY also in some States. The details of such roads should be made available on the Website of PMGSY, so that officers from different States with identical conditions for utilization of technologies can interact and can seek help from such PIUs. NRRDA may help in providing video films showing all steps of design, testing of materials, tendering, execution and performance of different technologies, on their website.

A directory of guest faculty may also be prepared by the CRRI/IAHE for enlisting outside support in preparation and delivery of training material for such technologies NRRDA may also seek the support of contractors' organizations to arrange regular colloquium with them in various regions of the country, for demonstration of such technologies involving STAs / PTAs/ SRRDAs. Technology providers may also be involved in providing such training and field demonstrations.

c) Quality Management (QM) and Quality Assurance (QA): While QM systems in PMGSY are superior to those in most Central programmes and are constantly improving, the major challenge is to make QM and QA the norm for the rural roads sector rather than the exception. "Knowledge improvement" programmes need to cover stakeholders in the non-PMGSY segment of the rural roads sector, including Policy makers and funding departments.

The second challenge is to reposition the NRRDA as part of the "quality assurance" process rather than the "quality management" process where it currently is, and

correspondingly ensure that SRRDAs reposition themselves for the QM role, by developing a greater sense of ownership. The "knowledge improvement" in this case at NRRDA has to be accompanied by orientation events for NQMs, so that there is appropriate focus on systems and processes for QA, rather than on "inspections" for QM. The transition from QM to QA requires cooption of all players into collaborative roles; in particular the contractor has to be part of the QA process rather than the target of the QM process, and appropriate "knowledge improvement" of contractor personnel too has to be incorporated into the framework.

The third challenge is to improve State level QM systems and ensure that the potential for sustainable growth is facilitated, not least in order to be able to cater in due course, to the non-PMGSY segment. Training of current and potential SQMs would clearly be the main component of the strategy, and potential SQMs would obviously be senior engineers in State Governments overseeing road construction programmes.

d) Maintenance and road safety: Planned and funded maintenance has of course been a key feature of PMGSY, and over time States have understood and accepted the objective and the funding requirement for the purpose. This is likely to evolve in two major directions: one, maintenance management systems for PMGSY will need to improve, with better processes to decide on maintenance investments and better quality maintenance works; and two, maintenance management approach of PMGSY will need to spread to other rural road systems, requiring a qualitative change in both the maintenance management capabilities and the maintenance works execution capabilities. Knowledge dissemination, training and capacity building of Planning and Financing Departments, implementing agencies, contractors, consultants, local administrations responsible for maintenance (including Panchayati institutions), as well as user communities would be key to the process. Since in due course, maintenance (including renewal) rather than construction (including upgradation) will be the main activity, the training framework will need to evolve to align itself with this direction in terms of the amount of relative time spent on the two subjects.

Unlike maintenance, road safety continues to be rather neglected even under PMGSY, partly because the design aspects of road safety tend to get subsumed into the operational aspects from a public user as well as Agency perspective, with each category feeling that investments on improvement are not worth it till the other aspects improve (e.g., the view that designing a bus bay is a waste of money till public transport drivers learn to drive more carefully, and the public transport provider not willing to make more investment in getting better drivers given the bad state of the roads and the poor quality of the buses) . However, it is the road users own disregard for safety and sense of helplessness that perpetuates this situation.

Clearly road safety needs to be better incorporated into design, execution, quality and maintenance, but mechanisms need to ensure user education in a sustained and comprehensive manner in order to ensure this. As in the case of maintenance, the process has to be made more user driven, through a vigilant user community, and

the Panchayati institutions. Training, capacity building and knowledge dissemination for all the stakeholders is obviously a prerequisite.

e) **Community based planning and management:** Citizen and User community interfaces occur at many points in the execution processes of PMGSY. Such interfaces are in the process of evolution with regard to management and productive utilization of the created assets. Development of informed user-communities and citizen groups for ensuring efficiency in the development and management of the rural road network and in helping develop capacity to ensure productive utilization of the assets is an end in itself, and is a legitimate goal for the training framework. There are many issues where knowledge dissemination events of all stakeholders should be held together, to facilitate mutual interaction, experience sharing and problem solving. Road alignment selection (including transect walk), maintenance and road safety and provision of services are clearly such issues. However, it is important that the overall strategy under the Framework where user communities are concerned should be to educate and inform, to sensitize, to empower, to create healthy relationships with the agencies responsible and most important, to facilitate development of leadership to take ownership on behalf of the community.

f) **Planning for development:** The State Planning and Finance, Agriculture, Rural Development, Mining, Industry and other departments and District and Intermediate Panchayats have vital stake in the rural road network. They need to be brought into the training framework, both in order to sensitize the other stakeholders of the larger purpose, and to ensure that the planning, execution and utilization of the constructed assets synergize the network.

(vi) **Training needs:** Based on the above the following main training need areas (including training of Trainers for the purpose) can be delineated:

a) **Engineering:** Related to survey, designing and quality, maintenance etc.
b) **Transportation:** related to network planning, transportation related services, maintenance etc.
c) **Management:** related to contracts, projects, programmes etc.
d) **Socio-economic:** planning for poverty-reduction and efficiency in delivery of socio-economic services, environmental and social impact management, law and order, road safety etc.
e) **Institution building:** in relation to NRRDA, SRRDA, PIUs PRIs etc.

(vii) **Training intervention levels:** On the basis of the stakeholder set and the range of training needs, it is clear that training interventions will need to follow a vertical organizational hierarchy as well as an object-based delivery stream directed specifically to the stakeholder sets at each level. While primary formal training will be for groups of homogenous stakeholders, the real value will come from addressing (through planned but informal and on-the-site interactions) the interfaces between different horizontal (and even vertical) homogenous groups and also providing "multi-disciplinary" inputs which more closely correspond to real life practicality. The vertical intervention points are obviously:

a) **National:** for national level institutions and "senior management" of NRRDA, SRRDA, NABARD, other Central and State stakeholders, NQMs, PTA/STAs etc.

b) **State:** for State level institutions and "senior management" of SRRDA, other agencies planning and executing rural road programmes at State level, State Departments concerned with planning, financing, executing or utilizing rural roads. This will also include SQMs and STAs and other engineering and transportation related academic institutions

c) **District:** for PIUs, senior management of Consultant organizations, SQMs, STA and other institutions. Also for District Panchayats and larger Community-based institutions.

d) **Sub-District/site:** for PIUs, Consultant personnel, Contractor personnel etc. Also for Intermediate Panchayats and Gram Panchayats and local Community-based Institutions.

As is apparent, some stakeholders appear at two successive levels, because of the nature of the role, and in the case of institutional stakeholders this further requires identification of personnel within the hierarchy for the respective levels.

