ASSESSMENT OF PMGSY
Improving its Design and Implementation
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>Aajeevika</td>
<td>The livelihoods and self-employment development programme of the MoRD implemented through the National Rural Livelihoods Mission (NRLM)</td>
</tr>
<tr>
<td>CBR</td>
<td>California Bearing Ratio, a measure of load bearing capacity of the soil</td>
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<tr>
<td>CRF</td>
<td>Central Road Fund</td>
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<tr>
<td>DDU GKY</td>
<td>Deen Dayal Upadhyaya Grameen Kaushalya Yojana, a skill impartation programme of the Central Government</td>
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<tr>
<td>DPR</td>
<td>Detailed Project Report</td>
</tr>
<tr>
<td>DRRP</td>
<td>District Rural Road Plan, an inventory of all roads and arterial tracks</td>
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<td>DTC</td>
<td>District Training Centres of the SIRD</td>
</tr>
<tr>
<td>ITI/RITI</td>
<td>Industrial Training Institute/Rural ITI</td>
</tr>
<tr>
<td>LWE</td>
<td>Left Wing Extremist affected area</td>
</tr>
<tr>
<td>MGNREGA</td>
<td>The Mahatma Gandhi National Rural Employment Guarantee Act, which provides up to 100 days of unskilled wage employment on demand</td>
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<td>MMGSY</td>
<td>Mukhya Mantri Gram Sadak Yojana, a Chief Ministers’ scheme in several states to build local roads</td>
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<tr>
<td>NABARD</td>
<td>National Bank for Agriculture and Rural Development</td>
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<tr>
<td>NE</td>
<td>North East</td>
</tr>
<tr>
<td>NIRD</td>
<td>National Institute of Rural Development and Panchayati Raj</td>
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<tr>
<td>NQM</td>
<td>National Quality Monitor</td>
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<tr>
<td>NRLM</td>
<td>The National Rural Livelihoods Mission, also known as the Deen Dayal Antyodaya Yojana (DAY)</td>
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<tr>
<td>NRRDA</td>
<td>National Rural Roads Development Agency</td>
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<tr>
<td>OMMAS</td>
<td>Online Management, Monitoring and Accounting system</td>
</tr>
<tr>
<td>PIC</td>
<td>Project Implementation Consultant</td>
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<tr>
<td>PIU</td>
<td>Project Implementing Unit</td>
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<td>PMGSY</td>
<td>Pradhan Mantri Gram Sadak Yojana (Prime Minister’s Rural Road Programme)</td>
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<tr>
<td>QCBS</td>
<td>Quality-cum-Cost Based System</td>
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<tr>
<td>QM</td>
<td>Quality Management</td>
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<tr>
<td>RIDF</td>
<td>Rural Infrastructure Development Fund</td>
</tr>
<tr>
<td>RSETI</td>
<td>Rural Self Employment Training Institute programme of the MoRD which develops entrepreneurial and management skills of youth seeking self-employment through micro-enterprises; it is a component of Aajeevika</td>
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<tr>
<td>SIRD</td>
<td>State Institute of Rural Development</td>
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<td>SQC</td>
<td>State Quality Coordinator</td>
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<td>SQM</td>
<td>State Quality Monitor</td>
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<td>SRRDA</td>
<td>State Rural Roads Development Agency</td>
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<tr>
<td>STA</td>
<td>State Technical Agency, identified academic institutions working for PMGSY</td>
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Preface

Road sector development in India has a fairly long history, and a useful starting point is the Jayakar Committee appointed by the Government of India in 1929, whose report was a major landmark as it signified the first organized effort at road building at the national level. It was on the recommendations of this Committee that the role of the Central Government in regard to development of road system was recognized.

As a follow-up to a recommendation of the Jayakar Committee, the Central Government set up the Indian Roads Congress (IRC) in 1934 which then facilitated the formulation of the famous Nagpur Plan (1943-1962). This Plan classified roads as national highways, state (or provincial) highways, district roads and village roads, and prescribed standards, norms and targets for road development of various categories.

In 1957, a new road plan, popularly known as the Bombay Plan (1961-1981), was developed. It envisaged that no village should be more than one-and-a half miles from any road in developed agricultural areas, three miles from any road in semi-developed areas, and five miles from any road in underdeveloped and uncultivable areas.

The system of developing long-term plans continued in the Central Government and when the Bombay Plan was about to end, another perspective road development plan was formulated, known as the Lucknow Plan (1981-2001). This plan was not confined to only prescribing accessibility targets for ‘developed’, ‘semi-developed’ and ‘under-developed’ categories in general; it also provided a direction on how states could prepare their own perspective plans for road development keeping in view the differences in the land-use pattern, population, terrain, stage of and potential for economic development and social infrastructure needs to achieve a balanced road network.

Many states formulated and executed their own plans for rural roads, helped in part by Central programmes for rural employment and drought relief that enabled the construction of earthen tracks. However, it was evident that the poor quality of construction and lack of maintenance of the roads were preventing the created assets from providing much long term socio-economic benefits. On the other hand, studies showed that well-designed rural connectivity did have significant impact in terms of rural poverty reduction, and needed to be leveraged for the purpose.

In October 1999, the President of India in his address to Parliament announced a new Programme for rural connectivity through construction of all-weather roads to connect all villages. The Programme was intended to provide “farm-to-market” connectivity as part of the strategy of rural poverty reduction. The Government of India constituted a National Rural Road Development Committee (NRRDC) on January 06, 2000 under the chairmanship of Shri Nitin Gadkari, then Leader of Opposition, Maharashtra Legislative Council to make specific recommendations on the way forward. Subsequently, in his Independence Day Address on 15th August 2000, the Prime Minister announced the Pradhan Mantri Gram Sadak Yojana (PMGSY), with the target of connecting, through good all-weather roads, every habitation that has a population of more than 1,000 within the next 3 years and every habitation with a population of more than 500 by the year 2007. The Programme was launched on 25th December 2000.

There is, today, a general consensus that PMGSY has been a game changer in persuading states (since roads other than National Highways are a state subject), to adopt a more systematic approach to road development, which incorporates planning, high-standard engineering, quality control, maintenance, and asset management. PMGSY has indeed initiated a paradigm shift in the way rural roads are
designed, monitored, built, governed and managed, thus ushering in a sector wide reform for sustainable rural infrastructure development and maintenance.

As a natural progression of rural road sector development, it is necessary to mainstream these progressive practices, by analyzing PMGSY for its innovations and enabling and facilitating the incorporation of the identified good practices into the standard operating procedures of the state management systems, not only for PMGSY (and its successor programs funded in part or whole by the Central Government), but also for the rest of the extended rural road network. The goal remains “all-weather farm-to-market” connectivity, and the current vision for the sector, evolving as it has been through the Nagpur Plan, the Bombay Plan, the Lucknow Plan and the NRRDC Report, is embedded in the “Rural Road Development Plan: Vision 2025” which was developed in 2007. Hopefully this Assessment Report, by evaluating over 15 years of implementation practices of PMGSY will go a long way in mainstreaming these progressive practices, some of which are best practices, not only in the sector, but in Central Government programme management.

Thanks are due to the World Bank for commissioning the Assessment lead by Mr. Ashok Kumar and assisted by Dr. Reenu Aneja; to Shri S Vijay Kumar, Distinguished Fellow TERI (and former Director-General NRRDA (2002-2005) and former Secretary Rural Development (2012-13)), to Shri Sushant Baliga (former Addl DG CPWD and former Director NRRDA) who developed the Report, to Shri D. P. Gupta former DG (Roads) MoRTH, NRRDA, SRRDAs, NQM, SQMs, PTAs and STAs and to all other stakeholders who provided valuable feedback and suggestions to the assessment process.

A final note: The Vision 2025 was developed in 2007 when PMGSY management practices were still evolving. I believe that the Assessment Report will provide new insights into the sector, and can enable a deepening and broadening of the Vision. “Vision 2030” is perhaps a need of the hour, and the Ministry of Rural Development would be looking to develop this vision, in collaboration with agencies like the World Bank, incorporating the insights provided by this Assessment Report.

Rajesh Bhushan

New Delhi,
May 3, 2017

Joint Secretary (RC) & Director-General, NRRDA
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We gratefully acknowledge the cooperation and support provided by National Rural Roads Development Agency, Ministry of Rural Development led by Mr. Rajesh Bhushan, Joint Secretary and his team throughout this assignment especially in organizing consultations, workshops and providing insightful inputs. The team also wishes to acknowledge the officials from various state governments, SRRDAs, NQMs, SQMs, STAs, and PTAs for their insightful feedback and suggestions for preparation of the report.

This Assessment Report is a compilation of observations and recommendations received from the systematic assessment undertaken based on extensive interaction with various stakeholders through detailed questionnaires and discussion during various workshops. Based on the analysis of available information, response to questionnaires and observations made in various audits conducted by NRRDA, several areas of enhancements have been identified to strengthen the PMGSY framework. This assessment report of PMGSY highlights the key issues, constraints, good practices examples, and list out specific improvements and enhancements to the PMGSY programme and to the rural roads network in general.

This team is grateful for the funding received from the Australian Aid Trust Fund for the study.
Executive Summary

The implementation of the Pradhan Mantri Gram Sadak Yojana (hereinafter referred to as PMGSY or the ‘program’), as a Centrally-Sponsored Scheme, has brought in a sea-change in the rural roads sector because of the rigorous planning, technical and contracting requirements of the programme, and the explicit attention to quality. The long term vision of the program is to form a rural roads network to realize the objective of “farm to market” connectivity.

Up to March 2016, the total length of road works completed under PMGSY was 472,695 kilometres with a total expenditure of Rs. 1,45,300 crore. For the period 2010-2014, states like Gujarat and Karnataka awarded more than half of the total number of cleared projects within 3 months of clearance. While Haryana, Punjab and Madhya Pradesh ranked the highest in Quality Assessments with the lowest percentages of unsatisfactory reviews by NQMs and SQMs.

With 99 per cent and 96 per cent respectively, Haryana and Gujarat rank the highest in the percentage of road work completed. Meghalaya ranks the lowest with just 59 per cent.

Institutional Structures

The states, entrusted with the responsibility of implementation of PMGSY, receive the funds from the Central Government through the Ministry of Rural Development. The responsibility for the execution of PMGSY rests with the NRRDA and SRRDA. The NRRDA provides management and technical support for the programme while the SRRDA, set up by the state, looks after the management of funds, planning, monitoring, financial management, quality management etc.

The NRRDA and the SRRDAs were set up as temporary institutions for the implementation of the PMGSY, but the success of PMGSY has led to the realization that NRRDA and SRRDAs are crucial for the professional management of rural roads and hence should become permanent bodies.

Also, the approach to quality and management inherent to PMGSY should be applicable to all rural roads to ensure that the objectives of the programme are met. For the NRRDA to take on a leading role in improving coordination amongst the stakeholders, the new organizational structure needs to be studied and operationalized.

Many posts, such that of the SQC, are held part-time in some states. This adversely affects quality. Funds for the administrative expenses should be utilised for the creation of full-time jobs for the key state-level posts. Frequent transfers, low tenures and the posting of staff from other departments into PIUs have resulted in a variable work culture. The State Governments should come out with a policy on the posting of staff to ensure more stability of tenure.

Adoption of PMGSY standards for all rural roads must be pushed as the national objective. For this objective to reach fruition, it would be important to administratively capacitate the SRRDAs for the purpose.

PMGSY’s management and monitoring systems are one of the best amongst all Central schemes. This robust system should be leveraged further by other states. The Internet and mobile based technologies should be expanded under OMMAS and all stakeholder workflows should be captured in such processes to the extent feasible.

While the SRRDA should evolve to become the asset management agency for all the rural roads, an even larger institutional mechanism, which can combine the asset management and the asset utilization functions is required. Also, there is a requirement to strengthen the SRRDA-STA linkage as many states view the STA as only a procedural device.
Planning

A district master plan i.e. DRRP, a collection of all existing and proposed road network systems in the district, is used to identify the proposed roads for connecting the yet unconnected habitations in the most economic and efficient way possible. Computerization of the DRRP data through OMMAS, and its visualization on GIS are utilised for planning and operational management.

Currently, the STAs check for the road on OMMAS from the Core Network while scrutinizing the DPR. This may be replaced by a process of checking for the road from the Annual list to be uploaded by the SRRDA on OMMAS.

Annual allocations, as in the case of PMGSY-I, may not allow for a “wider and equitable” distribution of works in case of PMGSY-II, as the roads will be longer with higher traffic. The NRRDA should also at the start of each year give the annual allocation, the portion earmarked for the ongoing works and the free portion available of the new DPRs. SRRDAs quarterly reports showing the expenditure incurred on the ongoing works and projected absorption patterns should be the basis for working out the division.

According to the procedures, the SRRDA should initiate the process of preparation of District level lists in advance without waiting for the actual annual allocation. This process is not being followed in many states and needs to be monitored for compliance. It would also be important to lay down, on the basis of the historical data, the total capacity of the PIUs. It should be done to ensure that this limit is not exceeded. This capacity may be in terms of km, separately for new construction, upgradation and for maintenance.

The Core network has substantially been strengthened by PMGSY-I, therefore the primary categorization can now be between the Core roads network and the other rural roads of the District Rural Roads Plan (DRRP). The latter roads may collectively be called the “local roads network”. Basis of categorization of these roads is mentioned in the report.

Also, the DRRP and the Core Network should be updated with respect to the various database elements. Data arising out of PMGSY activities should be updated concurrently, while, other data including population, infrastructure creation etc. should be updated periodically.

Annual proposals and their clearances

The finalization of annual proposals consisting of the list of roads eligible under PMGSY is done by the District Panchayat. After the Panchayat’s approval the approved list is forwarded to the SRRDA, which vets the list and places the final list before the State Level Standing Committee. And only after clearance of the committee, does the preparation of the DPRs begins. The review of the ongoing works also falls under the responsibilities of the committee.

The quality of the DPRs is a matter of concern in some states though. In some cases, the procurement process of the DPR consultants doesn’t ensure their ability to prepare good DPRs, while in some, there is a lack of synergy between PIU and the DPR consultant. Hence, NRRDA must prepare a bidding document and develop a selection procedure. The DPR and the project implementation consultants should be empanelled by the NRRDA giving regard to their competency in the types of tasks required by them. Hence, the SRRDAs would be able to engage them only within the limits of their capacity so as to maintain quality. It is also advisable that the NRRDA engages common DPR and Project implementation consultants on behalf of the NE states to maintain uniformity in quality and standards. The PIU should also be adequately equipped in numbers, logistics and knowledge. The clearance of Annual proposals for a state must hence be based on a PIU-by-PIU assessment of basic and residual capacity to handle new works.
In the Hill and NE states, the work can be executed in two stages, with Stage I i.e. Formation cutting, protection and drainage, being completed first followed by Stage II i.e. allowing the formation to settle and putting on the bituminous layer. The states are expected to maintain the road in the intervening period, which is not always done. Further, it needs to be ensured that the intervening period between Stage I and Stage II is not more than two years.

There should be a focus on the availability of natural resources required. There have been instances in the past where several works have been held up for prolonged periods due to ban on operations of quarries. Also, norms need to be set regarding the time required to prepare a DPR considering the details required. Milestones should also be set to allow smooth monitoring through OMMAS. The system should have an online check in terms of the District wise allotment of funds and schedule for submission, and an audit trail to analyse where delays or undue hurry is taking place.

In case of long roads, an end-to-end DPR may cover too large a scope for it to be completed within the time limit. It is therefore advisable to break the long roads into manageable segments. The DPRs for each of the segments will be prepared separately. The costing of the DPR could also be done at the appropriate time with the prevailing Schedule of Rates. States may also be encouraged to set up state level Project Preparation Funds to take care of the eventuality that the state priority for a road may not in some cases, find acceptance under the PMGSY.

The Tamil Nadu standard procedure of fixing dates and the number of DPRs for District-wise scrutiny well in advance by the SQC in consultation with the STAs may be adopted and made part of the OMMAS system.

**Surveys and Design**

Guidance on the selection of the alignment, and the geometric design standards to be followed in the construction is given in the Rural Roads Manual. Adoption of the Carriageway width (CW) on the basis of the traffic volume is to be given particular attention.

The CW may be kept 3m instead of the normal 3.75m in cases where the traffic is likely to be low, and is not likely to increase substantially in the future. A traffic survey is hence needed in order for design of upgradation of existing roads to PMGSY standards. It is also mandatory to have a drainage plan for each rural road project.

A preliminary survey and establishment of a baseline traverse is prescribed in the operations manual. However, this is not being done systematically and this results in the PIUs not taking ownership of the DPR during scrutiny by the STAs. Where a DPR consultant has been engaged, the Reconnaissance survey has to be jointly conducted by the PIU and the Consultant, and the PIU has to take full ownership for the DPR.

Though, PMGSY places the involvement of the local community on a very high footing, some PIUs aren’t oriented in this direction. The Transect Walk, which is a key requirement in ensuring that the design promotes inclusivity and participation, enables community ownership of the created asset. However, it is seen that in many cases the involvement of the local community remains inadequate which leaves pressing issues of land acquisition and social and environmental impacts unresolved. This leads to implications on the quality of the road. NRRDA needs to issue detailed guidelines both on the conduct of the walk and the recording of the proceedings to ensure that the Transect walk serves the intended purpose. Guidelines should lay down the mode for community and Panchayat participation.

There is also room for exploring uncharted avenues such as the Integrated Rural Accessibility Planning process developed with ILO.
The equipment possessed by some PIUs in their laboratories requires upgrading. DCPs, Nuclear Density Gauges, Total Stations etc. are some of the equipment required. DPR consultants are currently doing their own testing. NRRDA may frame a scheme for “one time” rectification of all supplied equipment so as to make the labs functional.

Project Preparation

Each Rural Road Project needs to have a separate DPR which is based on detailed surveys and investigations. The reports are to be of such detail that the quantities and costs are fairly accurate and minimal cost over-run takes place due to changes in quantities during execution.

PMGSY mandates the periodic evaluation of the work of the design consultants whether a serious excess has occurred between the estimated and the “as executed” quantities or whether any design deficiency has come to notice. However, this practice is being adopted by very few states due to which the quality of the output of the consultants is dropping. Therefore, the work of the design consultants should be evaluated annually. Inputs of the STAs and NQMs/SQMs should also be taken into perspective.

Also, the DPR should be owned by the PIU, even if it is prepared by the DPR consultant. The JE preparing the DPR must sign all the drawings, and the AE must countersign the key drawings as having been “checked at site”. Several states have constituted a “Technical Advisory Committee” chaired by the Chief Engineer SRRDA to ensure that the DPRs are of the requisite quality. NRRDA may issue Guidelines to make this the general practice. NRRDA may also help evolve specifications on use of specific local and marginal material, and issue Guidelines to limit the lead distance for accessing materials, so as to incentivize use of local and marginal materials in the interest of economy and resource use efficiency.

Scrutiny of DPRs

Under PMGSY, suitable engineering institutes are reached out to act as State Technical Agencies (STAs) for DPR preparation and designing process. These STAs scrutinize the DPRs and provide independent inputs. Proper scrutiny of DPRs is necessary to achieve the potential of the DPR based approach pioneered in PMGSY.

Poor quality of DPRs was observed in a few cases. Currently, the poor quality of DPRs is compounded by practices that reduce opportunities to STAs for a proper scrutiny. Like the DPR preparation itself, the scrutiny process is seen by the PIU as a procedural requirement rather than a process to improve design and effect economies. The two in combination may seriously derail the scheme.

The scrutiny process should move towards a dialogue mode with the PIU (and its Design consultant), with the STA collaborating in a learning process. It is also advisable that the scrutiny by the STAs be properly structured so as to have enough time for the purpose. During scrutiny by the STA, the PIU must be represented by the JEs who prepared the DPRs. In case of outsourced DPRs, the consultant personnel concerned and the AE must be present. The changes in the DPR made after scrutiny by the STA in all cases must be signed by the Executive Engineer. To deal with cases where the PIU does not agree with the observations of the STA, there must be a mechanism under the SQC consisting of a committee headed by an SE level officer, with one or two SQMs.