(viii) **Institutional architecture:**

a) NRRDA as the apex technical body for rural roads has attempted training initiatives in the past, but these could not be institutionalized or sustained. Individual PTAs and STAs have the capability to conduct training, but only when workload permits, which may not coincide with availability of the personnel who need to be trained. Site visits as part of training is also involves considerable effort in planning and execution. The coordination between the various training institutions is also an important issue when it comes to specialized training. Some of the training interventions, of a social or environmental nature, are also beyond the core capabilities of PTAs and STAs. Training and knowledge management needs specialized attention of dedicated personnel, who should be able to reliably access the required resources. For reasons brought out above, the appropriate model is to entrust the training related activity to training professionals under a well specified framework.

b) Given the range and variety of training related situations as mentioned above, it is clear that a wide spectrum of interventions will be required, involving a complex architecture and operational mechanisms. What is particularly important is that the training intervention is only partly an "engineering"–led intervention. The intervention requires a nodal institution to drive and manage the process and that requires the following:

a) A national presence, with capability at Central, State and District levels.
b) Access to multi-disciplinary resources
c) Ability to plan, execute and coordinate training interventions across multiple platforms

c) Only a reputed Government–supported professional training institution can provide a service of this kind. NRRDA itself would be a good candidate, except that it will find it difficult to develop internal capabilities for the purpose, and will need to depend on outsourcing the function to another agency. The same applies to SRRDA at the State level. In fact, since SRRDA's primary interest is to operationalize the contracts, there is a conflict of interest with the need to ensure training before commencing execution, and ideally that institution at the State level needs to be entrusted with the training which is not under operational pressure on the executing side. In the road sector, CRRI and IAHE (earlier NITHE) have capabilities approaching the requirements on the technical side, but they have limited reach at State and more so at district levels across the country.

d) For obvious reasons, specialized transportation/civil engineering training institutions will not be also able to develop a deep "reach" to district and sub-district levels on a Pan-India basis. In the case of PMGSY and rural roads in particular, the crucial need is to be able to reach out to the "cutting edge" at the level of the PIU, Contractor and Consultant. It is here that the design and executional quality is determined, and it is here that deficiencies in knowledge are most evident and need to be urgently addressed.

e) As such, identification of a nodal institution to drive the process has to be based primarily on the ability to reach to district and sub-district levels; and since such an institution will not be specialized (and in any case the training needs are likely to be multi-disciplinary, and beyond the capacity of any single institution), the crucial requirement is its ability to have assured access to high quality specialized training resources.

f) Based on a sector scan, it would appear that the institution that best fits the requirement is the National Institute of Rural Development and Panchayati Raj, (NIRD) Hyderabad, a national level training institution under the Ministry of Rural development itself. NIRD's Governing Body is headed by the Minister of Rural Development and the Executive Council is headed by the Secretary Rural Development, Government of India. The Ministry of Rural Development provides budget support not only to NIRD but also to the State Institutes of Rural Development (SIRD) which function under the State Rural Development department in all the States. The SIRDs work closely with NIRD, and the Annual Training Calendar is prepared in a coordinated manner. There is also substantial sharing of infrastructure and training resources between the NIRD and the SIRDs. The Ministry of Rural Development also funds the SIRD (through the NIRD) to develop District Training Centers (DTC).

g) The NIRD at the National level, SIRD at the State level and the DTC at the District level already constitute a viable structure for providing the necessary outreach. The core competence of this structure currently extends to training and capacity building related to:

a) District and local area planning
b) Livelihood and poverty reduction programmes
c) Socio-economic studies
d) Natural resource management
e) Environmental issues
f) Panchayati Raj and community institutional capacity building etc.

The Framework needs to enable this institutional structure to access the resources necessary for training of the various stakeholder groups at the different levels in the remaining areas, specifically design and execution and project management for rural roads.

NIRD as the National Nodal Institution:

In the context of the institutional architecture available in the NIRD-SIRD-DTC framework, the context-specific detail of the training and capacity-building activity-set can be as follows:

a) *Developing technical training resource reservoirs and training institutions:* This would primarily be the PTA/STAs and Engineering Colleges at State level, so that SIRDs and DTCs can call on these resources for addressing needs of contractor personnel, consultants, PIU personnel, and local communities; and IAHE (NITHIE), CRRI and similar institutions at National Level for Executive/Supt. Engineer level professional development.

b) *Capacitating the physical infrastructure in NIRD/SIRDs (and DTCs thereunder)* as institutions for providing training and as knowledge repositories, for knowledge dissemination to Contractor personnel, Consultants, AEs and below in PIUs, and local communities;

c) *Further improving lab facilities in PIUs/STAs:* to provide lab training to Consultant, Contractor and PIU personnel

d) *Utilizing services of ITIs, RITIs and Polytechnics*: to train skilled workmen of contractors and machine/equipment operators

e) *Developing Mentoring mechanisms in the form of SQMs and NQMs:* to mentor field staff of PIUs, Contractor technical personnel, Consultant personnel, etc.

f) *Creating Peripatetic Training(PT) mechanisms to provide on-site learning:* anchored in SIRD (and DTCs thereunder) or similar institutions, Peripatetic Training (PT) would

comprise planned training/knowledge-sharing on site of all stakeholders, including field staff of PIUs, Contractor technical personnel, Consultant personnel, etc. PRIs and local community institutions, at crucial points in the stages of planning and execution such as transect walk, survey & design, setting out, earthwork, WBM, etc., based on the PIU intimating the dates in advance. The SIRD/DTC would coordinate the presence of appropriate training personnel from a variety of sources based on availability (since the site cannot wait for the convenience of trainers).

g) *Organizing State/National level workshops /Colloquiums*: for peer-to–peer learning and for knowledge sharing at senior levels (SEs, CEs NQMs SQMs etc.), and with other stakeholders including STA/PTA and Engineering/institutions, large Consultancy Organizations, etc. These could be organized by SIRD/NIRD/CRRI/IAHE/NRRDA/SRRDA or PTAs etc. but the overall planning would be with the National Nodal Institution, i.e. NIRD.

h) *Coordinating online knowledge dissemination*: including Audio visuals and training materials, specifically designed for each category of stakeholders; etc. NIRD would plan the overall requirement in consultation with the stakeholders, and commission projects on behalf of NRRDA/SRRDA, involving appropriate Technical Partners (who could be STA/PTA or NQM/SQM or others based on requirement)

(ix) **Developing a Centre of Excellence in NIRD for rural connectivity/infrastructure:** NIRD as the national rural development training institution is already ideally positioned, and can develop the expertise to plan and coordinate training and knowledge management programmes with inputs from NRRDA, and perhaps a local Technical Adviser such as Osmania University or NIT Warangal or National Academy of Construction, Hyderabad. Its core values will enable delivery of services of high quality, and the network of SIRDs in the States will give it unparalleled local reach, which can be further leveraged through the DTCs and Peripatetic Training (PT) Groups. A comprehensive MOU between NIRD and NRRDA, with a similar back-to-back arrangement between NIRD and SIRDs would ensure that the organizational and funding arrangements are properly formalized; this will enable the institutions to dedicate resources including positioning an Engineering Professional as Full time Programme Coordinator.

(x) **Training Delivery management:** While the physical architecture for knowledge dissemination can be put into place, and operationalized by adequate budget provisioning, ensuring the creation of a positive momentum requires institutionalization of the process and creating a set of stakeholders interested in using the mechanisms put in place. Some of the issues are discussed below.

a) Making Training as a prerequisite:

a) Contract conditions with Contractor must provide for mandatory training at commencement of contract, prior to mobilization.

b) Peripatetic Training (PT) at site must be a condition at crucial stages of execution, e.g. compaction of earthwork and WBM, shoulders and side drains, wearing course etc.
c) Similarly contract conditions with for Design Consultants and PICs must specify mandatory training at commencement and PT at site at crucial stages (e.g. survey, transect walk, siting of CDs etc. for Design Consultants and stage passing for PICs)
d) Staff at JE level in PICs must undergo Induction Training before they can be authorized to make entries in MBs.
e) Staff deputed from other Depts. and not familiar with PMGSY must also undergo Induction training.
f) Staff on promotion (JE to AE and AE to EE) must undergo Orientation Training commensurate with their higher responsibilities.
g) STAs, NQMs and SQMs on appointment must undergo Induction Event.
h) Staff of NIRD/SIRD inducted into the Training Framework must undergo Induction Event.
i) Staff of SRRDA and NRRDA and RC Division of MoRD must undergo Induction Event.

b) Training for career development:

a) States need to be persuaded to develop HR Policies for the rural road sector that make mid-career trainings, including refresher training as essential for promotion and certain kinds of postings. NRRDA can develop a model policy.

c) Realistic Training schedules: Very often the enthusiasm to cram as much as possible into a training event proves self-defeating; the course is too long or held too far away from the station of posting, and those who need training (or will benefit the most) don't come and only those who can be spared do. To ensure that training reaches those who matter it is necessary that, subject to minor variations:

a) Training for PIU staff (AE and below) is held on site through PT
b) Training for senior AEs and EEs is held at District/STA level; for not more than 2 days at a time
c) Training for SEs and CEs and SRRDA is held at Circle/PTA or State level for not more than 1 day at a time
d) Training for CEs and CEOs of SRRDAs is held at State or Central level for not more than 2 days
e) Training for Project Consultants (design as well as execution) is held at site for not more than 2 half days at a time.
f) Training for Contractor personnel is held at site or in ITI/RITI/Polytechnic (for not more than 2 half days at a time)
g) Training for local community institutions is held at site or Panchayat headquarter (for not more than 1 day at a time)

h) Training for other District and State level stakeholders (including induction events for STA/PTA personnel and SQM/NQM) should be held in the District/State Hq; for not more than a day at District level and 2 days for Sate level.

d) Registration and Evaluation: For District level and above, training registration must be online, and all training material must be available there. Evaluations (of participants and institution) should also be online. For Contractor and Consultant personnel too, registration should be compulsory so as to track the competency levels.

e. **Capacity development in SRRDA to take ownership for training***:* The SRRDAs will need to put in place a training cell headed by a training Coordinator to coordinate the training delivery arrangements. Over time, this cell needs to evolve to be able to plan, organize and manage training programmes for its constituents. NIRD and SIRD need to hand-hold the SRRDA in this evolutionary process.

(xi) **Arrangements in MoRD/NRRDA/SRRDA:**

a) Funding for training, capacity building and knowledge management has to be separately budgeted in NRRDA, and passed on directly to NIRD (except for components like foreign visits etc. which will be handled by NRRDA separately, or where National Institutions like CRRI or IAHE organize events or activities under a Project or MoU with NRRDA) on the basis of an Annual Training Proposal conforming to the MoU, to be submitted by NIRD. The Proposal needs to include both the NIRD and SIRD components (the latter prepared in consultation with the SIRDs). NRRDA and SRRDA will need to designate a part time "Training Coordinator" to liaise respectively, with NIRD and SIRD.

b) To ensure adequate focus, both NRRDA and SRRDA will need to create Training Coordination Committees, chaired by the DG/CEO, with representation from NIRD/SIRD, PTAs and STAs and others with a stake in the outcome.

c) *International exposure visits* would need to be directly coordinated by MoRD and NRRDA through the TCC by way of structured MOUs with Institutions like RMIT, VicRoads, IFHREL, TRL, SANRAL etc.

d) *Audio visual and online training:* The TCCs would need to also identify online training opportunities and development of audio-visual training material. NIRD, SIRDs, CRRI and IAHE would need to be able to coordinate the actual development of subject-specific and area specific material based on standard templates to be developed by NIRD, which could act as the repository and manager for the purpose and handle the funding arrangements. STAs and PTAs would be Technical Advisers for the technical AVs, while suitable NQMs may be identified to be Advisers for the management-oriented AVs.

(xii) **Arrangements at NIRD/SIRD:** Clearly, NIRD and the SIRDs would need to create mechanisms to manage the activities under the Framework. This may need to include:

a) MoU with a Technical Partner (PTA/STA)

b) Engaging a full time Training in-charge, preferably a transportation specialist/economist or civil engineer with expertise

c) Creating a Committee under the DG /Director to approve the Training Calendar and monitor progress

d) Energizing the SIRDs (in the case of NIRD) and the DTCs (in the case of SIRD) etc.

(xiii) **Arrangements at STA/PTA/CRRI/IAHE:**

a) CRRI and IAHE, as National Institutions, would enter into separate MoUs with NRRDA, based on agreement on the Workshops/Seminars /Colloquiums to be conducted. They can be given financial support by NRRDA on a project-basis, including costs of event, institutional overheads, knowledge development expenses etc. An Annual Training schedule will need to be drawn up, so that the events are in sync with other events of the Annual Training Calendar.

b) In the case of STAs and PTAs, events organized by them would obviously need to be projectised so as to include costs of event, overheads, development expenses etc. Even when the STA/PTA is a resource for events in DTC/SIRD etc, it is necessary to develop a projectised approach so as to make their availability assured and productive. Accordingly, a norm may be developed by NRRDA to compensate the STA/PTA for the time (including journey days), travel costs, honorarium, institutional overheads and knowledge development expenses, when they participate in events under the NIRD/SIRD training Calendar.

(xiv) **Indicative Training Content framework:** Based on the above discussion, a suggested modular training content framework is given in the ***Annexure 1***. The modules themselves will need to be further detailed out with regard to specific objects (e.g. under "survey module", the object of the training may be "use of Total Stations"). The participant levels and expected outcomes would need to be specified suitably based on circumstances of each case. Even for the same object, the "knowledge prerequisite" may need to be specified so as to get relatively homogenous groups. Obviously the length of the training would be related to the knowledge prerequisite and the expected outcome.

(xv) The modules can be combined as appropriate in order to create viable events based on training needs and training resource availability. As mentioned earlier, training should be broken up into manageable segments to ensure adequate participation and the modular approach has been devised to facilitate this. It may not always be possible to ensure that training is held in a face-to-face event. Training adapted to the circumstances of the trainees is essential if delivery is to be ensured. ***Annexure 2***

discusses some of the issues in this regard, particularly from the perspective of alternate and additional solutions like audio-visual material dissemination and on-line training services.

(xvi) **The rollout strategy:** The detailing out of the Course content would in the first instance, need to be done by NIRD in consultation with the Clients (NRRDA and SRRDAs) and the associates (SIRDs and NIRDs Training Partners), keeping in view the inputs formalized in the PMGSY Training Workshop held on 16th January 2015 and then approved in the Training Coordination Committees (TCC) of the NRRDA (for National and State level) and SRRDA (for District level and below).The TCC would need to estimate the numbers (of trainees, trainers, physical resource availability, funds etc.) and prioritize the training events accordingly, having regard to capacity constraints at various points in the system. Hopefully the exercise will also enable development of responses to overcome the constraints over time. Based on the overall annual requirements projected by the State and Central TCC to NIRD/SIRD, Annual Training Calendars would need to be prepared at NIRD and SIRD levels with due consultation with all stakeholders to ensure appropriateness and convenience.

(xvii) **Monitoring and Evaluation of training interventions:** Building on the earlier experience incorporated in the PMGSY website there needs to be a comprehensive database of training related activities, and third Party evaluation of training service and training institutions.