Many of the staff at the JE level are on contract basis or do not have adequate experience in the road sector. To ensure that the PIU takes responsibility for the DPRs, the DPRs must be scrutinized by the AE level officers. In addition to this, a checklist for each DPR regarding extent of land availability site inspection etc. which has to be entered on OMMAS. Also, a customised software to standardise the DPR checking process needs to be devised.
In several states, not all STAs have the technical competence to scrutinize bridge designs. NRRDA should clearly identify STAs who have this capability on an annual basis.

**Procurement**

An electronic tendering system is used for the procurement of all the works contracts. PMGSY has devised a Standard Bidding Document and has specified the procedures to be adopted for submission of bids. The Standard Bidding Document envisages submission of bids in two envelopes marked respectively, “Technical Bid” and “Financial Bid”. On the basis of the eligibility criteria laid down in the Instructions to Bidders (ITB), the Technical Bids are evaluated, and a list is drawn up of the responsive bids whose Financial Bids are eligible for consideration.

The procurement process is not being managed perfectly, and in some cases this is contributing to quality losses as well as time delays. “Quality” as well as “Time” is the essence of PMGSY contracts. However, in some states, contractor evaluation procedures in practice do not focus adequately on either aspect. In many states (particularly the NE states and LWE areas, but also some states with very large connectivity deficits), where contractor development is poor and contractors are not willing to bid, there may not be adequate competition, and the capacity actually available with the contractor to execute the work is not always adequately evaluated in the haste to award work. Hence, in such areas, smaller and local contractors may need to be engaged.

To properly assess the bidder’s capacity, the states must create a registration process on a common platform applicable to contractors. Also, the award, execution, quality assessment and completion of works to the registration should be linked so that the contractors’ works-in-hand across all departments can be cross-checked.

Contractor outreach programmes should be conducted regularly since many contractors, particularly new entrants and new contractor personnel, may not be familiar with the bidding conditions and conditions of contract for PMGSY works.

Another major contributory factor in delays is the non-availability of equipment. Checks using registration number of equipment’s or such means should be set up to prevent this. While checking of availability of equipment at bid evaluation stage must be strictly enforced, facilities must be provided to contractors, especially new entrants, for accessing new and modern equipment. NRRDA may also create an online platform for contractors registered under PMGSY to enable equipment owners to put out availability of surplus equipment capacity along with time period. This will be particularly useful in remote areas including the North East.

In order to promote long term contractor development, a centralized registration process for contractors may be incorporated into OMMAS.

In areas affected by LWE, contracting and execution of works is a major problem, and smaller and local contractors may need to be engaged. Also, a strategy for developing a cadre of local contractors needs to be developed jointly by NRRDA and the SRRDA with the full support of the local administration, based on analysis of bidding patterns.

**Project implementation and Contract management**

As a program that lays so much importance on quality, PMGSY defines qualification criteria in terms of works executed, bid capacity, credit facility/liquid assets, engineering personnel and necessary equipment and machinery enables selection of competent contractors. The standard bidding document prepared for PMGSY not only ensures the selection of qualified contractors but also
ensures that the contract terms and conditions are robust enough to make time and quality assurance the essence of the document.

The following activities are required to be completed by the engineer and the contractor:

► Deployment of contractor’s personnel
► Listing of requirements by engineer
► Submission of work programme by the contractor to the engineer
► Handing over of site to the contractor
► Working drawings and designs
► Specifications and drawings of temporary works
► Approval of work programme
► Establishment of field laboratory
► Recording of pre-commencement levels

The enforcement of the conditions of the contract and field supervision in some cases is not satisfactory which has consequences on quality. Hence, it is essential to define and incorporate key contractual milestones into the OMMAS workflow for improved monitoring of the project. This can be achieved by leveraging the mobile technology such as geo-tagging of photographs documenting the progress.

The contractor should accordingly be given access to OMMAS and should, under his login, upload the details of technical personnel onto OMMAS at the time of mobilization, along with their personal details. The Engineer should check these details online and after the handing over of the site and the working drawings, and accord his approval to the work programme, with entry to this effect on OMMAS.

PMGSY as a DPR based programme depends crucially on testing in the Contractors laboratory. The setting up of the laboratory and availability of trained personnel must be reported by the Contractor’s IT person on OMMAS. NRRDA may review the provisions of the QC Handbook, and make the testing process more feasible with provisions for entering some of the key data into OMMAS onsite, using mobile technologies. On-site Training of Laboratory personnel as well as of the skilled workmen of the contractors, and induction training of the IT person on OMMAS must be a compulsory feature of contract management.

Also, details of dates of site visit by PIU, SE and CE, changes in work programme, dates of Management meeting etc. should all be entered on OMMAS, enabling the SQC to generate exception reports for monitoring purposes.

The timely flow of funds is essential for progress of works. Sometimes funds are not available for prolonged periods, which leads to slowdown/stoppage of work. On resumption of works, the contractor has to bear escalation of prices of materials which is inequitable. The management of Bank Guarantees also may be included in the OMMAS, so as to ensure timely renewal etc.

**PTAs/STAs**

State Technical Agencies (STAs) act as catalysing agents in the state level rural road programmes. These agencies are expected to improve the project quality at the design and conceptual level and function as a 2nd tier of quality management at the project preparation level.
The functions of the STAs include:

► Verification of the District Rural Roads Plan prepared by the District Programme Implementation Unit (DPIU). The verification includes:
► Checking the correctness of existing links.
► Checking the proposed links in terms of the parameters laid down by the District Panchayat.
► Ensuring that all necessary coding and indexing has been done to enable extraction of the Core Network.
► Post-Scrutiny of the Core Network
► Scrutiny of the Detailed Project Reports for road works prepared by the District Programme Implementation Units
► Provision of requisite technical support to the State/District Units
► Undertaking normal tests of parameters for road design and Quality Control tests for PIUs and QC:
► Training
► R&D Monitoring
► Technical Advice

Principal Technical Agencies (PTAs) are premier institutions with in-depth knowledge of the technology of road design and construction. As agencies helping to manage technical change in rural road programmes, PTAs are expected to:

► Oversee the activities of the STAs in the region and advise/assist in resolving issues that may arise at the time of the scrutiny of project proposals of the states.
► Carry out random ex-post facto checks of the proposals scrutinized by STAs to identify systemic issues
► Organize Orientation/Refresher Programmes for the STA Personnel for proper scrutiny of project proposals
► Identify at SRRDA’s request, the type of strengthening required for the Laboratories in the Districts (PIUs) and also at STAs
► Advise Programme Implementing Units (PIUs) on the basis of SRRDA requests on any region specific issues that will have a bearing on the design, construction, maintenance and performance of rural roads.

Inclusion of STAs and PTAs in the PMGSY process at various points was intended to improve the engineering inputs, generate fresh thinking in the sector and build capacity. While to a considerable extent, more in some states than in others, this has happened, the potential inherent in the arrangement has only been partly realized. On one hand, NRRDA, due to its own capacity constraints, is not making full use of this mechanism. On the other, states and SRRDAs have not taken ownership of the STA interventions, and have not leveraged them for improving the design and quality of the roads and for the development of the human resources deployed by them.

Hence, creation of capacity in the sector that would enable the increase in the number of STAs would substantially address the problem. NRRDA should now facilitate the inclusion of more private engineering colleges and other government colleges, which have the technical capabilities to participate in the PMGSY programme. States need to identify potential STA candidates and the NRRDA should lay down guidelines providing for a capacity building path for these institutions enabling them to qualify for nomination as STAs. The capacity building path would include formal training and
orientation, participation in workshops and field visits on a remunerated basis, assistance in approved cases to SRRDAs/SIRDs, such as in training events on SIRD premises etc.

Also, the pre-scrutiny meetings between the SRRDAs and STAs must be mandatory wherein the quantification of DPR scrutiny is scheduled keeping in mind the academic load of STAs. A system of DPR Audits needs to be incorporated into PMGSY, leveraging OMMAS so that rule-based exceptions as well as DPRs flagged by the STA during scrutiny could be subject to independent ground check at some stage.

The availability of marginal materials needs to be mapped and STAs should also involve themselves in this even as a ‘paid for’ research project through NRRDA. Local materials should be used extensively using blending or other methods to make good deficient properties. Further, there should be an open approach to design using such materials, which should be encouraged by the STAs.

HR development is urgently required for PMGSY and the road sector in general. NRRDA should also get STAs to hold paid programmes for the consulting community (i.e. registered consultants) also, who will be incentivized to participate since it will improve their bidding competitiveness. An all-embracing approach would help in improving the quality of the output. Audio visuals in best practices could also be documented.

PTAs who were driving forces in providing technical inputs have of late started withdrawing from PMGSY. Hence, an online forum needs to be set up (for which one of the PTAs could take up nodal responsibility) which would facilitate interactions on issues of technical importance, which in turn could be disseminated across the STA/PTA universe.

**Quality Management**

A three-tier Quality Management mechanism exists in PMGSY. The first tier of quality management mechanism is the in-house quality control system of the Executing Agency, the second tier of quality management is an independent quality assurance system made operational by the State Government. Thus, the State Governments are responsible for the first two tiers of the Quality Management Structure. The third tier is an independent quality management mechanism made operational by the NRRDA, in the form of the NQM, which is essential to ensure that the first two tiers are operating satisfactorily.

However, the three-tier Quality Management (QM) system established under PMGSY needs urgent attention as it is oriented more towards ensuring quality at the execution stage. Quality management at the DPR stage is inadequate because the PIU capacity is inadequate. The inspection by SQM and NQM should include observations on the quality of the input of the DPR consultant and the PIC with respect to specific items.

The OMMAS should provide for a distinct “1st tier QM” module, in the same way that it provides for an “SQM” module and an “NQM” module. This will ensure better focus on quality monitoring at the PIU level. The dates of Quality Control tests at site in the presence of the PIU/SE/CE should be captured in the data entry in OMMAS as already recommended.

It is important to ensure that the state takes ownership for the quality management process and its outcome and that the 3rd tier of NQMs does not operate to dilute this or to substitute for the 2nd tier. NRRDA may also develop Guidelines for Accreditation/Certification of SQMs so that they can be engaged by neighbouring states for bringing in independence and objectivity. In the case of the NE states, NRRDA may in fact centrally engage an institutional SQM if so requested by the states.
Also, the SQC must be full time, and his remuneration as part of the administrative expenses must be ring fenced and paid only when a full time SQC is in position.

The OMMAS should enable the generation of the monthly SQM abstract report for the SQC. The Annual Quality Report required to be prepared by the SQC on the basis of the SQM reports must be uploaded to OMMAS.

NRRDA must also hold regular regional reviews and ensure the participation of all NQMs in rotation in the regional reviews. It must be emphasized that regional reviews afford a unique opportunity for all the main participants in the management and monitoring process to get together and discuss problems and strive to improve quality.

Also, as in the case of the SQC in the SRRDA, the Central Quality Coordinator (CQC) in NRRDA must be full time. The SQMs and NQMs should also spend some time during their project visits in training the field engineers as to ‘best practices’ based on their experience.

**OMMAS**

An online management system, OMMAS (Online Management, Monitoring and Accounting System) is the backbone of the PMGSY. The basic principle of OMMAS is that:

- Data is entered at the point of origin, e.g. at PIU level. Additions and modifications to data and status are made through role-based login by PIU/STA/ SRRDA/NRRDA/MoRD etc.
- The same data is available in processed form at SRRDA and NRRDA levels; with the facility to drill down data to basic units i.e. road, habitation and rupee.
- MIS output from the common database can be structured to suit PIU, SRRDA, and NRRDA needs thus eliminating paper reporting and reconciliation of data.

OMMAS is also utilised for Programme monitoring as follows:

- Report on State Profile and District Profile
- Report on New Technology R&D works
- Report on State-Wise List of Works
- Report on Habitation Coverage
- Progress of Work Sanction during Each Year
- Report on Financial Closure of Physically Completed works
- Report on Quality Inspection of Works
- Report on Monthly-Closing of Accounts by SRRDA for Program Fund, Admin Fund and Maintenance Fund
- Analysis of Cost per Km of PMGSY Works

However, OMMAS needs to be upgraded and enhanced so as to more closely parallel the work flow of the PMGSY guidelines, Operations Manual and other guidelines. OMMAS should provide for more exception-reporting and SQL-based queries. OMMAS provides for project monitoring but it does not provide checks to ensure that the contractual consequences of delay or non-performance of any of the parties are taken into account in accordance with the conditions of the contract.

The architecture of OMMAS should be suitably expanded to capture the workflow in respect of non-PMGSY rural roads, including provisions for variations in procedure (subject to NRRDA’s approval), so as to provide an option to any State Department to migrate to this platform. The DRRP must be the
database for purpose, and any process or application in any Department which impacts on the DRRP must provide for suitable updating of the DRRP.

To ensure better monitoring of the DPR preparation process as well as enable post-monitoring and analysis, the process of initiation of the survey, data gathering, transect walk, visits by PIU to site etc. should be captured in OMMAS, with checks to ensure that there is no “bulk processing”.

To ensure impartiality and objectivity among SQMs, NRRDA may facilitate states in engaging SQMs from neighboring states. This should include an OMMAS sub-module for their empanelment as well as transactions related to SQM visit planning and reporting.

The OMMAS should have another provision so that if at clearance stage of a suspect DPR, in case time does not permit site visit, a flag can be placed, and a site visit can be done by the STA/SQM/NQM subsequently. And, the process of the Transect walk should be incorporated into the OMMAS, with visuals of the walk and key points.

Currently OMMAS provides for an accounting system where voucher data is entered. There is a need to decisively move towards an online payment system covering contractors, consultants, STAs, NQMs/SQMs etc.

Monitoring

Maintenance of the entire core network and particularly, the roads under the PMGSY are the responsibility of the State Governments. State Governments are required to develop sustainable sources of funding for undertaking the maintenance functions.

Close monitoring of the project throughout its lifecycle is essential for the programme. This will improve competition and contribute in better contractor development. Also, the existing reporting system in OMMAS should be upgraded to a work-flow based system covering the project life cycle which would enable monitoring at multiple levels and for multiple roles, with automatic generation of alerts and performance reports.

Maintenance and Road safety issues

States should be encouraged to come out with a comprehensive “Maintenance Policy” for rural roads, and should incorporate “asset management” principles into these policies. NRRDA should take the lead in getting an Asset Management system developed and incorporated in OMMAS, so as to enable states to rationally lay out maintenance funds under budget constraints.

PMGSY also provides for appropriate safety design standards and features in the rural roads so as to enhance road safety. However, road safety has a second component, relating to the operational use of the road and associated risk factors. In the case of rural roads, in view of the occasional and miscellaneous nature of the traffic and lack of mitigating measures, additional engineering provisions may need to be in-built into the design of rural roads, and buttressed with social and behavioural measures to promote safety-consciousness.

Construction contracts should include a provision that enables planned subcontracting of post-construction maintenance to registered local contractors. In addition to the initial five-year maintenance, the second round of batch-based five-year maintenance may be provided for data entry in OMMAS, since some states like Madhya Pradesh have introduced this practice.

Maintenance Stations with facilities like storage and processing of materials to be used for maintenance tasks, workshop facilities for repair of maintenance equipment/plant, training facilities/audio visual
aids etc. should be established at suitable locations. NRRDA may work out a system for test check of the Road condition surveys and for Road Safety Audits, and build capacity in the SRRDAs accordingly.

NRRDA may as an additional facility extend the use of the “Meri Sadak” mobile app “which enables a member of the public or a Panchayat representative to upload photographs of pothole, rain cuts, etc.

NRRDA and SRRDA should commission a Maintenance Manual for each state based on the state maintenance policy, incorporating the above mentioned issues in a suitable manner in accordance with the State Maintenance Policy, so as to enable the availability of an operational maintenance document.

Also, Annual maintenance contract may be implemented on pilot basis in selected districts as part of a skill enhancement strategy. There is need for a comprehensive and well planned long term strategy to ensure sustainable routine maintenance of the rural roads network.

Training and Capacity building

Leveraging knowledge to improve the quality of road construction is one of the key components of PMGSY. However, it was assessed that the training needs of the stakeholders was far more than the available capacity and training infrastructure. Also, the mechanism of STAs and PTAs is not being used to optimum extent for training and capacity building exercises.

Hence, the training programmes should be more inclusive. They should also incorporate all the institutions in the sector. Training of the trainers should also be kept in mind to ensure quality of the training interventions. They should also be made a pre-requisite, with realistic schedules.

Induction/orientation training of consultants must be built into the Hiring Contract. STAs would be the best institution for training of design consultants. 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.

Due to excessive contracting and because of poor technical and management practices by contractor personnel, some contracts are not getting completed in time. Training of contractor and sub-contractor personnel is essential to address the problems mentioned above. Training only personnel of contractors with contracts may also delay improvement in the larger universe of contractors, and encourage poaching.

The main training areas that cover the entire gamut of PMGSY are:

- Preparation of DPRs, material surveys, topographical surveys
- Design, construction and maintenance of pavements and CD works
- Project management, contract management and supervision
- Quality Management (QM) and Quality Assurance (QA)
- New and cost-effective technologies and practices
- Maintenance and road safety
- Community based planning and management
- Planning for development

Only a reputed Government–supported professional training institution can provide a service of this kind. 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. It will need to partner with STAs and PTAs etc.

NRRDA should engage a consultant who, in coordination with NIRD, can conduct a Training Needs Assessment (TNA) in each of the states.

**Special Provisions for North Eastern States and LWE areas**

North eastern states and LWE affected states in general are yet to reach the levels of the more advanced states. The PMGSY guidelines make the following specific provisions for North Eastern states, hill areas and tribal areas (including LWE areas):

- Providing all-weather road access to all villages/habitations of population greater than 250 in case of hill states (North-Eastern states, Sikkim, Himachal Pradesh, Jammu & Kashmir and Uttarakhand), the desert areas and tribal areas by the end of the Tenth Five Year Plan, i.e., 2007. This is recognition of the low population densities in these areas.

- In the case of hill states including the Northeast, there is a provision for Stage-I (formation cutting, protection, and drainage) and Stage-II (WBM, blacktopping and completion), with a period of up to 2 years being allowed to intervene between the stages to allow the formation to stabilize. The target habitation is “connected” only on completion of Stage-II.

- Generally, the technical, contracting and quality requirements in these areas are the same as in other areas, subject to local conditions.

Hence, for purposes of PMGSY, LWE areas should be determined at block or police station level rather than district level, so as to preclude undue benefit (at the cost of the affected area) to relatively unaffected areas of the district. In inaccessible LWE areas, DPR preparation process needs to be simplified keeping in view the difficult working conditions and lack of sufficient qualified personnel, including DPR consultants. The programme may provide for a flexible architecture in such areas including alternative designs; liberal use of project implementation consultants on QCBS basis to supplement PIUs and ensure closer supervision; stage construction; and incentives to contractors. Also, a strategy for developing a cadre of local contractors needs to be worked out jointly by NRRDA and the SRRDA, based on analysis of bidding patterns.

In case of the NE states, Training of PIU and contractor personnel has to be given high priority. The NIRD Guwahati and the Assam Road Research and Training Institute (ARRTI), Guwahati both offer institutional support for training which must be exploited to the maximum. In Arunachal Pradesh, a special drive should be undertaken with NRRDA support to complete this work using accessible remote sensing imagery.
Introduction

Background

India essentially has a rural-oriented economy with over 70 per cent of its population living in its villages. At the commencement of PMGSY in 2000, it was estimated that about 330,000 of its 825,000 villages and habitations were without any all-weather road access. A majority of the poorly connected rural communities lay in ten states (Assam, Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal).

It was against this background of poor connectivity that the Prime Minister announced in 2000, a massive rural roads programme. The Prime Minister’s Rural Road Programme (Pradhan Mantri Gram Sadak Yojana, PMGSY) set a target of:

(i) Achieving all-weather road access to every village/habitation with a population greater than 1000 by 2003.

(ii) Providing all-weather road access to all villages/habitations of population greater than 500 people [250 in case of hill states (North-Eastern states, Sikkim, Himachal Pradesh, Jammu & Kashmir and Uttarakhand), the desert areas and tribal areas] by the end of the Tenth Five Year Plan, i.e., 2007.