ANNEXURE 1 (TO APPENDIX IV)
CONTENT OF MODULES IN THE TRAINING FRAMEWORK

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
1.1	Engineers of PIUs							First time Road Construction Exposure/PMGSY
1.1.1		Planning of Rural Roads and PMGSY	DRRP, Core Network, Planning concepts, Introduction to PMGSY – Systems and Procedures	C	3	NRRDA	EE/AE	
1.1.1		Survey	Use of Total Stations & associated S/W	S/O	2	STA/IAHE	AE/JE	
1.1.2		Design	Preparation of Detailed Project Reports, common mistakes, Use of Local Materials & Stabilisation	S/L	2	STA/PTA/CRRI	EE/AE	
1.1.3		Transect walk	Conducting Transect Walks & desirable Outcomes	S	1	STA/IAHE	AE/JE/PRI	
		PMGSY Quality System, Field Laboratory, Equipment	SQM and NQM inspection Mandatory Equipment and other resources for Field Laboratory	C/S/L	2	STA/IAHE	AE/JE	

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
		requirements and Setting out	Construction equipment output and deployment for timely completion Setting out for Rural roads in normal and hilly terrain					
1.1.4		Earthworks	Embankment, cutting in earth and rock, sub-grade and shoulders: Material including non-conventional & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	C/S/L	2	STA/IAHE	AE/JE	
1.1.5		Surface Drains	Placement of surface drains, Brick and Stone Masonry Drains - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	C/S/L	1	STA/IAHE	AE/JE	
1.1.6		Granular Construction I	Granular Sub-base, Lime & Cement treated soil, Gravel/soil aggregate base and surface courses - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	C/S/L	2	STA/IAHE	AE/JE	

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
1.1.7		Granular Construction II	Water Bound Macadam and Wet Mix Macadam - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	C/S/L	1	STA/IAHE	AE/JE	
1.1.8		Bituminous Construction completion	Surface Preparation and Various Types of Bituminous Surfaces for PMGSY Roads - - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship	C/S/L	2	STA/IAHE	AE/JE	
1.1.9		Maintenance	Periodic Maintenance Operations and Repair Works & Exposure to Performance based Contracting	C/S	1	STA/IAHE	AE/JE	
1.1.10		OMMAS	Introduction to OMMAS, updating and its use	C	2	IT Nodal Officer	AE/JE	
1.1.11		Contract Management	PMGSY SBD and salient features, Case Studies, Disputes and their resolution, Arbitration	O	3	IAHE	AE/JE	
1.1.12		Project Management	Time, Cost and Resource Management, MIS and exception reporting	O	2	STA/IAHE	AE/JE	

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
1.1.13		Accounting	Accounting System for PMGSY	O	2	AO/NRRDA	AO/AAO	
1.2	DESIGN CONSULTANTS (DC)							
1.2.1		Survey	- Reconnaissance Survey for Low Volume Roads - Traffic Survey	S	2	STA/PMC	DC Engineers	At Inception and 1 day annually at DTC/STA
1.2.2		Survey	Use of Total Stations & associated S/W	S/O	2		DC Engineers	
1.2.3		Design	Contractual Expectations from: ▸ Investigations ▸ Geometric Design & Road Safety ▸ Design of Flexible Pavements ▸ Design of Rigid Pavements ▸ Optimising locations and Design of Cross Drainage Works	S	3	STA/PMC	DC Engineers	do

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
			▸ Managing Costs of Low Volume Roads					
1.2.4		Design	Use of Local Materials & Stabilisation	S/L	2	STA/PTA/CRRI	DC Engineers	
1.2.5		Transect walk	Conducting Transect Walks & desirable Outcomes	S	1	SIRD/DTC	DC Engineers	do
1.2.6		DPR	Avoiding Shortcomings in DPR Preparation	O	1	STA /NQM	DC Engineers	do
1.3	IMPLEMENTATION CONSULTANTS (PIC)							
1.3.1		Survey	Use of Total Stations & associated S/W	S/O	2	STA	PIC Engineers	
1.3.2		Design	Use of Local Materials & Stabilisation	S/L	2	STA/PTA/CRRI	PIC Engineers	
1.3.3		Transect walk	Conducting Transect Walks & desirable Outcomes	S	1	SIRD/DTC	PIC Engineers	do
1.3.4		Quality Tests	Quality Control Tests to be conducted at various stages, frequency and record maintenance	S/L	3	STA/PMC	PIC Engineers	At Inception and 1day annually at DTC/STA

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
1.3.5		Contract Management	PMGSY SBD and salient features	O	1	IAHE	PIC Engineers	
1.3.4		Project Management	Time, Cost and Resource Management, MIS and exception reporting	O	5	Resource Persons from Transport Sector	PIC Engineers	
1.4	CONTRACTOR ENGRs.							
1.4.1		PMGSY Quality System, Field Laboratory, Equipment requirements and Setting out	SQM and NQM inspection Mandatory Equipment and other resources for Field Lab Construction equipment output and deployment for timely completion Setting out for Rural roads in normal and hilly terrain	C/S	1		Engineers of Contractor	
1.4.1		Earthworks	Embankment, cutting in earth and rock, sub-grade and shoulders: Material including non-conventional & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	S/L	2	STA/PMC	Engineers of Contractor	At Inception as per Contract

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
1.4.2		Surface Drains	Placement of surface drains, Brick and Stone Masonry Drains - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	S, L	1	NQM/SQM, PMC	Engineers of Contractor	At Inception as per Contract
1.4.3		Granular Construction I	Granular Sub-base, Lime & Cement treated soil, Gravel/soil aggregate base and surface courses - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	S, L	2	NQM/SQM, PMC	Engineers of Contractor	Prior to stage passing of earthwork
1.4.3		Granular Construction II	Water Bound Macadam and Wet Mix Macadam - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship.	S, L	2		Engineers of Contractor	
1.4.4		Bituminous Construction completion	Surface Preparation and Various Types of Bituminous Surfaces for PMGSY Roads - - Material & its' testing, Construction techniques, Do's and Don'ts' and workmanship	S, L	2	NQM/SQM, PMC	Engineers of Contractor	Prior to stage passing of WBM

S no.	Group	Module	Object	Nature	No. of days	Trainers	Participants	Point of intervention/periodicity
1.4.5		Maintenance	Periodic Maintenance Operations and Repair Works	S	1	NQM/SQM, PMC	Engineers of Contractor	PRI to be associated

Choice of training methodology: Training and capacity building for rural roads management is a large and complex task, because of:

- the large number of diverse stakeholders, with different organizational ethos
- organizational variations in recruitment standards of officials in the States
- differences in operational procedural detail, based on local customary practices sanctified over time
- sheer volume of training in terms of numbers and subjects
- the geographical spread of the trainees and constraints of availability for training.

As a result, there will be situations where training will need to be imparted in conditions which are not face-to-face. This is a serious drawback because learning is much better in group situations, through a mixture of "competition' and "collaboration", and because in a face-to-face training event, the knowledge imparter can on the basis of real-time feedback, adjust his training delivery in terms of content and manner to suit the needs of specific audiences.

However, training should not be postponed or done away with merely because it is not convenient to arrange for a face-to-face event. Many of the problems in rural road construction and management originate from needless postponement of a training input on the assumption that the requisite face-to-face interaction is not feasible or convenient, and the solution lies in devising a mix of training interventions so that between them, the entire target group is covered, even if the standard varies a little in the process. As such, in addition to the face-to-face training option in the classroom, site or lab, it is necessary to devise other methodologies which enable coverage of the remaining target population. The two main strategies for the purpose are:

- audio-visual training material, which can be distributed on a media like paper or CD/DVD or on Computers; and
- online training material which can be "streamed" onto computers via the internet; which has the advantage of being more interactive and flexible, and can now, in addition to Computers and laptops, be accessed through mobile phones (4G technology will further expand the range).

The two strategies are not mutually exclusive, and certainly the "content" will have much in common, even if the mode of delivery is different. It will in fact be best if both options are used as per requirement and appropriateness to the context when face-to-face training is not possible (and even as a supplement thereto), leveraging the respective strengths of the two modes. This is "blended learning" and is explained in more detail later in this Annexure.

Reinforcement and feedback: To accommodate various learning styles, it is preferable to integrate review exercises in various formats. For example, training materials may include true or false or multiple choice questions to reinforce content. After watching an instructional video, participants can be asked to break up into small groups to discuss the content or write down their impressions. When creating a training workbook, knowledge may be assessed

through the use of quizzes. It is also necessary to evaluate the effectiveness of the training materials by asking training program participants to share their opinions. Training material feedback forms could contain questions about organization, clarity, variety and usefulness, and may be used to revise and improve the materials.

Audio-visuals (AV): Depending on the learning objectives and length of the training program, training materials may include illustrated workbooks, training manuals, computer-based lessons and audio-visual materials such as photograph or animation sequences, videos etc. Use of graphics, videos, tables and other visual tools reinforce important concepts and should be preferred. Photographs and videos are particularly useful in illustrating concepts in a classroom or other remote situation, and their usefulness can be enhanced in a number of ways; photographs either magnified or taken from an appropriate perspective can bring new insights in ways that words may not be able to convey. Videos, through juxtaposition, time delay or acceleration, and other special effects can be particularly helpful in helping explain complex systems. In some situations, animations may actually be superior to photographs or videos, particularly computer generated animations which can be structured to the needs of the presentation.

Audio-visuals are increasingly being delivered through computer systems because of their superior processing capabilities and some features given in the next paragraph. Audio-video presentations in such cases have to be suitably structured to handle variations in individual learning abilities and speeds, and to handle situations which normally be handled by the instructor, e.g., sequencing, feedback, etc. This would normally imply that the Audio-visuals are conceived within specific frameworks and sub-frameworks, which can be managed in pre-structured ways.

Two computer-based AV applications which are increasingly useful are:

- **Multimedia.** These training materials are an advanced form of computer-based training. In addition to text, they provide stimulating graphics, audio, animation, and/or video. Multimedia tends to be more provocative and challenging and, therefore, more stimulating. Although costs are higher than text-only software, the benefits in terms of learning may well be worth it. Multimedia training materials are typically found in DVD format.
- **Virtual reality.** Virtual reality is three-dimensional and interactive, immersing the trainee in a learning experience. Most virtual reality training programs take the form of simulation, which is a highly effective form of training. It is hands-on experience without the risks of actual performance, and particularly suited to training on heavy or expensive equipment such as earth moving machinery.

Advantages of Computer-Based Training (CBT)

- Computer-based training programs are easy to use.
- The voice-over and text can be altered to any preferred language by making suitable provision.
- They are good for helping the trainees develop and practice new skills.

- They are useful for refresher training and self-directed learning.
- They can be cost-effective because the same equipment and program can be used by large numbers of trainees.
- They are flexible because trainees can learn at their own pace and at a time that is convenient for them. Computer-based programs are available 24 hours a day, 7 days a week. No matter in which shift an employee works, training is always available.
- Some programs are interactive, requiring trainees to answer questions, make choices, and experience the consequences of those choices. This interaction generally results in greater comprehension and retention.
- They are uniform, which makes it possible to standardize training.
- They are measurable. When computers are used for training, it is possible to track what each trainee has learned right on the computer. Most programs have post-tests to determine whether the trainee has understood the training. Test scores give trainers statistics for training evaluations.

On-line training: Training is of course best conducted in a classroom or group situation in the presence of an instructor, who can ensure that the material is properly used to best effect. There will however be cases where learning will need to take place individually because of the remoteness of the individuals or because it is not possible for all of them to assemble at one place at any given time. While generally Audio Visuals do address these issues fairly effectively using computer based technologies, further efficiencies can be gained using the advances in communications technologies which enable "online" and "real time" delivery of content. These two features enable the following applications:

- **Internet or web-based training.** This method puts the computer-based training modules onto the Web. Training materials remain standardized because all trainees will use the same program. The standardization is a continuing feature because the materials are also easy to update in the server, so the training is always in step with the communication strategy. Web-based training programs are also often linked with software (a learning management system, or LMS) that makes trainees' progress trackable, which makes recordkeeping very easy for the training administrator.
- **Tele- or videoconferencing.** These methods allow the trainer to be in one location and trainees to be scattered in several locations, provided they are all available at the same time. Participants are networked into the central location and can usually ask questions of the trainer via Skype or by a webchat feature. Lectures and demonstrations can be effective using this method. This method is also suitable for field situations where mobile phones can be used.
- **Audio conferencing.** This method is similar to videoconferencing but involves audio only. It is particularly useful where the internet connectivity is poor, or video is not supported. Participants dial in at the scheduled meeting time and hear speakers present their training. Question and answer sessions are frequently held at the end of sessions in which participants can call in and talk to a presenter.
- **Web meetings, or webinars.** This method contains audio and visual components. Participants dial in to receive live audio training and also follow visual material that appears on their computer screens. These presentations are similar to CD-ROM or

PowerPoint presentations and sometimes offer minimal online interactivity. Q & A sessions may also be held at the end of sessions.

- **Collaborative document preparation.** This method requires participants to be linked on the same network. It can be used with coaches and trainees to teach writing reports and technical documents.

Advantages of online training:

- Online or e-learning programs are effective for training across multiple locations.
- They save money on travel expenses, and/or time of the participants.
- They can be a less expensive way to get training from experts / professionals and consultants from outside.
- They are useful for refresher training.
- They are good for self-directed learning.
- They can be easy to update with new practices or initiatives or policies or procedures, and compliance issues.
- They offer trainers a growing array of choices for matching training programs to employee knowledge and skill levels.

How to Use Blended Learning for a "Training for All" approach

Blended learning (including elements of face-to-face, audio-visual and online) is a commonsense concept that results in better target coverage, with a much higher learning success. The blended learning approach is simply acknowledging that one size doesn't fit all when it comes to training, because different States have different organizational features and different training needs in the rural roads sector. Blended learning has many advantages because it factors in:

- Subject matter
- Nature of training
- The knowledge transfer process
- Budget considerations
- Space, time and locational constraints
- Compliance issues

Once the training needs have been identified, the blended learning solution will depend on the following:

- List of training modules and feasibility of AV or CBT as mode of delivery
- Number of people to be trained per month/year
- Availability of classrooms
- Availability of labs
- Availability of Expert resources

- Prioritization of training which must be delivered in a year
- Prioritization of trainee groups

Based on an understanding of the 'throughput" and the available resources, the proportion for throughput in the various modes can be worked out, targets laid down and implementation arrangement commenced. However, time consuming this process may seem, blended learning offers trainees a well-planned session that is custom-designed for them, the subject, and the learning environment. In the long run, blended learning saves time and money since this training process is an efficient use of resources to help employees develop sufficient levels of knowledge retention.

Annual training Calendar: The Annual Training Calendar will need to be based on an application of the "blended learning" principle so as to allocate resources optimally in order to achieve the "training for all" objective. The exercise will obviously need to be done by the SIRDs and vetted by the NIRD before being made the basis for the rollout.