It was estimated that about 172,772 habitations (i.e. hamlets or sub-villages) would be provided with connectivity under the programme. This was later revised to 178,184 habitations. Since provision of all-weather road connectivity was conceived as part of the larger poverty reduction strategy, the Ministry of Rural Development (MoRD) has been entrusted with the task of administering and managing the programme. Some of the noteworthy features of the programme are:

► Earmarking 50% of the cess on High Speed Diesel for the programme.
► Preparation of Master Plans and Core Network for Rural Roads for all the Districts and Blocks, identifying the unconnected habitations and proposing the most cost-effective routes for the purpose.
► Appointment of a dedicated State Level Agency in all states with overall responsibility for rural road planning, programme execution and management and maintenance.
► Appointment of programme implementing agencies by all states, typically Public Works Departments (PWDs) or Rural Engineering Organizations (REOs) with Project Implementing Units specific to PMGSY.
► Commissioning of Independent State Technical Agencies (STA) by MoRD to vet designs and estimates.
► Appointment of PTAs to help in technology initiatives and support STAs and SRRDAs
► Use of competitive tendering by the implementing agencies of all works on the basis of a Standard Bidding Document (SBD).
► Contractually Scheduled Execution of the works within a period of 9-12 months.
► A Defects Liability and Maintenance period of 5 years specified in the Contracts for the roads constructed under the programme, with funds for maintenance being provided by the states.
A central on-line web-based financial and project monitoring system called OMMAS.

A 3-tier Quality Management System.

Operational management at the Central level by the National Rural Roads Development Agency (NRRDA).

PMGSY has established itself as a programme of high management and quality standards, with clear and comprehensive SOPs based on Manuals developed for various purposes including accounting, quality control, maintenance etc. As on 31st March, 2016, project proposals for providing connectivity to 146,757 eligible habitations had been sanctioned. The total cost of sanctioned projects, including the projects for upgradation of roads under PMGSY was Rs. 1,86,655 crore including the state share. Against this, an amount of Rs. 1,36,029 crore has been released till 31st March, 2016. As reported by the states, till 31st March, 2016, a total of 4,72,695 km roads including upgradation had been constructed and all-weather connectivity had been provided to 1,16,310 eligible habitations.

However, the original timeframe, i.e. 2003 for connecting larger habitations and 2007 for connecting smaller habitations has not been achieved; it was probably too ambitious, and made without adequate assessment of available capacity. The fact that even 7 years after the target date, the programme is still to be completed in several states, notably Bihar, Jharkhand, Odisha etc. indicates the difficulties in creating additional capacity in the road agencies as well as construction industry. There is an obvious correlation with lack of administrative and governance capacity, which becomes apparent when parameters related to “North East State”, “LWE affected” and “high poverty” are overlaid. In the list of states given below, North East states are shown in italics; LWE affected states are shown in bold; and the 9 states which are below the all-India average of percentage of population below poverty line are shown with the ranking in brackets (the state at serial no. (1) being the poorest). The state-wise position of likely completion is as follows:

<table>
<thead>
<tr>
<th>States who have almost completed PMGSY</th>
<th>States who have substantially completed the programme</th>
<th>States who may take 2 to 4 years to complete</th>
<th>States who may take more than 4 years to complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gujarat, Haryana, Karnataka</td>
<td>Andhra Pradesh, Kerala, Maharashtra, Nagaland, Punjab, Tamil Nadu, Telangana, Tripura, Madhya Pradesh (8), Rajasthan, Sikkim</td>
<td>Arunachal Pradesh (5), Chhattisgarh (2), Manipur (4), Uttar Pradesh (9), Jammu &amp; Kashmir, Mizoram, Uttarakhand</td>
<td>Assam (7), Bihar (1), Himachal Pradesh, Jharkhand (3), Meghalaya, Odisha (6), West Bengal</td>
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It may also be noted that three of the states lagging behind, namely Jammu & Kashmir, Uttarakhand and Himachal Pradesh are “Hill states”.

Impact Assessment Studies of PMGSY:

Impact Assessments of PMGSY in various States have been undertaken from time to time, particularly with regard to the poverty impacts. Summary of these studies is in Appendix I (Refer Volume-II). There is a general consensus that PMGSY is producing very positive productivity and poverty-reduction outcomes, both directly and indirectly. These include:

- Easier access to agricultural inputs and credit
Use of motorised farm equipment for cultivation
- Shift in cultivation to higher value crops and cash crops
- Increase in farm and off-farm incomes
- Rise in non-farm employment and self-employment
- Easier access to banks and post offices
- Improvement in public transport services
- Expansion of local industries
- Increase in private transport vehicles
- Increased enrolment, particularly of girl children, in schools and higher educational institutions
- Improved attendance of teachers
- Improved access to health care, fewer obstetric emergencies and lower women and child mortality
- More toilets and better sanitation
- More visits of grass root workers and NGOs

The fact that PMGSY, as a programme, is universally popular across the political spectrum with high public awareness about the programme entitlements and a demand in many States for similar programmes for smaller unconnected habitations attests to the success of the programme in terms of both design and execution. However, studies as well as analysis of available information also point to the fact that:

- The programme is delayed due to management structures at Central and State level and the execution capacity in the States not being commensurate with the highly demanding operational requirements of the programme and variable execution capacity in the States. The States with high poverty are also generally the States where inadequacies of administrative, management and executional capacity manifest themselves the most.
- There has been a manifold increase in the workload of the Implementing Units under PMGSY, with the staff for the required level of supervision becoming inadequate in terms of quality as well as quantity.
- Policies on many important issues remain unclear or unresolved. These include policies on maintenance and its funding, land acquisition, involvement of Panchayati Raj Institutions etc. Lack of maintenance was highlighted in the ILO study as being a cause of much dissatisfaction.
- Contracting capacity to execute the programme to the requisite quality standard is lacking in some states, though there has been very significant improvement as a response to the programme.
- Stakeholder involvement remains partial, particularly, when it comes to the involvement of local community institutions such as Panchayati Raj institutions. As a result, the creation of the road asset is not being leveraged to its potential.
- There is a lack of “complementary policies” to help improve access to credit, lack of trainings and a lack of new opportunities through sectoral policy interventions. There is also a need for greater synergies with programmes like MGNREGA and NRLM.
- Internal analysis in the Ministry and the States implementing PMGSY also point to a need to review the operational guidelines and instructions for executing the programme, so as to take into account regional or local problems as well as identify possible improvements in practices and procedures to take into account new technologies and institutional changes

The Current Assessment Study:

While the design of PMGSY is sound and the programme is generally functioning well, there are a number of areas where enhancements could be made in terms of improving its systems and
The current Assessment Report is expected to provide a structured and systematic evaluation with a focus on increasing “value for money” and improving implementation quality. The Report attempts to cover the following issues:

- Improving PMGSY implementation in States lagging behind
- Ensuring more effective participation of States
- Improving procurement and contract management processes
- Achieving economies in costs
- Enhancing PMGSY systems for PMGY-II and mainstreaming it to the entire sector
- Monitoring, management and assessment of impacts etc.
- Enhancing maintenance and safety

The Assessment is to be a synthesis of available experiences. This report accordingly attempts to list out specific changes, improvements and enhancements needed to be made to the PMGSY programme and, in fact, to the rural roads network in general, based on extensive interaction with the various stakeholders. The interactions were based on detailed questionnaires sent out in advance and the responses received. These interactions included:

- Workshops of STAs/Principal Technical Agencies (PTAs)/National Quality Monitors (NQMs)/State Quality Monitors (SQMs) held in New Delhi (2nd August 2014), Bhubaneswar (24th August 2014) and Hyderabad 17th &18th October 2014;
- Workshop on capacity building held in New Delhi on 16th January 2015;
- Workshop with States on 13th April 2015 in New Delhi and 25th April, 2015 in Hyderabad;
- Workshop with Contractors on 25th April 2015 in Hyderabad;
- Workshops with NE States and Contractors in Guwahati on 13th &14th June 2015;
- Discussions in NRRDA on 2nd, 6th, 22nd of July, 4th of August 2015 and 9th of November 2015
- Workshop on 9th February 2016 with NQMs who had visited various States along with a questionnaire to discuss the draft Report and elicit views on some of the key recommendations.
- A two-day workshop on 20th and 21st May 2016 with lagging States to specifically focus on enhancements that they may require.

Most of the recommendations are of an operational nature, and their uptake can proceed relatively easily. Some of the recommendations are of a policy or institutional nature, requiring further analysis and consultation. A Summary for Policy Makers has been prepared as a separate document to identify some of the main policy issues. Needless to say, the importance of policy improvements in efficiently achieving the poverty reduction impact of rural road connectivity should not be underestimated, and it is expected that the Summary will provide the strategic direction and momentum enabling the take-up of all the changes recommended in this Report.
In order to provide context and also to bring out the inter-State variations, a **Statistical Appendix** has been added which provides a snapshot of the volume of work, issues of quality etc. It must be emphasised however that the Report is based mainly on responses to the questionnaires and the discussions in the workshops, and that the Statistical Appendix provides mainly an additional insight and a State specific relevance.

The chart below shows the % of road length that has been completed in each of the states under PMGSY till March 2016.

The expenditure under PMGSY (till March 2016) for each of the states is represented below. As represented, Madhya Pradesh, Odisha and Uttar Pradesh rank high in terms of expenditure.
The contribution of each state to the total expenditure can be better understood by the following chart:

More than half of the total expenditure under PMGSY is represented by the top eight contributors to the total expenditure i.e. Madhya Pradesh, Odisha, Uttar Pradesh, Bihar, Rajasthan, Assam, West Bengal and Chhattisgarh.
New technologies such as Cement Stabilization, Geo textile, Lime stabilization and Waste plastic have been utilized for rural road development. Kilometres of new technology rural roads sanctioned per kilometres of rural roads sanctioned (2013-2014) is the highest for Haryana, Meghalaya and Mizoram. It is the lowest for Himachal, Punjab, Sikkim and West Bengal.

It may be noted that at some places in this Report, PMGSY is referred to as PMGSY-I. This is only to distinguish it from its follow-on programme, PMGSY-II, which was approved in 2013, primarily as a programme to upgrade rural “through routes”. Most of the recommendations of this report are applicable to both PMGSY-I and PMGSY-II, since they follow the same technical and management standards and operational procedures. The assessment report is structured along the following broad themes:

<table>
<thead>
<tr>
<th>Institutional capacity</th>
<th>Monitoring</th>
<th>Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>► INSTITUTIONAL STRUCTURES</td>
<td>► SURVEYS AND DESIGN</td>
<td>► ANNUAL PROPOSALS AND THEIR CLEARANCES</td>
</tr>
<tr>
<td>► PLANNING</td>
<td>► SCRUTINY OF DPRs</td>
<td>► PROCUREMENT</td>
</tr>
<tr>
<td>► PROJECT PREPARATION</td>
<td>► QUALITY MANAGEMENT</td>
<td></td>
</tr>
<tr>
<td>► PROJECT IMPLEMENTATION AND CONTRACTS</td>
<td>► OMMAS</td>
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<tr>
<td>MANAGEMENT</td>
<td>► MONITORING</td>
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<tr>
<td>► PTAs AND STAs</td>
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<tr>
<td>► SPECIAL PROVISIONS FOR NE &amp; LWE AREAS</td>
<td></td>
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</tbody>
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Section: 1
Institutional Structures

1.1 The Framework

Since roads other than National Highways are the responsibility of the State Governments, PMGSY follows the federal principle by entrusting implementation responsibility to states. Funds are provided by the Central Government in pursuance of the poverty reduction imperative and channelled through the Ministry of Rural Development to the states. The National Rural Roads Development Agency (NRRDA) has been set up as a registered society under the Ministry to provide management and technical support for the programme.

PMGSY Guidelines require each State Government to identify one or more Executing Agencies. This could be the Public Works Department/Rural Engineering Services/Rural Engineering Organization /Rural Works Department/Zilla Parishads/Panchayati Raj Institutions of the respective state.

Each State Government also needs to nominate a Department as the Nodal Department (which would normally be the State Department responsible for rural roads). The Nodal Department will have overall responsibility for the implementation of PMGSY and the management of road assets created under the programme in the state. A State level autonomous Agency, to be called the State Rural Roads Development Agency (SRRDA), with distinct legal status under the Registration of Societies Act is to be set up under the Nodal Department.

The functions of the Agency in relation to PMGSY would include:

► Rural roads planning and sectoral coordination
► Management of funds
► Preparation and submission of annual proposals
► Preparation of DPRs
► Works and Procurement management
► Contract management
► Monitoring of ongoing works
► Financial Management
► Quality Management
► Management of assets entrusted to it

It is expected that the Agency would, over time, be responsible for these activities not only in respect of PMGSY, but for the entire rural roads sector.

The Programme Implementation Units (PIU) are the basic units for project planning, execution and accounting. A PIU may consist of one or more Engineering Divisions, appropriately headed by an Executive Engineer or Superintending Engineer. The PIU would be directly responsible for preparation of DPRs, procurement of works, contract implementation and quality management of PMGSY works. The PIU would also be the financial and accounting centre at the field level.

1.2 The Assessment

NRRDA and SRRDAs were set up as temporary institutions to implement PMGSY and the programme itself was originally to be completed by 2007. Though behind schedule, the success of
PMGSY has led to a widespread realization that rural roads need continued professional management, and that NRRDA and the SRRDAs are critical for this process.

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of institutional structures:

(i) The role of NRRDA and the SRRDAs, to improve their effectiveness in delivering good quality roads with adequate engineering inputs.

(ii) The need to consider the network as a whole rather than only the missing last mile connectivity.

(iii) Creation of an overarching mechanism to ensure that the road network is well maintained and effectively performs its poverty reduction role over time.

1.3 Recommendations for enhancement

Accordingly, the following specific recommendations have been made with regard to institutional structure to enhance the effectiveness of PMGSY in achieving its objectives:

(i) The general approach to quality and management inherent to PMGSY should be applicable (subject to reasonable variation) to all rural roads in order to ensure that the objectives of the programme, i.e. farm-to-market connectivity to increase incomes and create new livelihood opportunities, are met and carried forward. MoRD should hold discussions with the main states and arrive at a formulation of the steps and timelines, and the facilitatory measures for the purpose. This will then enable the states with less robust systems to plan their own movement in the same direction, and build up capacity for the purpose.

(ii) At the national level, NRRDA should become a permanent body for the sector at the Central level, evolving and laying down technical and management standards and ensuring that the rural roads network enables the physical and socio-economic integration of the hinterland with the rest of the country. There is already a report of a consultant with regard to strengthening of NRRDA which needs to be expeditiously reviewed and implemented. Some of the recommendations in this report are very similar in direction and scope. Conferring permanent status on NRRDA will require Cabinet approval, but such an approval can enable conditions of service in NRRDA to become more attractive. As a caution, it would be advisable to create permanent posts, but not create permanent incumbents. Deputation from states on attractive terms, including residential accommodation, continued employment after superannuation from state service (up to the age of 62 or 65) should be the preferred option. This will not only enable a manpower pool with field level experience, but will also strengthen the informal bonds between the NRRDA and the states.

(iii) The new organizational structure for NRRDA given in the PMGSY-II guidelines needs to be operationalized to ensure that the entire system operates efficiently, and NRRDA is also able to take a lead role in improving coordination among the stakeholders.

(iv) At the state level, the SRRDA should become a permanent structure, responsible for the entire rural roads network, properly staffed to ensure management of the maintenance and upgradation works in the sector. The PMGSY as well as PMGSY-II Guidelines already lay out the structural requirements. These should now be implemented. Keeping in view this overarching role for the SRRDA, each SRRDA should also house a planning and design cell, particularly for design of CD works and bridges for rural roads. This will help address the need for more modern bridges, which are adequate to meet current and future traffic requirements (unlike bridges in many of the pre-PMGSY rural roads).
Many of these posts, including that of the SQC are held part time in some states, and this is adversely affecting quality in multiple ways. This should be strongly discouraged and funding of administrative expenses by NRRDA should be tied to the creation and full-time occupation of these key “state level posts” (though it is advisable that they be filled by deputation).

At the district level, PIUs must be dedicated for rural roads as a sector, including the Mukhya Mantri Gram Sadak Yojana (MMGSY) and NABARD’s RIDF roads. Essentially, the SRRDA and the PIUs must get a permanent status on account of the continuing need for management, maintenance and upgradation/renovation of the rural roads network in the state. NRRDA needs to ensure that the administrative expenses under the programme adequately incentivize and provide for these purposes, and that PMGSY systems including OMMAS have extension capabilities for this purpose as well. The SRRDA should be administratively in control of the district level PIUs and should ensure their capacity building. Technical and management capacity shortcomings of the PIUs are today a major constraint in the efficient delivery of the programme, and this shortcoming needs to be urgently addressed, not least in the context of the PMGSY-II programme.

Because of PMGSY and MMGSY etc. most states are in the “construction” stage, whereas the PIU strength should be based primarily on the “steady state” cycle of maintenance-renovation-upgradation of the rural roads network. NRRDA may engage a technical consultant who can advise the state on the optimum strength for PIUs in the state keeping in view long-term requirements. Outsourcing should be used only to the extent that this strength is required to be exceeded for a construction programme.

Adoption of the PMGSY standard for all rural roads must be pushed by NRRDA as the desirable national objective and the SRRDAs must be administratively capacitated for the purpose. States would continue to be free to choose the most appropriate methodology for the purpose with regard to provisioning of human resource, with a suitable mix of recruitment, deputation, contract and consultancies.

Frequent transfers, low tenures, posting of staff from other Departments like irrigation into the PIU have all resulted in a variable work culture at PIU level. The Nodal Department of the State Government, in consultation with the SRRDAs, must bring out a Policy on the posting of staff in PIUs to ensure more stability of tenure. Training interventions with assessment of theoretical and field level knowledge should be conducted prior to posting of engineers.

NRRDA should quickly develop a Training Framework for not only the PIUs but all the stakeholders of the programme including the contractors’ personnel. NIRD, the SIRDs, PTA/STA etc. may be involved in the training in a state-specific context, and NQMs and SQMs would constitute an excellent set of resource persons. All training and capacity building expenses must be budgeted separately and allocated state-wise, with provision for reallocation to states which are able to use the funds well. A one-week orientation programme for contractor technical staff and separately for work-persons should be made a contractual requirement, with certificates to successful participants. Over a period of time an increasing percentage of certified personnel can be contractually mandated. Institutions such as IAHE (ex-NITHE), Assam Road Research and Training Institute (ARRTI) - the latter for the NE Region - can be engaged for certification purposes and technical training.

In many states, PICs supplement the PIU, but their capacity may be limited in terms of knowledge and experience. PICs should be hired strictly on QCBS basis and as per NRRDA guidelines. SQMs and NQMs should assess the quality of these consultants as part of their QM work.
(xii) STAs and PTAs were created to provide a sound technical underpinning for the programme. While some states such as Tamil Nadu have developed good institutional relationships between the STAs and the SRRDA, many other states have viewed the STA only as a procedural device. The SRRDA-STA linkage must be put on a firmer footing and the SQC must be given the responsibility for this.

(xiii) The management and monitoring system created under PMGSY is among the best in Central Schemes, and should be leveraged further by the states. In particular, internet and mobile based technologies should be expanded under OMMAS and all stakeholder workflows should be captured in such processes to the extent feasible.

(xiv) While at the state level, the SRRDA should evolve towards becoming the asset management agency for all rural roads, there is a need for a still larger institutional mechanism, which can combine the asset management with the asset utilization function. The latter function, including the legislative framework in the form of the Motor Vehicles Act, is currently performed independently, and to a large extent without adequate coordination. It is suggested that states create a “Road Development Board” to bring together the diverse stakeholders of the sector. The main functions of the Board would include:

a) To develop a Vision and Perspective Plan for the entire road sector in the state; to coordinate Departmental Plans for different segments and hierarchies of the Network in accordance with such a Plan and Vision; and to make recommendations on improving the organizational structure and management practices for the better achievement of the Vision and Plan.

b) To create, manage and operate Dedicated Funds such as Road Development Fund or Road Maintenance Fund or Asset Management Fund for the above purposes.

c) To ensure optimum allocation of resources for development, improvement, upgradation and maintenance for all categories of roads in the state within a rational “asset management framework” system and identify new and innovative sources of funding.

d) To ensure development and enforcement of service standards for different categories of roads, with regard to road quality and maintenance and road safety, accident prevention and casualty management; and to create or strengthen regulatory agencies for the purpose.

e) To plan the development of rural areas based on the best utilization of road connectivity for urbanization, agriculture, industry, livelihoods promotion, passenger transportation, access to socio-economic services etc.

f) To strengthen the local community and governance institutions to play a proactive role in planning, maintenance, public transportation services, and road safety.

g) To enhance state level research and development studies and green and climate resilient technologies in the road sector.