Appendix V
Young Professionals Fellowship Programme for PMGSY

1. Introduction

1.1 Poverty reduction is one of the key elements in Government's planning processes., and while on the one hand employment generation programmes and social safety nets have been put in place to reduce the rigours of poverty, bringing people out of poverty into a higher trajectory of growth and sustained income generation requires capacity building (education, health, skills etc.) and infrastructure creation (transportation, communication etc.) to provide new opportunities and the ability to access such opportunities.

1.2 The PMGSY has been developed as a Central Government intervention to develop a rural road network and provide all weather access to hitherto unconnected villages because of its unique ability to act as an entry point for sustained poverty reduction since lack of access is accepted universally as a fundamental factor in continuation of poverty. There is a clear body of empirical evidence that links transport investment to the improved well-being of the poor. Transport is also highly relevant to the achievement of a number of targets defined under the Millennium Development Goals (MDGs). The multiplier effect of provision of rural roads is well known. The provision of a good road network is a better option than indefinitely expanding the education or health services to reach all consumers at their doorstep as it becomes expensive and unsustainable in terms of stationing trained service providers like health workers and teachers. The beneficiaries can thus access a sustainable service network through the roads. Roads thus multiply the impact of provision of a service without the government having to invest in its unsustainable expansion. In particular, rural roads act as facilitators to:

- promote and sustain agricultural growth
- improve basic health and hygiene standards
- provide access to schools and other educational opportunities
- provide access to economic opportunities
- create employment opportunities
- enhance democratic processes, reduce the sense of alienation and bring people into national mainstream
- enhance local skills
- reduce vulnerability and poverty
- act as infrastructure multiplier

1.3 Needless to say, while for most rural purposes (i.e. getting agricultural inputs and transporting agricultural produce), Rural roads is part of a transport chain with one end in the agricultural fields and the other on the local market, it is also the transport chain from the national market to the remotest farming community, bringing goods and services from other parts of the State and country and even from other parts of the world.

Development of rural roads cannot be viewed in isolation from the higher categories of roads Namely the District roads, State Highways and the National Highways. Rural roads serve the accessibility function. They feed traffic into and receive traffic from the secondary system, (State Highways and Major District Roads: SH and MDR), which in turn is supported by and supports the primary system (National Highways: NH). The secondary system contributes both to the rural economy and to the industrial development. They combine the mobility and access function. National highways serve the mobility function as they criss-cross the whole country, connecting capitals of the states, major ports, industrial and tourist centres. The road transport system functions efficiently only if all the three groups of roads are developed harmoniously and are integrated into one another.

2. The PMGSY framework

2.1 The primary objective of 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 with a population of 500 persons and above in Plain areas. In respect of the Hill States (North-East, Sikkim, Himachal Pradesh, Jammu & Kashmir and Uttarakhand), the Desert Areas (as identified in the Desert Development Programme), the Tribal (Schedule V) areas and Selected Tribal and Backward Districts (as identified by the Ministry of Home Affairs and Planning Commission) the objective would be to connect eligible unconnected Habitations with a population of 250 persons and above.

2.2 PMGSY permits the Upgradation (to prescribed standards) of the existing roads in those Districts where all the eligible Habitations of the designated population size have been provided all-weather road connectivity. However, it must be noted that Upgradation is not central to the PMGSY-I Programme.

2.3 PMGSY–I has now been almost completed, barring Assam, Bihar, Jharkhand and Meghalaya. A follow on programme has now commenced. PMGSY–II envisages consolidation of the existing Rural Road Network to improve its overall efficiency as a provider of transportation services for people, goods and services. It aims to cover upgradation of existing selected rural roads based on their economic potential and their role in facilitating growth of rural market centers and rural hubs. Development of growth centers and rural hubs are critical to the overall strategy of facilitating poverty alleviation through creation of rural infrastructure. Growth centers/rural hubs would provide markets, banking and other service facilities enabling to enhance self-employment and livelihood facilities.

2.4 Both PMGSY-I and PMGSY-II have very similar implementation protocols and supporting mechanisms. At the National level the National Rural Roads Development Agency (NRRDA), a registered society under the Ministry of Rural Development, and at the State level a corresponding State level institution, the SRRDA are responsible for the management of the programme and the SRRDA administratively controls the PIUs. Briefly the implementation processes comprise the following:

- A planning universe called the District Rural Roads Plan (DRRP) and a subset of single-connectivity links, called the Core Network.
- A well-defined design and specifications system developed by the Indian Roads Congress
- A DPR based project approach. DPRs are prepared by the Project Implementing Unit (PIU), scrutinised by the State Technical Agency (STA), generally an academic engineering institution of repute, and tendered for execution to qualified contractors. DPRs need to adhere to a Social and Environmental Management Framework (ESMF)
- Continuous capacity building of institutions, including technical capacity through the STAs and Principal Technical Agencies (PTAs)
- Strict quality control on execution, comprising three-tier monitoring, by the PIU, the State Quality Mechanism comprising State Quality Monitors (SQM) and the National Quality Mechanism at the national level comprising National Quality Monitors at the national level.
- A focus on asset management including post construction maintenance.

2.5 High technical and management standards have been a hallmark of PMGSY-I and is expected to be enhanced in PMGSY-II. Transparency and data based decision making are enabled through programme websites. Technical issues are considered at multiple levels: the STAs, the NRRDA Executive Committee, the Principal Technical Agencies, and the IRC itself.

2.6 Implementation of PMGSY over the last 10 years has brought about a sea change in the way the sector is organised. It has also revealed some of the structural deficiencies in the sector in different parts of the country. Some of the impacts and learning from PMGSY so far are as follows:

- Rural roads design and execution is getting more professionalised. Contractors have invested in equipment and machinery because of the knowledge that PMGSY is a long run programme with sustained funding. Some of it is caused by a parallel national highway programme, but significantly, the combination of PMGSY and the NHDP is resulting in a larger pool of better contractors and equipment, with a positive impact on the roads in between the rural roads and the national Highways; the district roads and the State Highways, in terms of construction quality of this hitherto neglected part of the network.
- Many States too have invested in creating durable organisational structures for management of rural roads keeping view the quality of the assets and the hype that surrounds PMGSY as a central intervention.
- Maintenance of rural roads has begun to be taken seriously and this is having a rub-on effect on the higher order roads.
- Community involvement in alignment selection has led to much greater involvement of community institutions in construction, management, maintenance, road safety and services of rural roads.
- The benefits of rural roads are now visible in the quality of life in connected areas. Rural roads are now being factored into local area planning routinely for managing the delivery of public services.
- PMGSY has spawned imitations in many States funded out of State budget.

- Many of the benefits enumerated above are very variable and some States have shown much better impacts than others. North eastern States and LWE affected States in general are yet to reach the levels of the more advanced States.
- R&D for more cost effective designs and specifications and the use of local and marginal materials, are however yet to pick up. Possibly the 100% central funding provides no incentive. PMGSY-II where central funding is only 75% may see a pick-up in this area.

3. Young Professionals

3.1 PMGSY is a fairly complex programme: it envisages central funding for asset creation by the States, with the overall objective of better achieving a central goal of poverty reduction. The goal is socio-economic and the effectiveness of the strategy at the national level and the efficacy of the road at the local level are both equally important subjects for study. The programme itself is an engineering based programme, whose utility depends on ensuring high standards, proper management and the full involvement of the many stakeholders. There are thus many aspects of the programme including those enumerated in para 2.6 that call for close academic and professional study and analysis, at the local, State and National levels. The results of such study would clearly be very welcome feedback into the programme at appropriate levels, both in respect of States who are lagging behind in completing PMGSY-I and in respect of the roll out arrangements for PMGSY-II.

3.2 It is therefore proposed to encourage Young Professionals (YP) in the infrastructure, transportation, civil engineering, poverty reduction, rural development and other sectors to undertake such studies and participate in the programme at first hand. On the one hand such an arrangement would enrich their knowledge and add to the sectoral capacity. On the other hand, the insights and feedback received through many mechanisms would help in the continuous improvement of the concept of PMGSY itself, and have beneficial impacts on similar programmes operated by the States.

4. The Scheme

4.1 The basic features of the Scheme would be as follows:

(i) YPs would be taken in annual batches in the following disciplines (and any other added):

- Civil engineering
- Transportation planning
- Rural development
- Poverty/socio-economic studies
- HDI/MDG related studies
- Energy and resource use efficiency
- Environmental impact assessments

- Systems design and organisational management
- Quality management
- Any other discipline decided by the NRRDA

The attachment would be in the nature of a Fellowship under the programme and the YPs will be known as "PMGSY Fellows" during the attachment.

(ii) The process of selection of Fellows would be conducted by NRRDA in collaboration with PTAs and the SRRDAs who wish to participate in the scheme, as per guidelines given in **Annexure 1**. The number of fellowships shall be decided by NRRDA in advance of the selection process.

(iii) Fellowships shall be awarded for work related to specific areas of work jointly identified by NRRDA and the participating SRRDA.

(iv) YPs would be attached for a period of one to two years with the sectoral professionals in the NRRDA and the SRRDA in accordance with the terms of reference (ToR)/methodology designed for the area of work. The YPs may also be attached with PTAs and STAs, for research oriented projects of special relevance to PMGSY. The specific area of work scoped out, together with the ToR and methodology shall constitute the "Project". The PTA/STA would need to propose the project for the purpose to NRRDA well in advance of the annual selection process of the YPs.

(v) Selected Fellows would be free to propose/modify the methodology for the Project in consultation with the PTA/ STA and /SRRDA/NRRDA

(vi) The attachments may include visits/temporary attachment with STAs/PTAs/PIUs/NQMs/SQMs etc. as appropriate, with the approval of the Project Supervisor.

(vii) The fellowship would be for a period of one to two years depending on the scope of the project, and would be non-extendable. However, a YP may apply through the normal process for another fellowship.

(viii) The YP would be expected to give monthly reports to the PTA/STA/SRRDA/NRRDA and participate as a Resource Person in workshops and seminars organised in respect of the programme. He shall give a final Project Report at the end of the Fellowship.

(ix) The YP would be paid a stipend by NRRDA, and the terms and conditions of the fellowship would generally be as given in the **Annexure 2**.

(x) On the successful completion of the Fellowship, the YP will be awarded a Certificate by the NRRDA.

4.2 The eligibility criteria for application shall be the following:

i. Applicant should be a citizen of India. However, as part of regional or international cooperation programmes of the Government, candidates from other countries sponsored by the Ministry of External Affairs may also apply.

ii. He should be of an age between 23-27 years at the time of application. For candidates belonging to SC/ST category, the maximum age limit will be 32 years.

iii. A Graduate in the case of Civil Engineering (Post-Graduates will be given preference), and a Post Graduate from a recognized University with a degree related to the discipline to which he is applying, in other cases.

iv. At least First Class marks in the aggregate or equivalent grade at the graduate as well as Post-graduate level.

v. Physical fitness, certified by Government Medical Hospital

4.3 Each YP would be attached for most of the duration of the Fellowship with an SRRDA/STA /PTA (unless the nature of the fellowship requires him to be attached to the NRRDA) and shall:

i. Familiarise himself with the area of work of the fellowship and give an inception report within 15 days detailing out how he proposes to carry out the Project.

ii. List out the agencies with whom he proposes to interact (along with purpose), so that visits /temporary attachments can be arranged.

iii. Give monthly reports on the progress to the STA/PTA/SRRDA/NRRDA, and participate in quarterly seminars organised by NRRDA to review the work of the Fellows.

4.4 The Director (Technical) NRRDA will be the programme in charge at the Central level (including for YPs attached with PTA/STA) and the State Quality Coordinator will be the nodal officer at the SRRDA level. The designated Nodal person in the STA/PTA for PMGSY shall be nodal for the Fellowship in their institution.

4.5 Each Fellow will be assigned a Supervisor by the SRRDA/NRRDA, depending on the content of the Project. The Supervisor should have the academic or technical qualifications and the practical experience necessary to guide the YP in the Project. The supervisor may be from within the SRRDA or from the PTA/ STA or from an academic institution in the vicinity. He may also be an NQM. The supervisor shall be paid an honorarium of Rs. 10,000 per month for the project period.

4.6 The Supervisor shall:

(i) Be responsible for ensuring that the Fellow works in accordance with the requirement of the Project.

(ii) Facilitate the Fellow in meeting officials and others as part of the Project.

(iii) Cause to be made available, or facilitate the Fellow in accessing, all data required for the Project.

(iv) Guide the Fellow during the Project period

(v) Approve the leave and report absence or other events in relation to the project.

(vi) Advise the SRRDA on the progress of the fellowship and give his suggestions on improving the Scheme at the end of a project.

4.7 The SRRDA/PTA/STA/NRRDA may incur a project related expenditure to cover travel expenses, and miscellaneous expenses not exceeding Rs. 1,00,000 per annum (called "Project grant"), with the recommendation of the Supervisor. In case the project is of a nature that requires higher expenditures, for example, on items such as data collection etc., the project costing must be included in the proposal at the outset (para 4.1(iv)).

4.8 NRRDA shall place the Project reports in a searchable data base in its Website. The conclusions/suggestions emerging from the Report should also be presented at various fora, including Regional Reviews, Sectoral Journals etc.

5. The dividends from the Scheme:

5.1 The Scheme is intended to create a small group of Young Professionals with an in-depth understanding of rural transportation issues, including the poverty reduction dimension. Such YPs, post their fellowship, will have good potential for absorption in NRRDA, SRRDAs, STAs, Consultancy organisations of the sector etc., and will help create virtuous cycles of innovation and quality improvement.

5.2 As the Scheme establishes itself, it would be useful to take it forward by addressing the needs of mid-career professionals (working in the SRRDA, PTA, STA etc.), and giving them a Strategy and Policy focus. Such a programme (which may be called a Senior Fellowship) could focus on those already employed in the sector at an implementation level (e.g. the senior Executive/Suptg. Engineer), and providing them with an opportunity to:

- Understand better the wider context of the PMGSY in the rural roads framework in particular and the road connectivity network in general
- See programme management institutions and systems in other parts of the world
- Appreciate information management frameworks and processes for operational, strategic and Policy purposes
- Study how R&D can be incentivised and R&D systems can be linked to operational work
- Undertake a short duration study project of a subject of their choice, with the objective of suggesting systemic solutions.

6 Guidelines for the Senior Fellowship

6.1 Selection:

(i) The sponsoring Institutions will be as identified by the NRRDA from time to time and would include the SRRDAs, PTAs, and STAs. The Ministry of External Affairs MEA) may be designated as a sponsoring institution if international candidates are proposed to be sponsored under the Scheme.

(ii) It is expected that there would be 15 Fellowships in one batch, and 2 to 3 such batches in a year. The NRRDA may fix the number of fellowship for each category of institutions from time to time.