Draft Model structure for the Board is given in Annexure-I.
Section: 2
Planning

2.1 The Framework

Connecting rural habitations through good quality all-weather roads, which provide access to services and also opportunities for the rural population to increase their income, requires the development of a proper Master Plan in order that all activities relating to rural roads can be taken up systematically within the Framework.

The District Rural Roads Plan (DRRP), developed under the PMGSY in its initial stages is a compendium of the existing and proposed road network system in the District, which clearly identifies the proposed roads for connecting the yet unconnected habitations to already connected habitations/all-weather roads, in an economic and efficient way.

PMGSY-I focuses on a "Core Network" of a minimal set of roads. The Core Network is the network of all the rural roads that are necessary to provide basic access to all habitations. A Core Network is extracted out of the total network of the DRRP and consists of existing roads as well as the roads required to be constructed to the as yet-unconnected habitations.

In order to define the Core Network, one needs to identify all the market centres in the Block. These are generally located either on bigger roads or at the confluence of roads leading from a number of habitations. They function as Rural Business Hubs and generally have facilities for marketing of agricultural surpluses, banking and telecommunication facilities, large stores for agricultural inputs as well as consumer items (durables and consumables). The market centres are identified using the data available from published Census records/information available from Marketing Board/local enquiries. For purposes of inclusion in the Core Network, market centres need to be identified to the extent that the local villagers should be able to go to the market centre and come back within the same day. The alignment of the road to an unconnected habitation should be planned so as to connect the habitation to the existing network so as to facilitate access to the market centre.

As is evident, selecting the most appropriate alignment for the road under PMGSY is crucial to achieve the poverty reduction impact. Occasionally, alternative alignments to the same market centre are possible. In some cases, more than one market centre may be identified, each with its own characteristics and range of services. In all such cases, choosing one out of many options requires extensive consultation with local populations, and an appreciation of the relative feasibility of each. Clearly such an exercise must precede inclusion of a road in an annual proposal list under PMGSY.

Computerization of the DRRP data through OMMAS, and its visualization on a GIS is part of the PMGSY process, both for planning and operational management and to provide infrastructure information for poverty reduction initiatives.

2.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of planning processes:

(i) PMGSY’s Operations Manual requires that states prepare an annual list of roads to be taken up for project preparation. However, this has not always been followed in spirit, particularly with regard to advance planning. As a result, DPR preparation may be hurried and without a complete reconnaissance or transect walk. PIUs and Consultants engaged for preparing DPR
should be given adequate time for this exercise. STAs also need to be given adequate time to scrutinize DPRs. Preparation of the annual List in a systematic manner is crucial to ensuring quality in subsequent stages.

(ii) PMGSY Guidelines describe in detail the need to develop an inventory of all rural roads in the form of a District Rural Roads Plan, and to extract a “Core Network” of roads for prioritization. The DRRP very clearly brings out the fact that the road network consists of several functional segments, each with a distinct socio-economic purpose, 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.

2.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to planning processes to enhance the effectiveness of PMGSY in achieving its objectives:

(i) Advance planning to enable PIUs getting adequate time for preparing DPRs. The current process of the STA checking for the road on OMMAS from the Core Network while scrutinizing the DPR may be replaced by a process of checking for the road from the Annual List to be uploaded well in advance (say 30 days) by the SRRDA on the OMMAS and locked. In fact, the Annual List may be replaced by a rolling 2-year List to give more scope for advance planning.

(ii) PMGSY-I roads are on average 2 to 3 km long, and as such considerations of geographical distribution of works can be managed within the annual allocations. PMGSY-II roads, being Through Routes with higher traffic are likely to be longer, and annual allocations may not allow for a “wider and equitable” distribution of works. It would not also be advisable to artificially curtail the scope of the work for the purpose. As such, states may consider putting in place mechanisms to pool the available funds from various sources including RIDF, PMGSY, ADB, World Bank, State funds etc. for the purpose of demonstrating that investments in construction of rural roads are indeed geographically well distributed, and that the scope of individual road works need not be artificially curtailed for the purpose.

(iii) ‘NRRDA should at the start of each year give the annual allocation, the portion of that earmarked for ongoing works and the “free” portion available for new works for which SRRDA needs to prepare DPRs. The quarterly progress reports of the SRRDA showing expenditure incurred on ongoing works and projected absorption pattern should be the basis for working out the division. The state must distribute the free portion among the districts based on objective criteria such as absorption capacity as well as road length for completion, and direct the preparation of DPRs as a multiple (generally 3, as used by MoRD in the past) of this amount. A copy of the district wise amount should be given to the STA, so as to draw up the PIU wise schedule of scrutiny. The success of this process in Tamil Nadu needs to be disseminated to all states as a “best practice”. EC meetings could be increased to two per annum or even more to ensure that DPRs are prepared after proper survey and that DPR scrutiny is not compromised.

(iv) In the case of hill states including the Northeast, there is a provision for Stage-I (formation cutting, protection, and drainage) and Stage-II (WBM, blacktopping and completion), with a period of up to 2 years being allowed to intervene between the stages to allow the formation and side slopes to stabilize. It is important that Stage-II works are in fact taken up quickly to prevent deterioration of the Stage-I work; that the Guidelines stipulate that the target habitation is “connected” only on completion of Stage-II; and that the Empowered Committee monitors
cases (using OMMAS) where 2 years have elapsed after completion of Stage-I works and sequesters funds for Stage-II works before clearing new proposals and sanctions in a timely manner, as Stage-I works left without Stage-II are prone to serious damage and degradation.

(v) Current procedures already specify that the SRRDA should initiate the process of preparation of District level lists well in advance, on the basis of the prevailing pattern, without waiting for the actual annual allocation. This process is not being followed in many states and needs to be monitored for compliance. In order to ensure that the capacity at PIU level is not exceeded in terms of its ability to get DPRs prepared and works executed, the SRRDA must make the District-wise allocation based on the residual capacity (rather than road length for completion of the programme), based on detailed Guidelines to be formulated and issued for the purpose by NRRDA.

(vi) Total annual capacity of the PIUs (based on historical data of their ability to take up work) should be laid down; it should be ensured that this is not exceeded. The capacity may be in terms of km, separately for new construction and for maintenance, with a ratio to enable a mix of both works to be assessed for capacity. It is also important that vacancies be filled up or contractual arrangements made as an interim measure.

(vii) Since PMGSY-I has substantially strengthened the Core Network, the primary categorization can now be between the Core Roads Network 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 and should be maintained. The roads of this network may be categorized as follows:

- **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). It is preferable, depending on traffic loads, that the roads are unsealed with a provision to upgrade them at an appropriate time.
- **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 stretches, 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 low population; 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 centres.

(viii) It is important to update the DRRP and the Core Network with respect to the various database elements. This should be done in two parts: data arising out of PMGSY activities.
should be updated concurrently (e.g. road length and alignment of newly constructed roads). Other data, including population, infrastructure creation etc. should be updated periodically, preferably once a year, based on a summary inquiry at Block level, cross checked with official databases.

Implementation of the PMGSY as a Centrally Sponsored Scheme brought in a sea-change in the rural roads sector because of the rigorous planning, technical and contracting requirements of the programme, and the explicit attention to quality. However, the actual adoption of the higher standard has been a slow evolutionary process, and widely variable across states because of administrative and capacity constraints. The encouraging sign is the readiness of states to extend the same standard to the other segments of the rural roads network.

The long term vision is that the rural roads 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 unthinkingly 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 (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. A detailed suggestive framework for the approach to the “Local Roads Framework” is given in Appendix II (Refer Volume-II).
Section: 3
Annual proposals and their clearances

3.1 The Framework

The Annual proposals consisting of list of roads eligible under PMGSY are to be finalized by the District Panchayat. After obtaining the approval of the District Panchayat, the PIU is to forward them along with the approved list to the SRRDA. The SRRDA will scrutinize the list to ensure that they conform to the guidelines and have the list placed before the State Level Standing Committee. Clearance by the Committee, which is chaired by the Chief Secretary/Additional Chief Secretary and includes Finance Secretary as a Member, is in the nature of Administrative Approval for the works and annual maintenance (based on the line estimate) enabling the preparation of DPRs required for obtaining project funds from the PMGSY. As such the Committee is expected to:

► Ensure their land is available for the road
► Review the progress of ongoing works and ensure that the Executing Agency is progressing well in terms of speed and quality.
► Ensure that adequate contracting capacity will be available for the proposed road works.
► Ensure that the proposed road works are fully in accordance with the PMGSY Guidelines.
► Satisfy itself that all necessary clearances can be obtained and policy, funding and procedural issues impeding execution are identified and resolved. In particular, the Committee shall ensure that maintenance of the rural Core Network in general and PMGSY roads in particular are fully catered to.
► Approve the budgeting of the five-year routine maintenance fund requirement.

Based on the approval of the SLSC, the SRRDA communicates the approval to the PIUs and coordinates the process of preparation of DPRs. For this purpose, it is required to:

► Hold meeting with PIU heads for determining the schedule for preparation of DPRs
► Hold a coordination meeting with STAs and PIUs to determine the schedule for scrutiny of DPRs of the various PIUs. At this meeting, issues of Design and DPR preparation can also be usefully discussed.
► Determine the funding limits to be allowed to PIUs for preparation of DPRs/trace cutting and communicate the details to the Bank branches.
► Monitor the progress of preparation of DPRs and ensure that necessary data on DPRs prepared is entered by the PIU in the OMMS database.

After the DPR has been prepared based on soil survey to estimate CBR, and traffic estimated (Annual Average Daily Traffic or AADT), the essential data of the DPR is to be entered by the PIU after logging into the Proposals module of OMMAS. The STA scrutinizes each DPR after checking that it has been entered in the Proposals module of OMMMS. After scrutiny, the STA will clear the DPR, make confirmatory entries in the OMMAS data for the DPRs and return the DPR documents duly certified and countersigned. The state consolidates the proposals and sends the proposals to NRRDA. The NRRDA does sample checking of DPRs to ensure that proposals are in tune with Programme Guidelines.

After scrutiny, the State Government’s preparedness is verified in a pre-Empowered Committee meeting and the proposals are placed before the Empowered Committee. The Empowered Committee
may recommend clearance of the proposals in accordance with the requirements of the PMGSY Guidelines.

The Ministry communicates the clearance of the Proposals to the State Government along with the list of sanctioned projects generated from OMMAS. Based on the clearance letter, the Ministry makes a confirmatory entry clearing the proposals into the “project” mode, to enable the state to continue with further data entry relating to tendering. Clearance by the Ministry does not imply Administrative or Technical sanction of the proposals. The established procedures of the Executing Agencies, in this regard, are to be followed. A simplified flow diagram of the process as described is given on the next page.

3.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of proposal formulation and clearances:

(i) The quality of DPRs is a matter of high concern in many states. In some states, DPR consultants have been engaged but their procurement process does not adequately ensure their ability to prepare good quality DPRs. Even where the DPR Consultant is hired using a quality-based process, in many states, the PIU does not sufficiently engage with the DPR Consultant at the time of the reconnaissance and transect walk, data collection etc. nor does it take ownership for the DPR itself, either at the time of verification on the ground or during scrutiny by the STA.

(ii) In Hill and NE states, as per the PMGSY Guidelines, the work can be executed in two phases, with the formation cutting, protection and drainage (Stage I) being completed first and the formation being allowed to settle for a season or two before the WBM and bituminous layers are placed (Stage II). States are expected to maintain the road in the intervening period. However, this is not always being done; in some cases, landslips and subsidence also take place, making execution of the DPR for the second phase unfeasible or prone to dispute with the contractor.

(iii) DPR Consultant costs are high in the case of QCBS procurement in some cases because the consultant does not take up all the eligible road links in one visit to the area, but only those likely to be included in the annual proposal. An area based approach to DPR preparation is necessary in the interest of economy of use of resources.

Currently, land for the project is to be made available by the state, and land acquisition costs cannot be met from Central project funds. In many states, this has led to delays in commencement or in completion, in case the contract is operationalized without ensuring land availability. In other cases, it has led to changes in alignment, often after clearance of the proposal and contract commencement. All this adversely affects the completion of the work due to deviations in quantity of items, with delay in approvals as well as quality and safety, in terms of road width, sight distance, and design of curves.

(iv) DPR quality also suffers because STAs, who have an academic load, are often required to scrutinize a large number of DPRs within a short time period. Absence of senior PIU staff and the presence instead, in some instances, of inexperienced DPR Consultant staff and/or PIC staff makes the process of correction that much more difficult.

3.3 Recommendations for enhancement
Accordingly, the following specific recommendations are made with regard to the process and methodology of preparation of proposals to enhance the effectiveness of PMGSY in achieving its objectives:

(i) The SLSC should also focus on the availability of natural resources required such as sand, stone aggregates etc. In the past, several works were held up for prolonged periods due to a ban on operations by quarries on account of environmental concerns.

(ii) It is essential that the PIU is adequately equipped in numbers, logistics and knowledge. Norms for staffing of PIUs vis-à-vis their projected annual workloads need to be established and adhered to as the requirement for management and supervision is key to the success of the various stages of implementation. The PIU’s capacity building must be a regular process under the NRRDA’s training framework. In future the clearance of Annual Proposals for a state must be based on a PIU-by-PIU assessment of basic capacity and residual capacity to take up new works, so that poor capacity at PIU level does not contribute to poor quality at design or execution stages. In respect of states with a large number of proposals, to avoid problems caused by the large volume of throughput through various choke points, six-monthly submission of proposals may be allowed. This will also help in the case of states who need to take steps to improve execution capacity, and whose progress in this regard needs to be closely monitored for compliance.

(iii) Norms have to be brought out regarding time necessary to prepare a standard DPR considering all stages, and to the detail required. Milestones should also be identified, so that the DPR preparation process can be brought within the ambit of OMMAS and properly monitored.

(iv) In the case of long roads, which may be the case in remote locations in hilly areas, the DPR from end to end may cover too large a scope for it to be done within the time limit specified in the PMGSY Guidelines. It is not feasible to provide for longer time periods, since escalation issues may arise. Artificially restricting the time is also not advisable. In the circumstances, it is best if longer roads are broken up into manageable segments and DPRs prepared for each segment as a separate work. The DPRs may be taken up for execution sequentially, with successive DPRs being tendered (at applicable SoR) when the earlier work is nearing 1st stage completion. As far as possible, Stage-II work of an earlier segment should receive a higher priority than Stage-I work of a later segment.
Annual Allocation of funds to states by MoRD

2. Preparation of District wise CNCPL and CUPL for PMGSY I and CUCPL for PMGSY II based on the unconnected habitations and PCI

3. CNCPL, CUPL and CUCPL placed before the District Panchayat for finalization according to their allocation and order of priority

4. List sent to MPs for their suggestions

5. The finalized list of roads submitted to SRRDA by the District Panchayat after incorporating the suggestions if any received from the MPs with Proforma MP-I and MP-II

6. SRRDA will consolidate and verify the list of proposals received from District Panchayats in accordance with PMGSY guidelines

7. Scrutiny and approval of annual list by the State Level Standing Committee

8. Communication of finalized annual proposals to PIUs by SRRDA

9. Transect walk, Preparation of DPRs by the PIU and entries on OMMAS

10. Scrutiny of DPRs at SRRDA

11. Scrutiny of proposals including online scrutiny by STAs

12. Consolidation of proposals, verification of online scrutiny done by STA for each proposal and submission of proposals to NRRDA through State Government by SRRDA

13. Scrutiny of 15% DPRs by the NRRDA and preparation of annual proposals for placing before the Empowered Committee for its consideration

14. Recommendation of annual proposals by the Empowered Committee and clearance of proposals by the Hon’ble Minister of Rural Development

15. Conveyance of clearance of annual proposals to the states by the Ministry and Technical sanction of DPRs and tendering by the State Government
(v) The Hill and NE states (and LWE areas) may be allowed to prepare a supplementary DPR to the
2nd stage DPR in case there are substantial changes (due to landslips, subsidence or other
unanticipated causes), and bring it before the Empowered Committee along with the annual
proposals. However, such supplementary DPRs will be brought before the Committee within
3 years of completion of the 1st stage, after which the state should be made to bear 10% of the
supplementary cost per annum (or part thereof) of delay in submission beyond the 3-year
period.

(vi) As per current procedure, the cost of preparation of the DPR is part of the project cost and is
met from funds in hand, subject to future book adjustment when the proposal is cleared. Most
states take up DPR preparation only with respect to the current year’s proposals. However, it is
preferable to prepare the DPRs well in time. As such, in addition to the annual List, states may
be permitted to prepare lists for the next year based on the prioritization laid down in the
programme Guidelines. By doing so, DPR preparation in advance for geographically compact
areas in a planned manner would be enabled, bringing down DPR preparation cost including
consultancy charges. The BOQ costing could be done at the appropriate time with the
prevailing Schedule of Rates. The process of initiation of the survey, data gathering, transect
walk, visits by PIU to site etc. should be captured in OMMAS, with checks to ensure that there
is no “bulk processing”. DPR Consultant costs may be paid out of a suspense fund created
within the administrative fund, and recouped from the Programme Fund once the DPRs are
cleared. The use of programme funds for the purpose would be subject to conformance with the
systematic entry into OMMAS and subject to book adjustment within a specified period, e.g. 2
years. States may also be encouraged to set up state level Project Preparation Funds to take care
of the eventuality that the state priority for a road may not
in some cases, find acceptance under the PMGSY.

(vii) The fact the Central Government funds cannot be used for land acquisition by the state does not
imply that land need not be acquired for the project at all. States must put in place land
acquisition policies so that in case land cannot be made available through donation, exchange
etc., acquisition in an equitable manner is done and full land availability is assured when
approving the DPR. Sufficient provision for land acquisition should be permitted/envisaged in
the DPR to acquire land without any disputes. This aspect needs to be a focus during the
transect walk process as well, and the full width of the proposed alignment should be marked
out to identify issues for resolution, such as acquisition, forest land diversion, utility shifting,
livelihood loss or other social or environmental impacts that need to be addressed.

(viii) Key milestones of the DPR preparation process (including survey data) should be included in
OMMAS under the road code, and the DPR Consultant payment system linked thereto, similar
to works contract management. The system should have an online check in terms of the District
wise allotment of funds and schedule for submission, and an audit trail to analyse where delays
or undue hurry is taking place. At present, entry of key DPR data is to be made in the OMMAS,
and checked by the STA at the time of scrutiny. NRRDA may review the data requirements and
add some data elements that need to be entered from mobile devices at site by the survey team,
to ensure geotags with time stamps along the alignment during the survey and DPR
preparation.

(ix) Quality of DPR Consultants and of the supervision by the PIC/PIU needs substantial
improvement. It is imperative that the staff engaged by consulting organizations on survey
work, soil investigation, design of pavement and bridge design are qualified and have the
requisite experience. Many SRRDAs are currently outsourcing the DPR consultants, often
without adequate regard to quality, even though the costs on a QCBS basis are reimbursable,
and costs of outsourcing on non-QCBS basis are not. The same is true for Project Implementation Consultants (PIC) who are engaged to assist PIUs during execution. NRRDA must prepare a Bidding Document, develop selection procedure and also define contract conditions in detail. The sub-contracting of DPR preparation by the DPR Consultants needs to be checked through contractual measures and instances taken up with ‘black-listing’ done at National Level. This should also be done for PICs.

(x) NRRDA should empanel the DPR and Project Implementation Consultants, either nationally or regionally, particularly giving regard to their competency in the type of tasks such as survey in difficult terrain, use of total stations, soil investigations, bridge design etc. as may be required and also work out their capacity, and allow SRRDAs to engage them only within the limits of their capacity so that quality does not suffer. The payment terms should be made rational so that Consultants are not motivated to increase the DPR value. A fair procedure of dealing with complaints against Consultants for undesirable practices, with provision for blacklisting may also be devised by NRRDA and operationalized, leveraging OMMAS.

(xi) In the case of some NE states, because of remoteness, lower volumes of work etc., DPR and Project Implementation Consultants are often engaged at a higher cost. The quality of their work is also variable, and individual NE states are not in a position to enforce standards due to capacity constraints and poor leverage. It would be useful if in this instance, NRRDA engages common DPR and/or Project Implementation Consultants on behalf of all NE states who wish to use the facility.