(iii) The sponsoring Institutions would be requested by the NRRDA to sponsor names for Mid-Career Training (MCT) Programmes, which would generally be 3 month programmes on Policy and Strategy issues related to rural roads

(iv) The candidates would need to be regular employees of the Sponsoring Institution (except in the case of MEA candidates)., and generally satisfy the following requirements (detailed requirements will be specified by NRRDA in the call for sponsorship):

a) At least 10 years' regular service

b) Association with rural road programmes for at least 5 years

c) At mid-career level, and likely to deal with policy and strategy issues in the near future.

Preference may be given to candidates already in policy /strategy level assignments. Preference may also be given to those with higher qualifications and/or published work relating to the sector. Selected candidates would need to provide an undertaking that they will remain with the institution for at least 3 years after the Fellowship.

The Director (Technical) NRRDA will be the programme in charge at the Central level and the State Quality Coordinator will be the nodal officer at the SRRDA level. The designated Nodal person in the PTA/STA for PMGSY shall be Nodal for the Fellowships in their institution.

6.2 The Fellowship:

(i) The selected candidates would be called "PMGSY Senior Fellows" during the period of the fellowship.

(ii) The Fellowship would generally be for 10-12 weeks, comprising academic work, field trips and Workshops and Seminars. The Sponsoring Institutions, NITHE and NIRD would be required to contribute expert resources for the academic work/Workshops and Seminars on remuneration basis. The sponsoring SRRDAs would make available local logistics and support for field trips in their State. There would also be, to the extent possible, one to two-week attachment with a reputed international road research training institution

(iii) The Sponsoring institution would continue to bear the salary, and other compensations of the selected candidates during the fellowship period. The Fellowship Grant would include:

a) A Project stipend of Rs. 10,000 per month for out of pocket expenses,

b) Domestic and international TA/DA as applicable, as per Central Govt. norms, or as fixed by NRRDA

c) A one-time Book Grant of Rs. 10,000.

(iv) At the end of the Fellowship, the Senior Fellows would be required to submit a Paper of about 10,000 words on a subject related to rural road policy and strategy covering:

- The wider context of the PMGSY in the rural roads framework in particular and the road connectivity network in general; or
- Programme management institutions and systems in other parts of the world; or
- Information management frameworks and processes for operational, strategic and Policy purposes; or
- Incentivizing R&D and linking R&D systems to operational work
- Any other relevant topic proposed in consultation with the Sponsoring Institution and approved by NRRDA at the start of the Fellowship.

NRRDA shall place the Papers in a searchable data base in its Website. The conclusions/suggestions emerging from the Papers may also be presented at various fora, including Regional Reviews, Sectoral Journals etc.

(v) The NRRDA may select the 3 best Papers for an award. The Authors would need to make a presentation in the Valedictory of the Fellowship when the Awards will be conferred.

(vi) On the successful completion of the Fellowship, the Senior Fellows will be awarded a Certificate by the NRRDA.

7. Management:

(i) There shall be a Management Committee for the Fellowships, chaired by DG NRRDA and comprising all the Sponsoring Institutions as well as the IRC, NITHE and NIRD

(ii) The Ministry of Rural Development may get included in NIRD's Plan, a **Centre for Rural connectivity** under its S**chool for Infrastructure and Urbanisation** in order to provide continuous academic and quality management inputs for the fellowship

(iii) The Director (Technical) NRRDA shall place a Report before the Executive Committee of the NRRDA and the General body of the NRRDA giving the details of the implementation of the scheme, and its evaluation from time to time.

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ANNEXURE 1 (TO APPENDIX V)
THE PROCESS OF SELECTION OF PMGSY FELLOWS

1. The Executive Committee of the NRRDA shall work out the list of disciplines in which fellowships are to be offered in the forthcoming year, and the number of fellowships in each discipline.

2. NRRDA and SRRDAs will mutually consult on the specific areas of study under each discipline and shall formulate the Topic of study and the broad scope and methodology, having regard to need perceived in the NRRDA and the SRRDA. NRRDA/MORD may consult or invite suggestions from other Ministries or stakeholders in case it is desirable. The intention is to define a definite deliverable "Project' for the purposes of the fellowship

3. The applications (in a prescribed proforma) for the fellowship shall be invited in January each year by open advertisement and publication on the Official websites and selections finalised by March. The list of topics and the location of the study shall be mentioned in the advertisement.

4. The application proforma will enable a preliminary assessment of the academic and intellectual capabilities of the applicant and the career path he has mapped out for himself.

5. Applications will be screened based on the academic performance, the appropriateness of the University degree to the Project topic, the capabilities and the relevance of the Project for the career path, and 3 candidates shortlisted for each project topic will be interviewed to determine the final selection.

ANNEXURE 2 (TO APPENDIX V)
TERMS AND CONDITIONS OF THE FELLOWSHIP

1. The Fellows shall be entitled to a consolidated stipend package of Rs. 75,000 (Rupees Seventy-Five thousand only) per month during the first three months and Rs.1,00,000 per month (Rupees One Lakh only) thereafter, subject to the Fellow's satisfactory performance as determined by the NRRDA in consultation with the SRRDA/PTA/STA and the Supervisor, based on an assessment of the progress. This package shall be deemed to cover the Fellow's honorarium, boarding and lodging expenses /accommodation/house rent during the Fellowship period, health insurance, life and disability insurance cover and any other contingency expenses. It will be mandatory for the Fellows to purchase suitable health insurance and life and disability insurance coverage for the entire duration of the Fellowship.

2. NRRDA shall pay the monthly stipend to the Fellows and shall make direct deposits into the bank account of each Fellow immediately upon confirming the attendance of the Fellow from the SRRDA as per the format of monthly reporting to be prescribed.

3. The Fellow shall not take up any type of employment with any other person, firm or any other agency during the tenure of the Fellowship.

4. The SRRDA/PTA/STA (or NRRDA in case of a direct attachment) will make available space in the SRRDA/ PIU/STA/PTA or other office premises to the Fellow and shall make available a computer/laptop along with internet connectivity free of charge.

5. The PIU will provide the Fellows attached with the SRRDA with suitable modes of transport while travelling within the district for regular work.

6. Travel reimbursement where PIU does not make the arrangement will be based on actual and restricted to AC-II tier train fare by shortest route or equivalent, plus local transport cost.

7. The Fellows are entitled to casual leave for a maximum of 8 days, restricted holidays for 2 days and earned leave for 15 days in a calendar year. The Fellows may take unpaid (i.e. days for which stipend shall not be paid) leave for a maximum of 45 days, if adequately justified. All leave shall be taken with the prior written request to the Supervisor, duly approved. The tenure of Fellowship may be increased for those Fellows by the duration for which they remain on unpaid leave, in case that is necessary to complete the project. Unauthorized absence shall be reported at once by the Supervisor to the SRRDA/PTA/STA and the NRRDA

8. Under normal circumstances, the Fellows are supposed to complete their Fellowship in terms of the Project scope as originally laid down. However, for reasons to be recorded, and in case NRRDA, SRRDA/PTA/STA and the Fellow jointly agree, the scope and ToR of the project can be modified in view of specific circumstances, and in the public interest.

9. All materials generated during the Project, and all reports and audio-visuals and other intellectual property shall, unless a prior right subsists, be the property of the NRRDA, and shall be described as such. However, Fellows, and any other persons, are free to use data collected during the Project as well as material included in the project after acknowledging the PMGSY fellowship/NRRDA for the data/intellectual property.