(xii) From a long term perspective, it is essential that the SRRDA/PIU possesses the core competency to prepare high quality DPRs for rural roads. Only then will it be able to supervise the work of the contractors effectively. As such, where DPR work is being outsourced because of high volume of work, the PIUs should continue to do the survey and prepare DPRs for a certain percentage to be fixed by the SRRDA, and these DPRs should be checked by STAs additionally in a “training and capacity building mode”. Where DPRs are being outsourced because of insufficient knowledge within the PIU, the Training Framework should specifically address this issue and there should be a progressively higher percentage of in-house DPR preparation over time, with the STAs checking these DPRs in a “training mode”.

(xiii) PMGSY relies heavily on the DPR, and it is essential that the design is cost-effective and environmentally optimized. The format of DPRs should be made more purposeful in this regard, and standardized designs must not be allowed. Time and geo-stamped data entry procedures using OMMAS should be worked out for the purpose. Some key geo-referenced and time-stamped data entry should be made by the Design and Project Implementation Consultants. STAs and SQMs/NQMs must scrutinize DPRs carefully in this regard and bring all suspected cases to NRRDA’s notice, so that strict action including termination and blacklisting of the Consultant, disciplinary action and suspension of the programme can be considered. The OMMAS should have a provision so that if at clearance stage of a suspect DPR, in case time does not permit site visit, a flag can be placed, and a site visit can be done by the STA/SQM/NQM subsequently. There may be a case for evaluating work of Consultants and rating the quality of DPRs, with the ratings serving as input for award of further work to them.

(xiv) The Tamil Nadu standard procedure of fixing dates and number of DPRs for scrutiny District wise in advance by the SQC in consultation with the STAs may be adopted and this may be made part of the OMMAS system, with a system check which ensures adherence to the agreed schedule. As per this procedure, each PIU will first bring two sample DPRs, and the
scrutiny results of these DPRs will be incorporated where applicable into the other DPRs before submission to the STA. This process should be incorporated into OMMAS as well.

(xv) Interventions should be done by PTAs/STAs on a paid basis under the Training Framework to bring awareness on the preparation of a ‘fairly error free’ DPR, based on common mistakes and past experiences. A Handbook on Rural Road DPRs should also be commissioned to standardize the process, highlight common mistakes, document best practices and provide training material.

The SRRDA is required to indicate its readiness to NRRDA for sending the annual proposals for clearance by the Empowered Committee. It should be ensured that the system checks described above enable the SRRDA to indicate its readiness on the basis of the “State Brief” which will be an output of OMMAS and can be successfully generated only if due procedure has been followed.
Section: 4
Surveys and Design

4.1 The Framework

The IRC: SP 20:2002, Rural Roads Manual gives detailed guidance on selection of the alignment, and the geometric design standards to be followed for PMGSY-I. Particular attention is required in adopting the Carriageway Width (CW) based on traffic volume considerations. Where traffic is likely to be very low, as in short roads terminating in dead ends, and is not likely to increase substantially in the future, a carriage way of 3.0 m may be designed instead of the normal 3.75 m. In view of the fact that many of our rural roads are mainly "farm to market" roads, the design traffic is of a very low order and Gravel Roads can adequately cater to such low volumes of traffic, these can also be considered as these are more dependent on local materials. The design of such roads is covered under SP77:2008.

The design of the crust thickness for new connectivity roads is done as per the Guidelines for design of Flexible Pavement (SP: 72) and Guidelines for design of Rigid Pavements (SP: 62) published by IRC. Special care is to be taken while assessing the design parameters, namely the CBR of subgrade soil and projected traffic for the design life period in terms of cumulative equivalent axle load.

In respect of design for upgradation of existing roads to PMGSY standards, a traffic survey is needed in order to estimate the extent of pavement strengthening. The purpose of the traffic survey is to establish the Average Annual Daily Traffic (AADT).

It is mandatory under PMGSY to have a drainage plan prepared for each rural road project. Generally, the provisions of the Rural Roads Manual are adequate for CD Structures for rural roads. However, when special CD Works are needed due to location specific conditions, such CD Structures are to be designed after appropriate exploratory investigations. In such cases, where length of an individual bridge exceeds 15 m, a separate DPR is to be prepared for the CD Works as a part of the main DPR for the sub project proposal.

The Manual also contains instructions on survey of soil and materials for the road projects. Since low volume rural roads need to be cost-effective for construction as well as subsequent maintenance, the specifications for pavement materials in various layers should be as economical as possible, consistent with the traffic expected to use the road, the climatic conditions etc. From this angle, local materials (including marginal materials) which are cheaper and involve minimum haulage cost should be used to the maximum extent feasible.

4.2 The Assessment:

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of designing processes and improve outcomes:

(i) The Operations Manual gives detailed guidelines on the methodology of preparing DPRs, starting with a preliminary survey to establish a base-line traverse, along with benchmarks at 250m intervals. Feedback from both the STAs and the NQM/SQMs indicates that in many cases, this is not being done systematically, the knowledge of the surveyors may not be adequate, the PIU does not properly undertake verification and the data is open to doubt. This is one of the reasons why PIUs do not take ownership for the DPR during scrutiny by the STA. It has been brought forth in many fora that often PMGSY roads have far lower traffic densities than those
projected during the survey, leading to doubts on the initial traffic surveys. Thus traffic survey data has to be double checked to prevent over design and avoidable expenditure.

(ii) Though PMGSY as a programme places high importance on involving the local community at all stages, the PIUs (and indeed the SRRDAs) are yet to be oriented in this direction. The Transect Walk is an important mechanism to elicit participation. However, in many cases, the involvement of the local community is inadequate and issues of land acquisition, social and environmental impacts and mitigation or adaptation measures that need to be addressed during the Walk remain unresolved due to inadequate commitment or engagement, leading to changes in the alignment or scope of work during execution, with implications for quality and road safety.

(iii) In the rural roads sector, one of the innovations of PMGSY has been the DPR based approach as a matter of principle. However, the feedback is that many states have not yet internalized the concept and see the DPR as a mere procedural requirement. The actual DPR content is often not as location specific as it should be, resulting in overdesign or mis-design, with all its implications for cost, quality and serviceability.

4.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to improving the quality of design and making it more cost-effective, to enhance the effectiveness of PMGSY in achieving its objectives:

(i) The Operations Manual prescribes a preliminary survey and establishment of a baseline traverse, along with benchmarks at 250m intervals. Feedback from both the STAs and the NQM/SQMs indicates that in many cases, this is not being done systematically, and this is the main reason why PIUs do not take ownership for the DPR during scrutiny by the STA. Ensuring the survey on the ground has to be a fundamental duty of the PIU, and failure to do so or to provide essential data for the purpose should result in suspension of new projects or disciplinary action at the very least. In case a DPR consultant has been engaged for the purpose, and it fails to ensure proper survey, it must be blacklisted by the SRRDA/NRRDA. To help improve the reliability of data, it is necessary to put in place mobile based systems to geotag the key records of the survey. The alignment emerging from the survey should be marked out for the entire width so as to properly conduct a transect walk as soon as possible after completion of the survey.

(ii) Where a DPR Consultant has been engaged, the Reconnaissance survey has to be jointly conducted by the PIU and the Consultant, and the PIU has to take full ownership for the DPR.

(iii) The PIU is required to conduct a Transect Walk during the process of finalizing the DPR. Feedback indicates that in many cases the involvement of the local community is inadequate and issues of land acquisition and social and environmental impacts and mitigation or adaptation measures that need to be addressed during the walk remain unresolved, leading to changes in the alignment or scope of work during the execution stage, with implications for quality and road safety. The Transect Walk is a key requirement in ensuring that the design promotes inclusivity and participation and enables community ownership of the created asset, not least for purposes of road safety and maintenance. NRRDA needs to formulate and issue detailed guidelines both on the conduct of the walk and the recording of the proceedings to ensure that the Transect walk serves the intended purpose. The nature and extent of community participation should be clearly spelt out in alignment selection, prevention/removal of encroachment and routine maintenance of roads.
Guidelines should lay down the mode for community and Panchayat participation during the Walk. In particular, the Walk should be:

a) Held after fixing a date in consultation with the local Panchayat, and giving wide publicity so that elected representatives (and not merely the Panchayat secretary) are present, as well as local residents.

b) Attended by the AE in all cases (and not only the JE), and the DPR Consultant, if there is one. Presence of the local revenue and forest officials must be mandatory.

c) Organized on a systematic basis in a local area. Notice of the dates for transect walk in a PIU area must be given to the SQC, so that he may depute a conveniently located SQM to participate. At least 10% of the transect walks must be held in the presence of SQMs. Similarly, revenue and forest officials should participate, and their inability brought to the notice of the District Collector, as the Walk cannot be conducted in their absence.

d) Transparently managed, with the tentative alignment marked out to the full width along the entire length with chalk powder on the ground.

The results of the walk should be summarized in writing, specifying the land, social and environmental issues and the outcome of the discussions, and including the list of participants. The final alignment should be marked out on a cadastral scale map, showing the ownership and area of the private lands falling within the alignment. Disputed or unresolved land issues should be shown as such. The Summary of the Walk, along with photos, should be uploaded to OMMAS in the public domain. To the extent possible, the Walk and the Discussion should be video graphed and uploaded under OMMAS. Availability of the Summary on OMMAS should be a prerequisite to scrutiny of the DPR by the STA.

Feasibility of use of simple infrastructure tools such as the Integrated Rural Accessibility Planning process developed with ILO support should be explored.

The World Bank Evaluation (June 2014) of PMGSY has flagged the issue of the Transect walk not being sufficiently well executed. The Transect walk proceedings may be separately uploaded to OMMAS under the road code, and seen by the STA online during the first stage scrutiny. All photos of a road, whether taken during transect walk, DPR preparation, construction or quality monitoring should be uploaded (with geo and time stamping) to OMMAS under the road code, using the Android mobile app. DPR consultants, PIU, PIC, Local Panchayat, etc. may also be given login access. This facility can also be extended to the maintenance management system, including reporting of potholes and other defects by the Panchayat.

States need to notify a practical rural road-specific land acquisition policy, which includes exchange, alternate modes of compensation etc., and delegates the power to the District Collector, so that formalities can be completed quickly and land mutated in favour of the Government by the time the work is awarded. One of the practical problems in land acquisition is that land losers are paid at current rates, whereas there is often an appreciation of land price all-round after the road connectivity is provided, and the feeling of loss is compounded. Land pooling, land exchange and other more equitable land management options need to be explored and Model Policies developed for adoption by states.
(viii) Soil survey and CBR determination, location and design of CD works, Traffic Survey and use of local and marginal materials are key to a cost-effective DPR. Though PMGSY has been DPR-based as a matter of principle, the feedback is that the actual DPR content is often not as location specific as it should be, resulting in overdesign or mis-design, with all its implications for cost, quality and serviceability. NRRDA must institute a system of DPR Audits by PTA/STA as an independent activity, and in case of major diseconomies, the State Government rather than the Central Government should bear the incremental cost of a sub-optimal design. To facilitate this, the OMMAS must enable a flag to be placed by the STA against a DPR that could do with a ground check at some stage, and such DPRs must be picked up by the SQM/NQM during their visit to the area. PIUs/DPR Consultants who consistently prepare high quality DPRs which lead to economical roads with use of local materials should be recognized through suitable means.

(ix) Where conventional designs are proposed, a mandatory certificate provided by PIU should be part of the DPR to the effect that local/marginal materials which are economically viable for construction of the road are not available. All such DPRs must be flagged in OMMAS for Audit (two suggestions have separately been made, which should be operationalized to give effect to the post-audit: one is that in case inventorization of local materials is not done, a presumptive cost of 10% is borne by the state. The other is that if the failure to use local materials despite inventorization or due to improper inventorization results in diseconomy, the State rather than the Central Government should bear the incremental cost).

(x) The equipment possessed by some PIUs in their laboratories requires upgrading. DCPs, Nuclear Density Gauges, Total Stations etc. are some of the equipment required. DPR consultants are currently doing their own testing. Since NRRDA has funded PIUs for labs and these are underutilized, and the DPR consultant test results have in many cases been found to be unreliable. NRRDA may frame a scheme for “one time” rectification of all supplied equipment so as to make the labs functional. Random checking at STA laboratories may continue till the arrangements are satisfactory. Once the labs are certified to be fully functional, it should be compulsory for PIUs/DPR consultants to get the tests done in the PIU lab in respect of equipment available. SQMs/NQMs should, after inspection, include a report regarding the efficacy of the District Laboratory serving the projects they visit.

(xi) During surveys, levels should be checked by JE/AE of the PIUs at random locations independently and recorded in OMMAS.

(xii) Pavement design, CD design and the use of local and marginal materials and DPR preparation require the PIU, and the DPR Consultant where there is one, to have adequate knowledge and expertise, and currently this is not always the case. Where the terrain is non-typical, the work of preparing the DPR should not be left to DPR Consultants, who may not possess the requisite expertise. To ensure that the design is of adequate quality, the Training Framework referred to earlier must focus specifically on this aspect. Similarly, the SRRDA needs to build internal capacity for bridge design, since capacity to prepare and even scrutinize DPRs may not be adequately available outside; NRRDA may provide institutional and training support for the purpose.

(xiii) The selection and operational framework for the DPR consultant and PIC must also be made much more rigorous, including:
- A central registration process for DPR Consultants and PIC Firms, with assessment of capacity including a random but detailed survey of DPRs prepared/Projects supervised in similar local terrain.

- Procurement of DPR Consultant and PIC by states following a QCBS system based on a model document of NRRDA, and guided by the residual capacity available. Remunerating DPR consultants on the basis of percentage of DPR value must be prohibited, and the industry standard should be followed. Consultants should not be permitted to outsource the work and such instances should be penalized sternly by black-listing, and contractual conditions should be suitably framed.

- Ensuring proper survey and cost-effective design must be a fundamental objective of the consultancy.

- Terms of reference approved by NRRDA which should set out the approximate timelines for the various stages and make payment in stages accordingly.

- Requirement for the PIU to sign off at key stages; and a test check role for STA and SQM.

- A mandatory induction training for all key personnel of PIUs and DPR Consultants.

- Incorporation of quality of DPR and of the DPR Consultant and PIC services for assessment in the Quality management system, for the second and third tier of QM.

- A system of DPR on-site audit for quality assurance of data used in DPRs must be institutionalized, with a feedback loop for empanelment/pre-qualification of DPR Consultant firms. In particular, the audit must analyse the difference between BOQ in the original estimate and “as constructed”. To facilitate this, OMMAS may provide for a module for the purpose.

(xiv) As part of DPR Audit (suggested above), actual traffic may be assessed over representative completed roads, and cost of overdesign may be recovered from the state.
Section: 5
Project Preparation

5.1 The Framework

As mentioned earlier, each Rural Road Project (whether a new link or upgradation of an existing road) needs to have a separate Detailed Project Report (DPR). The DPR is to be based on detailed survey and investigations, design and technology choice and should be of such detail that the quantities and costs are fairly accurate, and minimal cost over-run takes place due to changes in quantities during execution. The IRC Publication IRC: SP: 19 provides the necessary guidance for preparing the DPR, though it deals with rural sections of National Highways, State Highways and Major District Roads. However, a Manual on Preparing DPR for rural roads with World Bank assistance is under finalisation by the NRRDA with IRC support.

The Operations Manual requires that before the commencement of the preparation of the DPRs, a joint meeting of all concerned Engineers of PIUs and STA(s)/PTA be convened by the SQC under the Chairmanship of the Chief Engineer (PMGSY) to discuss the issues and the data requirements for the preparation of DPR. At this stage the STA/PTA is required to take the initiative in guiding Executing Agencies for adopting designs with New Materials where it is possible. If needed, they are expected to associate in the investigations of special nature.

Since PMGSY is a time-bound programme, State Governments need to build up capacity to prepare DPRs of acceptable quality. For this purpose, they have been empowered to outsource this service where adequate in-house capacity is not available, to Consultants with adequate expertise and capacity. The DPR consultants are engaged on Quality and Cost Basis System (QCBS) using the document prescribed by NRRDA. The process involves inviting expression of interest and short-listing prospective consultants meeting the requirements, including previous experience of preparing DPRs of road works equal to at least 50% of the value of the proposed DPRs.

5.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of preparation of DPRs:

(i) Though the Guidelines mandate that the work of Design Consultants be periodically evaluated by assessing whether any serious excess has occurred between the estimated and “as executed” quantities or whether any design deficiency has come to the notice of the Department in the execution of the work, very few states are adopting this practice, as a result of which quality of Consultant outputs is dropping.

(ii) Road construction activities have degrading impacts on the environment. Though PMGSY incorporates certain environmental codes of practice and in many ways has practices well in advance of the rest of the sector, there is a huge scope for “greening” the process of road construction, including procurement of material (e.g. using locally available materials including marginal materials), construction practices etc.

5.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to the way projects are prepared and submitted, to enhance the effectiveness of PMGSY in achieving its objectives:
The work of Design Consultants should be evaluated annually by assessing whether any serious excess has occurred between the estimated and as-executed quantities or whether any negligent overdesign or design deficiency has come to the notice of the Department during the execution of the work, which could substantially be attributed to poor survey and estimation. Inputs of STAs and NQMs/SQMs should be taken for the purpose. NRRDA should issue Guidelines for the preparation of an Annual report by the SRRDA, giving a Consultant-wise analysis, and facilitate its use for evaluating a Consultant for engagement or continuation. The Consultants whose work has not been wholly satisfactory ought not to be awarded further consultancies.

Whether the DPR is prepared by the PIU or the DPR Consultant, the document must be owned by the PIU. The JE preparing the DPR must sign all the drawings, and the AE must countersign the key drawings as having been “checked at site”. NRRDA may specify the key drawings such as the Plan and L/S, C/S, CDs and protection works. Where the DPR is prepared by the Consultant, the JE must check all the drawings, and the AE must countersign the key drawings as in the earlier case, the AE must also check all the designs.

Several states have constituted a “Technical Advisory Committee” chaired by the Chief Engineer SRRDA to ensure that the DPRs are of the requisite quality. NRRDA may issue Guidelines to make this the general practice, so as to improve quality of survey and design, use of marginal materials etc., and ensure ownership of the DPR by the PIU.

NRRDA may help evolve specifications on use of specific local and marginal materials, and issue Guidelines to limit the lead distance for accessing materials, so as to incentivize use of local and marginal materials in the interest of economy and resource use efficiency. The policies of the South African National Roads Agency could be referred to. The SRRDA/PWD must be tasked with inventorying and characterizing such materials on a location specific basis - this could also be out-sourced, costs being met out of programme funds, and design being based on such materials in the specified areas. In case of failure to complete the inventory within a specified period, say a year, a presumptive cost on use of conventional materials (say 10%), must be deducted from the Central share of the project cost, till such time as the inventory is completed and approved.

MoRD may create a Committee of experts from associated disciplines on creating a framework for “greening” of road construction keeping in view the SDGs.
Section: 6
Scrutiny of DPRs

6.1 The Framework

One of the innovative features of PMGSY has been the reaching out to Academia to partner in the
design and DPR preparation process by identifying suitable engineering institutions to act as State
Technical Agencies (STAs). The STAs are expected to provide independent inputs to improve the
quality of the design and also to enable innovation in the use of materials, so as to improve the
economy of the estimation for the given projected life of the road, which is crucial since PMGSY is
DPR based and centrally funded. The STAs while scrutinizing the DPRs are expected to:

► Check that the proposals are part of the Core Network.
► Verify that associated through Routes if taken are appropriate for upgradation/renewal as per PCI
and age, and all subsidiary links as per CNCPL have been taken.
► Check that Land Availability Certificate and Transect Walk proceedings are attached.
► Check that the pavement design for low volume roads is as per the provisions of SP: 72, 2007 for
design of flexible pavement and SP: 62, 2014 for design of rigid pavements, published by IRC. In
particular, they will examine the data on traffic and ensure that all cases of traffic exceeding 45
CVPD are adequately justified. They will also analyse the CBR values. In all cases where CBR is
below 3, it shall be ensured that soil stabilization measures are included. Link Roads to habitations
with population below 1,000 should be designed as unsealed roads of appropriate design in view
of the likelihood of traffic being below 15 CVPD. Where the target habitation is below population
500 and motorized vehicles per day (MVPD) less than 100, the carriageway width may be kept as
3.0 m instead of 3.75 m.
► Check whether the soil tests have been carried out as per laid down standards, and traffic has not
been over-estimated
► Investigate economies in use of materials, including soil stabilization and use of alternative/ local
material.
► Check the geometric design parameters and make sure that they are as per RRM/Guidelines.
► Ensure that a proper drainage plan has been worked out.
► Verify that the method of flood and waterway computations is satisfactory and check the number,
location, suitability and design of CD works as per the guidelines and given site conditions.
► Check whether the CD works require additional protection works based on the site conditions.
► Check the items and estimation of BOQs and the cost as per Standard Rate Analysis and SSR.
► Verify whether suitable and adequate provisions are made for PMGSY logo & Information Board,
Citizen Information Board, Maintenance Board, traffic signs, Km & boundary stones and guard
stones as required.
► Check that lump sum provision for each year of the 5 years of routine maintenance has been
adequately provided in the BOQ, as per NRRDA guidelines.
► Visit the site if so requested by the PIU for advice, or where it is felt that the design needs site
inspection.
► Point out the shortcomings and offer suggestions for their rectification (major defects shall be
intimated in writing).
6.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of the entire scrutiny process to design cost-effective, safe and durable roads under the programme:

(i) Proper scrutiny of DPRs is necessary to achieve the potential of the DPR based approach pioneered in PMGSY. Currently, the poor quality of DPRs is compounded by practices that reduce opportunities to STAs for a proper scrutiny.

(ii) Like the DPR preparation itself, the scrutiny process is seen by the PIU as a procedural requirement rather than a process to improve design and effect economies. The two in combination may seriously derail the scheme. The scrutiny process should move towards a dialogue mode with the PIU (and its Design consultant), with the STA collaborating in a learning process.

(iii) The fact that PMGSY provides for 100% funding of the construction cost on a DPR basis, though providing comfort to the contractor, is actually a flaw in terms of incentivizing economy or innovation in design by State Government agencies. This can only be overcome by strong systemic measures to dis-incentivize overdesign and technically uneconomic practices. The fact is that once an over-designed road has been accepted, it sets the path for future over-design.

6.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to technical scrutiny of DPRs to enhance the effectiveness of PMGSY in achieving its objectives:

(i) In many PIUs, many of the staff at JE level are on contract basis or part of the DPR consultant, or do not have adequate experience in road projects. In order to ensure that the PIU takes responsibility for the DPR, in addition to the JEs, all DPRs must be scrutinized by AE level officers, and signed by them. 30% of the DPRs (as well as DPRs of CDs with span exceeding 15 metres) must be checked at site by the Executive Engineer in the manner prescribed in the Operations Manual and entry made in the OMMAS. The selection of the DPRs for the purpose should not be done by the PIU but rather by the SQC, who must enter the selected list in OMMAS so that the compliance is ensured during STA scrutiny.

(ii) There must be a checklist for each DPR regarding extent of land availability, site inspection etc. which must be entered on OMMAS by the AE/EE concerned under his login before the proposal can be sent to the STA for scrutiny.

(iii) Customized "DPR software" to standardize and tighten the process of DPR checking needs to be devised.

(iv) To ensure general conformance to guidelines, design standards, specifications, safety requirements, costs etc., the SQC must also list out 10% of the DPRs, and DPRs of all CDs with span exceeding 25 metres for personal examination and site visit by SE (as part of his normal supervision). The check of the DPR during the site visit in such cases must be entered by the SE under his login.
(v) The scrutiny by the STA must be properly structured, so as to ensure enough time for the purpose. The STA must make a site visit in the following cases for self-evident reasons:

► Where the CBR is low and traffic projection is high
► Where CBR is low and soil stabilization has not been proposed to improve CBR
► Where per km pavement cost is above the benchmark fixed by NRRDA for the state
► Where the number of CDs or the proportional cost of CDs per km exceeds the benchmark fixed by NRRDA for the state
► All DPRs with CDs with a span exceeding 15 metres
► All DPRs where use of marginal or local materials has not been proposed, but where NRRDA has identified the area as being highly potential for the purpose (e.g. on account of availability of material like slag or mineral slurry or fly ash etc.)

In case the STA is not able to make a visit to the DPR site at scrutiny stage, the DPR should be flagged in OMMAS for site visit by STA/SQM/NQM at a subsequent point in time. However, the STA must visit the site for at least 50% of the flagged DPRs during scrutiny.

(vi) During scrutiny by the STA, the PIU must be represented by the JEs who prepared the DPRs. In case of outsourced DPRs, the consultant personnel concerned and the AE must be present. In case of contract JEs too, the AE must be present. The STA must draw up a summary of the scrutiny proceedings on a daily basis, mentioning the DPRs scrutinized, and the PIU officials present on the day, and must upload it to OMMAS.

(vii) Where the STA does not agree with a provision or its absence, and the PIU is of the view that the STA needs to reconsider, a site visit should take place if that can resolve the issue locally.

(viii) The changes in the DPR made after scrutiny by the STA in all cases must be signed by the Executive Engineer. To deal with cases where the PIU does not agree with the observations of the STA, there must be a mechanism under the SQC consisting of a committee headed by an SE level officer, with one or two SQMs. The Committee’ recommendations shall be sent to the PIU which shall revise the DPR accordingly and the STA shall scrutinize the DPR submitted on this basis. In case the STA does not agree with the recommendations, or is not satisfied with the quality of the DPR even after the changes, it shall record the nature and extent of its disagreement on the DPR, and all such DPRs will be scrutinized by an Expert Committee set up by NRRDA, whose recommendations will be final and the DPR finalized on this basis shall be submitted for clearance by the Empowered Committee. The STA will be informed by NRRDA of the final decision in the matter for its future guidance.

(ix) In several states, not all STAs have the technical competence to scrutinize bridge designs. NRRDA should clearly identify STAs who have this capability on an annual basis. In all other cases, scrutiny of bridge design should be entrusted to one or more Technical Consultants to be engaged by NRRDA on an ongoing basis. Alternatively, the STA should be empowered to engage specialized technical resources (such as retired engineers of the State Government or professionals and domain experts in the private sector), transparently with the prior approval of NRRDA and on a paid basis.
Section: 7
Procurement

7.1 The Framework

All works contracts under PMGSY are procured through the electronic tendering system. PMGSY requires that all road works cleared by the Empowered Committee, and technically and administratively approved by the competent authority in the State Government, be packaged into suitable size packages and contracted out for construction and subsequent maintenance. PMGSY has devised a Standard Bidding Document and specified the procedures to be adopted thereunder. The Standard Bidding Document envisages submission of bids in two envelopes marked respectively, “Technical Bid” and “Financial Bid”. On the basis of the eligibility criteria laid down in the Instructions to Bidders (ITB), the Technical Bids will be evaluated, and a list will be drawn up of the responsive bids whose Financial Bids are eligible for consideration. The evaluation of bids based on Qualification Information comprises scrutiny of the:

- Eligibility of bidder
- Qualifications
- Availability of equipment and personnel
- Certificates: including current income tax clearance certificates and such other certificates defined in the Appendix to the ITB
- Bid capacity
- Sub-contracting: up to a maximum of 25% of the contract price
- Methodology and Work Programme

7.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of procurement processes to deliver assets in time and with acceptable quality:

(i) “Quality” as well as “Time” is the essence of PMGSY contracts. However, in several states, contractor evaluation procedures in practice do not focus adequately on either aspect. In many states (particularly the NE states and LWE areas, but also some states with very large connectivity deficits), where contractor development is poor and contractors are not willing to bid, there may not be adequate competition, and the capacity actually available with the contractor to execute the work is not always adequately evaluated in the haste to award work. Table 2 of the Statistical Appendix brings out that in Arunachal Pradesh, Uttar Pradesh, Mizoram, Manipur, Uttarakhand, Assam, Himachal Pradesh, Jharkhand and Meghalaya, the constraint is the pace of expenditure, which is a proxy for contracting capacity.

(ii) Due to capacity constraints and lack of training, in many states there is an inadequate enforcement of quality related conditions, both in terms of availability of qualified personnel and requisite equipment. This results in contractors doing poor quality work not getting excluded from new procurements.

7.3 Recommendations for enhancement
Accordingly, the following specific recommendations are made with regard to procurement processes so as to be able to get competent contractors and to enhance the effectiveness of PMGSY in achieving its objectives:

(i) The poor management of the procurement process is contributing to quality losses as well as delays. In the long run, it will also add to the states’ maintenance costs. To ensure that the bidders’ capacity is properly assessed, states must create a registration process on a common platform applicable to contractors at least for all rural road works, and should link the award, execution, quality assessment and completion of works to the registration, so that the contractors’ works-in-hand across all departments can be crosschecked. As part of the registration process, the criteria regarding technical qualification of engineering staff should be strictly enforced.

(ii) When states have to resort to successive advertisements for bids due to poor response, the cost of advertisement inviting bids becomes prohibitive compared with the earnest money received. State Governments facing this problem should analyse the reasons for the same, since the reason can be demand-supply mismatch in terms of contractor availability, perception regarding PMGSY contracts (with respect to quality checking procedures, payments, maintenance provisions etc.), or location specific problems of land or law and order.

(iii) Many contractors, particularly new entrants and new contractor personnel, are not familiar with the bidding conditions and conditions of contract for PMGSY works. The SRRDA must hold contractor outreach programmes to educate the contractor community, as this will improve competition and quality of response. Smaller contractors who work as sub-contractors must be included in the outreach to facilitate growth of the sector and increase sectoral capacity.

(iv) In addition to the current security instruments, instruments issued by Regional Rural Banks could be considered if the state so desires, to facilitate contractors to participate in bids. The option may be exercised by the SRRDA under intimation to NRRDA, and should not be changed. The current procedures for release of securities as per the SBD should be revisited to reduce the possibility of locking up of liquidity in projects for prolonged periods thus reducing contractor capacity to bid, though they may be competent otherwise.

(v) The bidding and evaluation process including the pre-bid meetings as mentioned in the SBD are not being taken seriously enough in many states, with the result that the contractor’s capacity to ensure the essence of the contract, which in the case of PMGSY is both the time and the quality, is compromised. Pre-bid meetings must be held at Circle level and minutes uploaded to OMMAS.

(vi) Non-availability of equipment is a major contributory factor in delay, and contractors sometimes show the same equipment for a large number of works. Checks using registration numbers or such means should be set up to prevent this. While checking of availability of equipment at bid evaluation stage must be strictly enforced, facilities must be provided to contractors, especially new entrants, for accessing new and modern equipment. Since security requirements for equipment advances under the SBD are not easy to operate because of banking restrictions on BGs, states who can, may create a facility in the State Finance Corporations or similar financial institutions which enables rural road contractors to access term loans for purchase of such equipment against a margin, and hypothecation of the equipment.
(vii) NRRDA, without any liability, may also create an online platform for contractors registered under PMGSY to enable equipment owners to put out availability of surplus equipment capacity along with time period, as well as enable contractors to notify their requirement for equipment, enabling direct contact between the two for hiring out of spare or idle equipment. This will be particularly useful in remote areas including the North East.

(viii) Bid evaluation processes must be centralized in SRRDA in order to properly evaluate residual bid capacity, though intermediate processes like technical evaluation can be done at Circle level. Evidence of availability of key equipment and technical personnel (including laboratory personnel) specified in the bidding document must also be properly evaluated and information centralized, so as to prevent the same resources from being deployed over multiple contracts. The actual availability of equipment and technical personnel with the contractor must be checked by the PIU, SE, SQM and NQM during their site visits in the manner suggested in a later paragraph.

(ix) In order to promote long term contractor development, a centralized registration process for contractors may be incorporated into OMMAS. OMMAS should be extended to all rural roads, and as such the registration and subsequent data entry will provide a good idea of the rural road contracts completed and in hand for each of the registered contractors. Where a state has a separate registration system for all public works, data interchange systems should be incorporated into OMMAS. Bid evaluation processes should leverage this information.

(x) As per NRRDA Guidelines dated 22.10.2012, planned subcontracting is permissible and the subcontractor has to enter into an agreement with the Prime Contractor. However, the subcontracting needs the approval of the employer, which is the SRRDA. Transparent and quick procedures for subcontracting (with separate eligibility and registration process) are needed to eliminate informal subcontracting, which adversely affects quality. Formal subcontracting enables growth of local contractors and development of more competition, and must be incentivized. In the case of LWE areas particularly, NRRDA may proactively ensure that states use this provision to promote local contractors. Formal subcontracting will also enable contracting out of maintenance to local contractors.

(xi) As such, the procedure for approval of subcontracting may be delegated to the Circle level, with subcontractors also getting registered under eligibility conditions to be specified by NRRDA. Detection of, and penalties for, unauthorized subcontracting also need to be increased, and the inspection by PIUs, SEs, SQMs and NQMs must include inquiry and reporting of formal and informal subcontracting.

(xii) For this purpose, and for the purpose mentioned in the next para, NRRDA needs to define what exactly is meant by “small contractor” and “local contractor”.

(xiii) In areas affected by LWE, contracting and execution of works is a major problem, and smaller and local contractors may need to be engaged. The programme may provide for a flexible architecture in such areas including alternative designs within the capability of local contractors; liberal use of Project Implementation Consultants on QCBS basis to supplement PIUs and ensure closer supervision; stage construction; and incentives to contractors. The architecture may be worked out between the State Government and the Ministry for the identified areas on a state by state basis.
In LWE areas, and other locations where sufficient competition is not available, a strategy for developing a cadre of local contractors needs to be developed jointly by NRRDA and the SRRDA with the full support of the local administration, based on analysis of bidding patterns.
Section: 8

Project Implementation and Contract Management

8.1 The Framework

PMGSY requires that all works should be executed by contractors with the capability of executing the work within the given time and as per specifications, and with the requisite quality. PMGSY places great emphasis on both time and quality. Defining qualification criteria in terms of works executed, bid capacity, credit facility/liquid assets, engineering personnel and necessary equipment and machinery enables selection of competent contractors. The Standard Bidding Document developed for PMGSY not only sets down the well established procedures of competitive bidding to ensure selection of qualified contractors with the necessary expertise and ability, but also ensures that the Contract terms and conditions are commensurate with the need to make both time and quality assurance the essence of the Contract.

Mobilization: The following activities are required to be completed, generally in the suggested order, by the ‘engineer’ and the contractor during the mobilization time:

(i) **Deployment of contractor’s personnel**: The contractor is required to employ the technical personnel enumerated in the Contract data. At the start of mobilization, technical and administrative instructions are to be passed on to the contractor by the engineer and therefore, to fully understand the instructions and before any further activity is allowed, the contractor will be required to employ his key technical personnel who will interact with the engineer. At the mobilization stage, at least one graduate engineer and the required number of diploma engineers should be deployed to attend to the work programme, working drawings and recording of pre-commencement level and field supervision thereafter. After the commencement of the work, the technical personnel required for field laboratory should be in place till the completion of the work.

(ii) **Listing of requirements by engineer**: In the Appendix to Instructions to Bidders, the requirement of material, labour and machinery during the construction period divided suitably in the defined durations is required to be listed by the ‘employer (engineer on his behalf)’. Similarly, a list of the equipment required to establish the field laboratory is also provided.

(iii) **Work programme**: Based on the BOQ and the list of requirements of men, material and machinery, the contractor is required to submit a work programme for approval to the ‘engineer’. The Work Programme is the programme showing the general methods, arrangements, order and timing of all the activities in the works along with monthly cash flow forecasts for the construction of the work. The contractor, if he so desires, can take guidance from the engineer in preparing the Work Programme. The work programme should be detailed in such a way that the date of start and date of completion of every item of work is clearly laid down; the details of resources - equipment, material and skilled/unskilled labour - for completion of various items of works and the cash flow forecasts should also be captured. It is desirable that a sample PERT-chart of complete activity of construction should be drawn up wherein the details of every large or small activity should be clearly shown. It is also desirable that in the work programme, the contractor should clearly indicate the tentative periods during which the presence of the engineer or his representatives will be required at site.

(iv) **Handing over of site to contractor**: The ‘Engineer’ is required to handover the full possession or part possession (at least 75%) of the work site to the contractor. As far as possible, the ‘engineer’ should handover the possession of the full work site.
(v) Working Drawings & Designs: While the ‘engineer’ is handing over the possession of the work site, complete set of working drawings should be handed over to the contractor which, inter alia, will include L Section, Cross-Section and Plan of road alignment, drawings of CD works and designs as decided by the ‘engineer’.

(vi) Specifications & drawings of temporary works: The contractor has to submit the specifications and drawings of proposed temporary works for the approval of the engineer. The contractor shall be responsible for temporary works as well as for the safety of all the activities on the site.

(vii) Approval of work programme: Once the above activities are complete, the work programme will be submitted by the contractor for approval of the ‘engineer’, and the ‘engineer’ after checking that the work programme is realistic (keeping in view seasonal factors) shall accord his approval. It is important that the time period given for completion of different portions of the work are properly checked with reference to availability of machinery, and if necessary the ‘engineer’ should advise the contractor to redraw the work programme before according his approval. It is to be stressed that not deploying requisite key personnel or equipment is a fundamental breach of the contract.

(viii) Establishment of field laboratory: The contractor will establish the field laboratory at a convenient location as approved by the engineer. It will be ensured by the contractor that the laboratory has all the equipment as directed by the engineer. Payment to the contractor is contingent upon establishment of a duly equipped field laboratory by the contractor, in the stipulated time period. Non-establishment of the Laboratory within the time given is a fundamental breach of the contract. The contractor shall have some area available for holding meetings with PIU. It is suggested that the contractor provide a temporary site office along with the field laboratory. Such an office would serve as a meeting place between PIU engineers and the contractor’s engineers. Also the works programme and other day-to-day required information can be kept in such an office.

(ix) Pre-commencement levels: Recording of pre-commencement levels is the first activity of the Work Programme. After the handing over of the possession of the work site, actual measurements of pre-commencement levels will be recorded by the representative of the ‘engineer’ in the measurement book in the presence of authorized representative of the contractor. The acceptance signature of the representative of the contractor will invariably be recorded.

As soon as the above mentioned activities are complete, and in particular the men and machinery are in position and the site Quality Control Laboratory has been established, the PIU shall inform the SQC so that the empowered officer can make operational the financial limits for the contract package.

PMGSY Guidelines make a provision for management meetings to review plans and progress of work. The ‘engineer’ may require the contractor to attend the management meetings. It is desirable that the ‘engineer’ organize the first management meeting within 3 days of issue of the Work Order and the items listed above under the head of mobilization be attended to in this management meeting. It is also desirable that the ‘engineer’ works out a schedule of management meetings in relation to the Work Programme. A communication listing the schedule should be sent to the contractor well in advance so that the business of review of progress of works is well understood and appreciated by all concerned. The management meeting should be an integral part of the contract management process to ensure that there are no deficiencies or delays on part of the contractor or the employer/engineer. As such it would be useful to maintain a clear record of such meetings. A copy would be given to the contractor, and a copy would be given to the AE/JE, with the office copy being filed in the relevant management meeting file for the package.
**Work programme:** The contractor will commence the work as per the work programme. The ‘engineer’ is required to monitor the progress of execution of work in relation to the work programme, and in case the contractor is not in a position to carry out the work as per the work programme, the updated/revised work programme shall invariably be submitted by the contractor, without affecting the total stipulated duration of the contract. In case of initial delay in activities, the contractor may adjust the activities of further work within the stipulated duration and furnish the revised work programme, within the duration prescribed in the contract data, for approval as per the provisions of the contract. If the contractor fails to submit the revised work programme, there is a provision for withholding the amount as per the contract data. The ‘engineer’ is empowered to withhold from the next due payment and continue to withhold this payment until the next payment after the date on which the overdue programme is submitted. The ‘engineer’s approval of the programme shall not alter the contractor’s obligations. The Work Programme is an agreed schedule for monitoring and ensuring progress of the work to meet the contractual stipulation for timely completion.

The revised/updated work programme shall be a programme showing the actual progress achieved for each of the activities, and the effect of the progress achieved on the timing of remaining works, including any changes to the sequence of the activities. The contractor is free to revise the programme and to submit it to the ‘engineer’ again at any time. The revised/updated work programme must show the effect of variations, if any, and compensation events, if any.

**Quality management:** The contractor has to construct and maintain the works in accordance with specifications and drawings. The contractor is solely responsible for carrying out mandatory tests prescribed in MoRD’s specifications for rural roads, and for ensuring correctness of test results, whether performed in his field laboratory or elsewhere. For ensuring effective quality control, the following requirements are to be met:

(a) The contractor will be required to furnish a Quality Management Plan along with the work programme. The engineer will prepare the schedule for those tests which will be carried out in the presence of the JE, AE or EE as per provisions given in the Quality Control Register/Handbook.

(b) The contractor is required to establish a field laboratory. The engineer will ensure that the field level quality control laboratory required for mandatory tests is established by the contractor during the mobilization time.

(c) No material will be used on the work unless the mandatory tests have been conducted and the material has qualified the test parameters. No work will be accepted unless the mandatory tests for workmanship have been conducted and the workmanship has qualified the tests parameters. In case the contractor has failed to comply with the above, the engineer will take cognizance of this and issue a written notice to the contractor for rectification of the defect.

Under PMGSY, time and quality are both the essence of the Contract, and failure to ensure quality of the work constitutes a fundamental breach of the contract, including specifically:

(i) Failure to set up a field laboratory with the prescribed equipment, within the period specified in the contract data.

(ii) Failure to correct a particular defect within a reasonable period of time determined by the engineer.

(iii) Failure to deploy machinery and equipment or personnel as specified in the contract data at the appropriate time.
**Time Extension:** The engineer is empowered to instruct the contractor to delay the start or progress of any activity within the works. However, the engineer will have to obtain written approval from the employer for ordering delay totalling more than 30 days.

The engineer is empowered to extend the intended completion date in the following events:

- If a compensation event occurs; or
- If it is impossible for completion to be achieved by the intended completion date because of a variation order issued by the engineer.

The engineer shall decide within 21 days of the request of the contractor whether, and by how much time, the extension is to be granted. The contractor is required to give a full and detailed proposal for extension of time along with supporting information.

**Post-completion maintenance:** All the contracts under PMGSY will not only be construction contracts but will also include routine maintenance for five years. Items to be attended to during routine maintenance have been clearly laid down in the contract data. The contractor will be required to attend to the defects during the defect liability period. The contractor is also required to carry out routine maintenance of the work executed by him, in such a way that the road surface and structures are kept in a defect-free condition during the entire maintenance period of five years. The engineer is required to issue written notices to correct the defects noticed during the defect liability period. In case the defect is not satisfactorily rectified within the given time period, the engineer shall deduct the cost and get the defect corrected.

**Completion:** The contractor shall request the engineer to issue a certificate of completion for the construction of works, and the engineer will do so upon deciding that the works are completed. In case of routine maintenance, the contractor shall request the engineer to issue the certificate of completion for routine maintenance, and the engineer will do so upon deciding that routine maintenance is completed.

**Finalization of account:** The contractor shall supply the engineer with a detailed account of the total amount that the contractor considers payable for works under the contract within 21 days of issue of certificate of completion of construction of works. The engineer shall issue a defect liability certificate and certify any payment that is due to the contractor for works within 42 days of receiving the contractor’s account if it is correct and complete. If the account is not correct or complete, the engineer shall issue within 42 days a schedule that states the scope of the corrections or additions that are necessary. If the account is still unsatisfactory after it has been resubmitted, the engineer shall decide on the amount payable to the contractor and issue a payment certificate within 28 days of receiving the contractor’s revised account. The payment of final bill for construction of works will be made within 14 days thereafter. In case the account is not received within 21 days of issue of the certificate of completion, the engineer shall proceed to finalize the account and issue a payment certificate within 28 days. The payment of final bill for construction of works will be made within 14 days thereafter.

8.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of project implementation:
(i) While the procedures and processes prescribed in the PMGSY guidelines, Operations Manual and other documentation are very detailed, comprehensive and aim at achieving quality, in actual fact poor adherence by the contractor and poorer adherence by the PIU and PIC is seriously affecting the quality of the programme in several states, most noticeably in LWE areas. In some States, internal procedures, allocation of responsibilities and enforcement of accountability may need to be reviewed to better align processes with the requirements of PMGSY.

(ii) The fact that SRRDA and the PIUs are not envisaged to be permanent is the main factor which is contributing to poor executional capacity, as the states are unable to invest in institutional capacity building and long term management of human resources. As a result, posts are filled by deputation or contract and the changes over time in personnel, the unfamiliarity of new personnel with the programme standards, and the increasing workload in some states with low capacity and poor governance ethos are all compounding the seriousness of the problem. As Table 2 of the Statistical Appendix brings out, delay in completing PMGSY in the case of Chhattisgarh, J&K, Bihar, Odisha and West Bengal is substantially because of PIU capacity constraints.

(iii) Systems designed to improve quality, such as the utilization of STAs, attracting of competent contractors, and a strong quality control process are all rendered less effective because of poor supervision and contract management.

8.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to project implementation, and specifically to contract management, to enhance the effectiveness of PMGSY in achieving its objectives:

(i) Currently, enforcement of the conditions of the contract and field supervision is poor in many cases for various reasons, with direct consequences for quality. It is essential to define and incorporate key contractual milestones into the OMMAS workflow for improved project monitoring. This could be achieved by leveraging the availability of mobile technologies and the features of android-based smart phones, including geo-tagging of photographs documenting progress.

(ii) Just as the DPR and Project Implementation Consultants should record some key (and time-stamped and geo-referenced) data on OMMAS to improve the credibility of the process, contractors should now participate in the workflow process of OMMAS at key points in order to improve the efficiency and transparency of the process to supplement written communication, and this should be a condition of the contract, and mentioned in the tender notice. Contractually appointed subcontractors too can be included in the process in a similar fashion. Since under the contract, the interests of the contractor are not the same as those of the employer or the engineer, to ensure that the data entry by the contractor does not cause prejudice to either party, the contractor's data entry portion in OMMAS should be ring fenced, with confirmatory email alert and audit trails.

(iii) The contractor should accordingly be given access to OMMAS (for a designated IT person who should be a “key person” under the contract and who will be provided induction training in OMMAS with respect to his role) and should, under his login, upload the details of technical personnel onto OMMAS at the time of mobilization, along with their personal details. He must also upload his work programme. He must also notify the setting up of the field laboratory on
OMMAS with a uniquely itemized and contract specific numbered list of lab equipment and upload a geo-tagged photograph. Data entry regarding work programme revision, work commencement, quality management, interruptions, stage completion, completion, etc. should be entered by them and checked online by the PIU. The contractor will also need to upload photographs at key stages or with such frequency as may be specified by NRRDA in its Guidelines, for use by the QM system. In particular, geo-tagged photographs at each stage must be uploaded. The contractor can be asked to submit the information, via duly modified contractual conditions, in specified formats duly signed by him/his representative which can be entered and uploaded.

(iv) The Engineer should check these details online and after the handing over of the site and the working drawings, and accord his approval to the work programme, with entry to this effect on OMMAS. Revisions of the work programme should also be entered and approved/responded in the same way.

(v) The recording of the pre-commencement levels, which is the first item in the Work Programme, should also be done by the Engineer, along with details of the Contractor personnel present at the time.

(vi) The OMMAS must ensure that the financial limits for the package can be made operational only after these prerequisites are completed.

(vii) The Work Programme must be used as the operational document for monitoring as well as management purposes, and recording of milestones and stage passing must be enforced and recorded in OMMAS for payment purposes. Online payment systems aligned with the stages of the work need to be developed so as to enable payment only when the contractual prerequisites are recorded in OMMAS as being complied with.

(viii) PMGSY as a DPR based programme depends crucially on testing in the Contractors laboratory. Setting up of the laboratory and ensuring the presence of trained personnel as per the Contract conditions, and verifying that the tests have been done as per the QC Handbook are the key features of supervision by the PIU, which are currently not always being followed. The QC Handbook requires to be brought into the ambit of contractual conditions through specifications. The setting up of the laboratory and availability of trained personnel must be reported by the Contractor’s IT person on OMMAS. NRRDA may review the provisions of the QC Handbook, and make the testing process more feasible with provisions for entering some of the key data into OMMAS onsite, using mobile technologies.

(ix) On-site Training of Laboratory personnel as well as of the skilled workmen of the contractor, and induction training of the IT person on OMMAS must be a compulsory feature of contract management. Where the state has engaged a PIC or a PMC, the consultant must be tasked with this work with a separate line item for the purpose. In other cases, the SRRDA must engage paid services for the purpose. The Training Framework should include training of the skilled workmen as well.

(x) The methodology for engagement of contractors and to indemnify or protect them against specific risks in use of the new materials/technologies also requires to be analyzed by NRRDA and suitable amendments brought to the SBD. The issue of maintenance liability needs to be looked at for roads constructed with new materials/technologies, so as to avoid exposing the contractor to high risk. Provision of onsite training to contractor personnel and site level handholding should be included as special conditions of contract. In case of proprietary
materials, rates should be fixed for supply to the site during the currency of the project by intervention by NRRDA.

(xi) Details of dates of site visit by PIU, SE and CE, changes in work programme, dates of Management meeting etc. should all be entered on OMMAS, enabling the SQC to generate exception reports for monitoring purposes. Failure of the PIU to hold regular Management meetings must be a cause of disciplinary action for negligence in every case of delay beyond the contract period.

(xii) All other contract management related information, including work progress, delays and stoppages, compensation events, levy of liquidated damages, running and final bill dates etc. should also be entered in OMMAS by the Contractor/PIU. The PIU/SQC/SRRDA would get appropriate reports for their respective purposes.

(xiii) Timely flow of funds is essential for progress of works. Sometimes funds are not available for prolonged periods, which leads to slowdown/stoppage of work. On resumption of works, the contractor has to bear escalation of prices of materials which is inequitable.

(xiv) The management of Bank Guarantees also may be included in the OMMAS, so as to ensure timely renewal etc.

(xv) States may be advised to consider vesting the power of exemption certificates for Excise and Custom with the Chief Engineer (PMGSY) or CEO SRRDA instead of Secretary, PWD, as contractors complain that this is currently causing delays.

(xvi) The management of the process of recording completion, including issue of completion certificate and financial closure needs to be computerized for better management so as to progress towards bonus schemes for early completion if needed. The contractor should record the completion using his login, which may be accepted by the PIU unless deficiencies are pointed out for remediation. Completion Certificate must be issued within 60 days of accepted completion, and entered by the PIU on OMMAS, and financial closure should take place within 90 days thereafter and recorded on OMMAS. Maintenance should start from the date of completion. In order to ensure that the bonus/penalty system works well, this has to be integrated with the work programme entry in OMMAS.
9.1 The Framework

**State Technical Agencies (STAs)** are Engineering Colleges/Technical Institutes which have been identified in various states (in consultation with the states) for acting as catalysing agents in the state level rural road programmes. These agencies are expected to improve the project quality at the design and conceptual level and function as a 2nd tier of quality management at the project preparation level. Their functions include:

- Verification of the District Rural Roads Plan prepared by the District Programme Implementation Unit (DPIU). The verification includes:
  - Checking the correctness of existing links.
  - Checking the proposed links in terms of the parameters laid down by the District Panchayat.
  - Ensuring that all necessary coding and indexing has been done to enable extraction of the Core Network.

- Post-Scrutiny of the Core Network: The State Technical Agency will, after finalization of the Core Network by the District Panchayats, conduct a 100% review (suitably phased) in consultation with the DPIUs in order to help locate deficiencies, if any, in the Core Network with the objective of achieving a standard suitable for a GIS application.

- Scrutiny of the Detailed Project Reports for road works prepared by the District Programme Implementation Units: The scrutiny by STAs of project reports is expected to be a thorough and detailed one in order to ensure that geometric and physical design is appropriate and economic, that the specifications are adequate and based on site conditions and that the estimation of quantities is accurate and reasonable. PMGSY roads are to be of the highest quality and it is the STAs that will have to provide the new inputs into the system to ensure a paradigm shift in terms of proper designing of roads for excellence with economy.

As such STAs while scrutinizing DPRs must:

- Ensure that time constraint does not interfere with proper scrutiny by estimating time required for thorough checking including site visits, where required, intimating this to the SRRDA and firmly adhering to it. They should liaise with DPIUs to ensure a proper phasing of the process.
- Ensure that each DPR is made on the basis of thorough field investigation. If necessary additional data may be asked for.
- Check that the basic parameters viz. traffic and CBR are properly estimated.
- Determine that the design is really appropriate and there is no over-designing.
- Investigate that all possible economies in use of materials, including soil stabilization measures, use of alternate material like fly ash/industrial waste etc. have been fully explored and used appropriately wherever possible.
- Provision of requisite technical support to the State/District Units: The DPIU, if required, may take the advice of the STA in design of works involving special problems. The DPIU will associate the STA in all cross drainage design works where the proposed structure involves a span exceeding 15 metres. The STA would normally not be involved in routine monitoring of execution of works. However, in case of works involving new or innovative features or with R&D components, where
the PTA/STA has been associated, the DPIU may take the technical services of the PTA/STA in studying the benefits of such innovations and making general recommendations on their utility.

- Undertaking normal tests of parameters for road design and Quality Control tests for PIUs and QC: The STA laboratories would be available for conducting tests necessary for design and quality control to supplement the fully functional PIU labs. The DPIU and the SQM would liaise with the STAs for the tests. Samples may also be sent by NQMs for testing through the DPIUs. The STA will also liaise with other engineering institutions in the area in order to maintain information regarding whether testing facilities in such institutions are available so that routine testing for design and estimation could be done at such locations as well.

- Training: The training modules designed by Principal Technical Agencies (PTAs) will be made operational by STAs, who will draw resource personnel from their own as well as other suitable technical institutions. The STAs will conduct initial assessment tests, training, post-training tests, evaluate feedback and suggest future training needs. The training may include both routine and refresher programmes as well as specific technical programmes of local or special relevance. The STAs may also prepare audio-visual training material for dissemination and use these under the overall specifications and guidance of Principal Technical Agencies.

- R&D Monitoring: Research & Development activities will be carried out by STAs with the involvement and direction of PTAs. STAs may be associated with specific projects in terms of implementation, monitoring and feedback, and in terms of general evaluation on behalf of the PTA. STAs are most welcome to identify active research projects after consultation with the DPIUs. Such projects should be aimed at using locally available materials, locally relevant designs or any other research activity with a view to effecting economies. NRRDA will give 100% funding support to such proposals. Research work will be executed through DPIUs as a part of the PMGSY programme, and the STA will monitor/advise the DPIU and document and report on the research projects.

- Technical Advice: STAs may be associated by State Governments with all activities concerning the rural road sector. The nodal Department as well as the SRRDA should maintain close liaison with STAs and use their resources to provide valuable policy level and technical inputs into the State Government decision making process. The STAs will be associated with the State Level Standing Committee for the purpose. State Governments may also, if required, commission studies through STAs on issues such as traffic patterns, road designs, quality control, maintenance etc. STAs may however not be associated with day to day operational issues. PTAs would utilize STA inputs for determining R&D activities, training requirements etc.

**Principal Technical Agencies** (PTAs) are premier institutions with in-depth knowledge of the technology of road design and construction. As agencies helping to manage technical change in rural road programmes, PTAs are expected to:

- Oversee the activities of the STAs in the region and advise/assist in resolving issues that may arise at the time of the scrutiny of project proposals of the states.
- Carry out random ex-post facto checks of the proposals scrutinized by STAs to identify systemic issues
- Organize Orientation/Refresher Programmes for the STA Personnel for proper scrutiny of project proposals.
- Identify at SRRDA’s request, the type of strengthening required for the Laboratories in the Districts (PIUs) and also at STAs.
- Advise Programme Implementing Units (PIUs) on the basis of SRRDA requests on any region specific issues that will have a bearing on the design, construction and performance of rural roads.
Design and manage Regional Training Programmes for the engineers of PIUs and contractors, by developing course material for different training modules and acting as resource persons/institutions.

Manage Regional Quality Control System and assist NRRDA with the analysis of Quality Monitoring Reports of SQMs and NQMs. Also, help identify and resolve any issues arising out of the Quality Monitoring System.

Evaluate specifications, practices and the use of locally available materials for making the proposals cost effective.

Formulate design specifications for new and innovative technologies.

Study the gaps in the existing practices in rural roads construction, and identify areas for R&D. The PTAs will also assist NRRDA in processing the R&D proposals and entrusting the same to reputed organizations.

9.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose, brings out the following principal issues, addressing which can significantly enhance the effectiveness of both PTAs and STAs in performing their roles in what is clearly an innovative framework with potential applications in many other sectors:

(i) Inclusion of STAs and PTAs in the PMGSY process at various points was intended to improve the engineering inputs, generate fresh thinking in the sector and build capacity. While to a considerable extent, more in some states than in others, this has happened, the potential inherent in the arrangement has only been partly realized. On the one hand, NRRDA, due to its own capacity constraints, is not making full use of this mechanism. On the other, states and SRRDAs have not taken ownership of the STA interventions, and have not leveraged them for improving the design and quality of the roads and for the development of the human resources deployed by them.

(ii) The initial enthusiasm among the STAs and PTAs has also declined as their role has become routine and without much intellectual inputs. Their investment in the relationship with SRRDAs and NRRDA has also tapered, partly because of lack of interest of the stakeholders and partly because the remuneration is not attractive; further the academic loads are also heavy thus some PTAs and STAs have in fact left the programme. As the workload has expanded, new STAs have been inducted and the quality of the STAs and their inputs has become more variable.

(iii) PTAs who were expected to also take a lead in R&D and innovation, have languished in the absence of sufficient interest from the states in this regard and lack of pressure from NRRDA.

9.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to PTAs and STAs, to enhance the effectiveness of PMGSY in achieving its objectives. In doing so, the fact that using external agencies and that too academic institutions outside the Government is an extremely innovative idea has been at the forefront, so as to enable the principle to be used in other sectors as well:

(i) **Capacity Building:** Though PTAs and STAs are crucial to the process of designing rural roads with due consideration to economy and resource use efficiency, the initiative is not as
successful as was hoped, partly because the remuneration to PTAs and STAs is not always attractive enough and also because the tendency to overload STAs with DPRs for scrutiny and hurry up the clearance process actually precludes them from adding value and dis-incentivizes them from fully participating and contributing to the knowledge management that would qualitatively lift the programme. Creation of capacity in the sector that would enable the increase in the number of STAs would substantially address the problem. NRRDA should now facilitate (with strict assessment checks of individual and institutional capabilities and regular monitoring) the inclusion of more private engineering colleges, which have the technical capabilities to participate in the PMGSY programme. States need to identify potential STA candidates and NRRDA should lay down guidelines providing for a capacity building path for these institutions enabling them to qualify for nomination as STAs. The capacity building path would include formal training and orientation, participation in workshops and field visits on a remunerated basis, assistance in approved cases to SRRDAs/SIRDs, such as in training events on SIRD premises etc.

(ii) Scrutiny of Detailed Project Reports:

- Pre-scrutiny meetings between the SRRDAs and STAs must be mandatory wherein the quantification of DPR scrutiny is scheduled keeping in mind the academic load of STAs. It should be planned in such a manner that the STA has enough time to scrutinize and even visit sites where necessary.

- STAs are often required to scrutinize a large number of DPRs many of which have the same common mistakes. Absence of senior PIU staff and the presence instead, in some instances, of inexperienced DPR consultant staff and/or PIC staff makes the process of correction difficult. The Tamil Nadu standard procedure of fixing dates and number of DPRs for scrutiny district wise well in advance by the SQC in consultation with the STAs may be adopted and this may be made part of the OMMAS system with a system check which ensures adherence to the agreed schedule. As per this procedure, each PIU will first bring two sample DPRs, and the scrutiny results of these DPRs will be incorporated where applicable into the other DPRs before submission to the STA. This process should be incorporated into OMMAS as well.

- The site visits by the STAs to see the project area should be part of OMMAS wherein these are picked out based on pre-defined red flags. The site visits to these picked projects should be mandatory, but the STA could visit other works based on his/her assessment of need. The STA’s costs for such visits shall be met by NRRDA directly. STAs should not reduce the proposed cross drainage works purely based on costs, but should verify through field visits as to the actual requirements.

(iii) DPR Audit: A system of DPR Audits needs to be incorporated into PMGSY, leveraging OMMAS so that rule-based exceptions (e.g. high traffic and low CBR cases) as well as DPRs flagged by the STA during scrutiny could be subject to independent ground check at some stage.

(iv) Correlation with the Transect walk:

The World Bank Evaluation (June 2014) of PMGSY has flagged the issue of the Transect walk not being sufficiently well executed. The Transect walk proceedings (including videos of specific portions if necessary) may be separately uploaded to OMMAS under the road code, and seen by the STA online during the first stage scrutiny. All photos of a road, whether taken during transect walk, DPR preparation, construction or quality monitoring should be uploaded (with geo and time stamping) to OMMAS under the road code, using the Android mobile app. DPR consultants, PIU, PIC, Local Panchayat, etc. may also be given login access. This facility
can also be extended to the maintenance management system, including reporting of potholes and other defects by the Panchayat.

(v) **Quality of DPRs:**

a) Some of the common deficiencies detected by STAs in scrutiny are:

► Traffic data and CBR data which was suspect or obviously erroneous
► Provision of CD works and engineering justification
► Lack of proper Hydraulic Design of drainage
► Mismatched soil properties typically mismatch in CBR and Atterberg Limits
► Errors in design of pavements
► CS/LS data stopped at shoulder
► Drawings sizes not adequate for proper checking
► Bridge Design being deficient particularly in foundations, due to erroneous soil properties investigations.

b) Interventions should be done by PTAs/STAs on a paid basis to bring awareness on the preparation of a ‘fairly error free’ DPR, based on common mistakes and past experiences. After so many years that the programme has been running, this should not be difficult. PTA, Warangal volunteered to conduct site visits to analyse bridge designs, locations of which had been visited by the CE/SE under special guidelines for the purpose, and submit a report on the efficacy of the system. Based on the outcome, NRRDA may institute similar initiatives in respect of areas of concern from the point of view of technical excellence or cost-effectiveness.

c) PIUs rely excessively on DPR consultants in many states, and the quality of interaction between the PIU and STA is inadequate. In particular, the DPR must be owned by the PIU, who should visit the site at critical points and locations and sign off on the DPR at an appropriate level (generally the EE) after satisfying itself of the correctness. The details of the checks done should be uploaded at site to OMMAS. When the DPRs are uploaded, the implication should be that the PIU/SE has approved and ‘taken ownership’ of the DPR and all the data. The STA should start scrutiny only after these requirements are met.

d) STAs should encourage a percentage of roads to be constructed using local materials by educating PIUs and DPR consultants. Once the inventory of local materials is complete, the STA should have access to this data. In fact, the STAs should be involved in the characterization of these materials as part of their inventorization.

e) NQM/SQMs should, where they feel that the DPR is seriously flawed, recommend to the SQC that he/she fix responsibility and also send the DPR to the STA to make recommendations on what needs to be done to prevent recurrence of similar cases in future.

(v) **Research:**

a) The availability of marginal materials needs to be mapped and STAs should also involve themselves in this even as a ‘paid for’ research project through NRRDA. Local materials should be used extensively using blending or other methods to make good deficient properties. Guidelines/Manuals should be prepared for facilitating the use of these materials.
CRRI is engaged in inventorization of materials, which can be used in low volume roads in place of WBM. STAs are also involved in this project. This should be expedited and rolled out nation-wide so that pilot to mainstreaming can be fast-tracked. NRRDA should take up this project on “mission mode” and get it completed by 2017 at the latest.

b) Further, there should be an open approach to design using such materials, which should be encouraged by the STAs. The present codes do not provide the flexibility for such an approach; STAs may make their recommendation to NRRDA so that the matter can be taken up with CRRI/IRC. The methodology for engagement of contractors and to indemnify them against specific risks in use of the new materials/technologies also requires to be detailed.

c) Brainstorming to identify research areas should be undertaken by CRRI/PTAs/STAs (facilitated by NRRDA) and topics identified for submitting proposals in the required format to NRRDA. A Technology Cell should be created within NRRDA for this and allied purposes.

d) Guidelines for research may be modified to permit 2-3 years’ period of research instead of the current 1 year.

e) 5% of PMGSY funds should be sequestered for R&D before the state-wise allocation is made for ongoing and new projects. The 5% should also be allocated state wise, but only for R&D projects and in case a state is not able to propose projects, the funds should be available to states who do. Fund allocation for completion of R&D projects should be given higher priority in situations of funds constraint.

(vi) HRD for getting good DPRs:

a) HR development is urgently required for PMGSY and the road sector in general. In 2004-2006 training interventions were organized for PIUs covering survey, fixing of alignment, field tests, properties of road materials, improving poor soils, design of cross drainage, preparation of DPRs etc. Training of contractors’ engineers and workmen was also undertaken. Currently, many engineers are from departments such as Water Resources, Buildings etc. and need to brush up on road engineering concepts. STAs should be leveraged by NRRDA under its Training Framework to provide paid training to all stakeholders. Training of PIUs should include training on contract management for DPR consultants.

b) NRRDA should also get STAs to hold paid programmes for the consulting community (i.e. registered consultants) also, who will be incentivized to participate since it will improve their bidding competitiveness. Further, consultants’ staff may also require an orientation programme. Contractors’ engineer and workmen also require training. There are institutions which provide training for road equipment operators, and collaboration with these could be considered.

c) An all-embracing approach would help in improving the quality of the output. Audio visuals in best practices could also be documented. In fact, an earlier exercise in these areas had been done, and a synthesis of available materials and improvements keeping in view present requirements is needed.

d) NRRDA needs to directly fund STAs to run programmes at various levels, in which attendance of personnel of contractors and consultants associated with the PMGSY programme should be encouraged. NRRDA may fix an annual budget for the purpose and work out an annual calendar of such programmes in consultation with the STAs and PTAs.
International exposure to STAs and PMGSY engineers to reputed organizations such as VicRoads, RMIT, SANRAL etc. would create awareness of the sector practices and innovations made by these organizations. It is necessary that the capacity building requirements are assessed with regard to knowledge domains, participation levels and training providers in order that goals are set for roll out. The earlier programmes conducted through NRRDA in 2007 which covered substantial number of engineers of PIUs and contractors could be used as a guideline in respect of methodology, testing procedure, course content etc.

e) PTAs who were driving forces in providing technical inputs have of late started withdrawing from PMGSY. An online forum needs to be set up (for which one of the PTAs could take up nodal responsibility) which would facilitate interactions on issues of technical importance, which in turn could be disseminated across the STA/PTA universe.

(vii) **STA/PTA Remunerations:** The remuneration to the PTAs and STAs should be reviewed in order to provide suitable incentives, including to PTAs taking on specific nodal responsibilities. Assessment of STA performance (rating system for STAs) should be instituted. Increased compensation from current levels and investment in ensuring well equipped labs at all STAs need to be implemented at the earliest. Linking of compensation to the ratings may be tried on an experimental basis.

(viii) **Annual conference:** An Annual Conference on Low Volume Roads with PTAs and STAs as resource institutions should be held to build a network, encourage research and innovation and enable free flow of ideas and experiences. Awards should also be instituted under PMGSY to be handed out at the Conference. One of the PTAs may be given nodal responsibility for the purpose.
Section: 10
Quality Management (QM)

10.1 The Framework

PMGSY lays a lot of stress on the design and operationalization of supervisory mechanisms to ensure that the performance under the contract yields assets of acceptable quality. Ensuring the quality of the road works is the responsibility of the State Governments, who are implementing the Programme. Work-site level Quality Control Registers have been prescribed by the NRRDA to implement the provisions of the mandatory testing prescribed under the specifications. The operational guidelines also stipulate that payment shall not be made to the contractor unless the tests have been conducted as per the prescribed procedure and the results have been found to be satisfactory.

A three-tier Quality Management mechanism is envisaged under the PMGSY. The first tier of quality management mechanism is the in-house quality control system of the Executing Agency, the second tier of quality management is an independent quality assurance system made operational by the State Government. Thus, the State Governments are responsible for the first two tiers of the Quality Management Structure. The third tier is envisaged as an independent quality management mechanism made operational by the NRRDA, in the form of the NQM, which is essential to ensure that the first two tiers are operating satisfactorily.

The 1st tier of QM: The in-house quality control system to ensure the implementation of quality standards by way of carrying out mandatory tests is the first tier of the quality management mechanism, and is housed in the PIU. The supervision of works by the officers of the implementing agency also forms part of this system. The PIU’s quality management functions include:

► Preparation of quality DPRs based on field data with adequate attention to aspects such as geometrics, drainage and correct estimation of items and costing. The quality standards will be as prescribed in the MoRD Specifications for Rural Roads.

► Ensuring that the contractor brings adequate and stipulated resources to bear for the proper execution of the contracted work including necessary equipment and qualified key engineering personnel, and that the Field laboratory is properly equipped for testing quality. As per PMGSY guidelines, payment cannot be made to the contractor unless these conditions are satisfactorily fulfilled and the work programme approved. The quality standards will be as per Specifications prescribed in the Standard Bidding Document and Quality Control Handbook.

► Supervising Site Quality Control arrangements including materials and workmanship, primarily through testing as per provisions of the Quality Handbook.

► Taking action to ensure replacement of defective material and rectification of defective workmanship.

Where in-house capacity in a PIU is limited, a Project Implementation Consultant (PIC) may be outsourced for carrying out all or any of the PIU functions including actual operation of the first level of quality control. The PIC will need to be recruited on the basis of NRRDA’s PIC procurement procedure which is quality-cum-cost based. The PIU, as employer/principal for the PIC, will continue to have overall responsibility for the first level of quality control.

To ensure quality control on materials and work management at site, the PIU is required to ensure that all the tests are conducted by the designated staff of the contractor and the test results are recorded in the Quality Control Registers prescribed, maintained separately for each road work. For
effective quality control, the following percentages of various categories of tests will be done in the presence of the JE/AE/EE:

(i) 50 percent of the tests are conducted in the presence of the JE in charge of the work. The JE should record his observations in the Quality Control Register, Part I.

(ii) 20 percent of the tests are conducted in the presence of the AE in charge of the work recorded in the Quality Control Register, Part I.

(iii) 5 percent of the tests shall be conducted in the presence of the EE in charge of the work, and the EE should record his observations in the Quality Control Register, Part I. The EE will also see that the Non-Conformance Reports are issued in time, and timely action is taken by the contractor.

Register Part II is the Record of abstract of the tests conducted and Non-Conformance Reports. If the test results do not conform to the prescribed limits, a Non-Conformance Report (NCR) in the format prescribed in the Register will be issued to the contractor. The EE is expected to review regularly to see that the Quality Control tests are being performed at the desired frequency and with the desired accuracy. The EE will also verify that the Non-Conformance Reports are being issued by the AE whenever non-conformance occurs, and that the contractor is taking action promptly on the Non-Conformance Reports. Payment to the contractor shall be regulated by the EE as per the returns of the Quality Control tests. Any deviation will be the personal responsibility of the EE.

The SE in charge of the circle and the Chief Engineer having jurisdiction are responsible for the proper functioning of the PIU as part of their normal administrative duties. Their inspection and quality testing supervision will therefore be counted as part of effective supervision of the 1st tier of quality management (and not as a 2nd tier of quality management). The SE/CE are supposed to:

(i) Oversee the operation of the Quality Control Testing procedure and record his/her observations in the Quality Control Register, Part I during their visits. The SE and CE will also verify that the Non-Conformance Reports are being issued in time and action is being taken by the contractor promptly.

(ii) Prepare Inspection Reports in the prescribed formats, which shall be sent to the PIU for taking remedial action. A copy of all such reports will be endorsed to the State Quality Coordinator in the SRRDA. The report should cover all aspects of the work inspected, including:

► Design and estimation
► Contract Management by PIU
► Contractor performance
► Quality of Works and Comments on Quality Control Register
► Online data entry status

2nd tier QM: While the 1st tier of Quality Management has the primary function of quality control through enforcement of technical standards, the function of the 2nd tier of independent quality management is to improve the quality and effectiveness of the enforcement process. This includes:

► Checks to ensure that the 1st tier is properly functional
► Independent quality tests to verify that the quality control system is achieving its intended objective
Detection of systemic flaws in the quality control process and action to improve the process

Independent supervision of deterrent and punitive measures in respect of the 1st tier and the contractor

The functionaries of the system are designated by a generic term ‘State Quality Monitor’ (SQM). In order to be able to take an independent, impartial and dispassionate view of quality control, it is essential that the 2nd tier should have no stake in the outcome. In other words, it should have nothing to do with the day-to-day or supervisory management or administration of contracts so that issues of legal action against the contractor, disciplinary proceeding against PIU officials, answerability to audit etc. do not colour its judgement or actions. Detailed guidelines for inspection of projects by SQMs, under the 2nd tier of Quality Monitoring, have been prescribed by NRRDA. The SQMs are required to upload the abstract of quality grading for items of work and the corresponding georeferenced photographs in OMMAS through smart phones. The details about the quality grading of projects and their corresponding photographs are available in the public domain.

The 2nd tier of Quality Management functions from the SRRDA, headed by the State Quality Coordinator (SQC), an officer of the SRRDA. The quality management function may be provided by a combination of:

- Independent Quality Management Division of the Executing agency
- State Quality Monitor, mainly retired senior engineers of the state with adequate experience in road project management and suitable for the assignment.
- Outsourced consultancy organizations with proven capabilities selected on quality-cum-cost criteria based on NRRDA’s Project Management Consultant (PMC) procurement document.

**State Quality Coordinator:** The SRRDA is required to nominate/appoint a State Quality Coordinator with the following minimum qualifications:

- He should be a graduate Civil Engineer not below the rank of Superintending Engineer.
- He must possess field experience of working for construction of roads for at least five years in the last ten years. Also, in the last five years, he/she should have worked for at least two years in the field of construction/maintenance of road works.

The main functions of the State Quality Coordinator are the following:

- Supervise the first tier Quality Management arrangement.
- Liaise with the STAs who function as the 2nd tier of Quality Control for Design and DPR.
- Coordinate and control the activities of State Quality Monitoring arrangement (the 2nd tier), and ensure compilation by PIUs of action on the reports of SQMs.
- Facilitate and coordinate the activities of the National Quality Monitoring arrangement (the 3rd tier) and ensure compilation by PIUs of action on the reports of National Quality Monitors.
- Prepare monthly abstracts of SQM visits and an Annual Quality Report based on the Reports of SQMs and NQMs, identify systemic and procedural deficiencies in the Quality Management System and submit the Report for the consideration of the SRRDA and the State Level Standing Committee.
 ► Assess training requirements at PIU level and arrange for and coordinate training programmes in coordination with STAs.

 ► Act as nodal point for request of public complaints and for taking action thereon.

 **Supervision of the 1st tier of Quality Management** includes obtaining a certificate from PIUs at the time of commencement of the contract that:

 ► Contractors have brought the necessary machinery and equipment
 ► Field laboratory has been established
 ► Key engineering personnel have been deployed by the contractor
 ► The work programme has been approved

 After the certificate is received, the State Quality Coordinator intimates the Empowered Officer of the SRRDA to allocate the credit limits for the contract and operationalize the accounting system in order to enable payments to be made and accounted for. The SQC is expected to monitor the action taken on non-conformance reports. The SQC shall also test check to see that payments to contractors have not been made in the absence of satisfactory tests.

 **The SQC is expected to liaise with the State Technical Agencies to ensure quality in Design and DPRs including:**

 ► Holding of initial coordination meeting with STAs and PIUs to sort out issues of design, investigation and data collection, so that the DPR is of acceptable standard.
 ► Coordination of the scrutiny process so that STAs get adequate time to scrutinize DPRs.
 ► Sorting out issues raised by STAs during scrutiny of DPRs, and making references to NRRDA for clarifications where required, through the Chief Engineer (PMGSY).

 **The SQC is the nodal person to coordinate and control the activities of the State Quality Monitors and make operational the 2nd tier of Quality Management. As such, the SQC is required to:**

 ► Draw up programmes for SQM inspections in such a way that every work is inspected at-least three times. The first two inspections of every work should be carried out during the execution of work, spaced at least 3 months apart, and the last inspection should be carried out on the completion of every work, within one month of its completion.
 ► Examine the SQM reports with regard to their adequacy and counsel SQMs in case of deficiency. The State Quality Coordinator should send the Monitor’s reports to the Project Implementing Unit with a copy to the SE. Compliance reports to the SQC should be routed through the CE/SE. All cases of delay in reporting compliance and major cases of deviation from acceptable quality standards should be taken seriously. The SRRDA may adopt a two level classification for quality, viz. Unsatisfactory and Satisfactory.
 ► Compile an abstract of the SQM visits giving the District-wise grading and send copies to the DPIU, CE, Nodal Department and NRRDA in the prescribed Format.
 ► Send an Annual Report to NRRDA through the State Nodal Agency comprising the analysed performance of the State Quality Monitoring System in a prescribed format. The analysis should
include the SQM reports, NQM reports, Action taken in individual cases and systemic deficiencies detected and remedied.

As part of the Quality Management process, the SQC also looks after the training needs of the PMGSY staff and contractors’ personnel, drawing up an annual programme of training at various institutions such as the IAHE, CRRI, State Training Institutes, and Engineering Institutes etc.

3rd tier of QM: Whereas the State Government is responsible for Quality Management, the NRRDA provides external Quality Assurance by deploying National Quality Monitors, whose responsibility is to verify that the state’s quality management is adequate. Their role is to guide the Quality Management team and to give feedback on the quality management shortcomings to enable systematic improvements.

As the third tier of the quality management structure, the NRRDA engages independent NQMs, mostly retired Senior Engineers from State/Central Organizations. The NQMs are given programmes of inspection once in two months for carrying out inspection as per the programme for the forthcoming two months, indicating the districts to be visited. The inspection schedule of NQMs is also displayed on the PMGSY website. Guidelines for the Third Tier Independent Quality Monitoring are available on the OMMAS website and provide that:

- The details of schedule of visit will also be available on the PMGSY website in the last week of the preceding month to enable SQC and PIUs to make necessary arrangements.
- It will be the responsibility of the SQC to ensure adequate arrangement for inspection by the NQM, including local stay and transport.
- The NQM is required to inspect these districts in a single visit in one state in each of two months (the total districts inspected during one visit shall not exceed three). S/he should finalize a suitable programme to spend no more than 3-4 days in each district inspecting normally between 1-2 works on each day.

NQM should focus on project management by the PIU and make his/her observations on:

- DPR quality
- Contract management
- Quality management

Post-inspection discussions should take place: The NQM should hold informal meetings with the PIU officers to discuss the results of the inspection and to suggest improvements necessary in order to obtain better quality.

- The Inspection Report by NQM should be acted upon by PIU/SQC in a prescribed way:
- The PIU will start taking action based on inspection reports furnished by the NQM immediately after inspection, unless it disagrees with a recommendation. In all such cases, the matter should be immediately referred to the SQC.
- SQC should ensure that the PIU takes immediate steps to implement the observations of the NQM. In case the PIU proposes not to implement a recommendation, the SQC should give suitable advice, or if required, seek further clarification from the NRRDA.
► Action in respect of institutional issues will be taken by the SRRDA, and an ATR will be communicated to NRRDA.

► While furnishing the ATR, the head of PIU will clearly mention whether the item of work graded as unsatisfactory has been removed and re-done; and if in-situ rectification has been done, the process of rectification will be explained in sufficient details.

► It is a basic duty of the SQC to take an Action Taken Report from the PIU after the lapse of one month of inspection. The ATR will be treated interim, if the action is not complete and the ATR will be treated final, if the action is complete. The monitoring of Action Taken Reports will be done accordingly in NRRDA. NQMs are required to upload the abstract of quality grading of items of work and the corresponding geo-referenced photographs in OMMAS through use of smartphones provided by NRRDA. The details uploaded by NQMs are available in the public domain.

► Details of NQM/SQM visits, including grading and geo-tagged photographs are required to be uploaded to the OMMAS, enabling analysis SQM/NQM wise or state/PIU wise.

10.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of the quality management process and help better realize the aspiration to provide quality assurance:

(i) The PMGSY guidelines envisage that since the PMGSY roads are State Government assets, the quality management will be primarily done by State Government agencies, with the SQC having the nodal responsibility. However, many State Governments have not appreciated the importance of quality management at construction phase and depend almost exclusively on the power of the “defect-free” warranty mentioned in the contract.

(ii) Due to inadequate appreciation of the need for quality, the expected role and functions of the SQC and the 1st and 2nd tiers of quality management are not being played out.

(iii) The SQM system is inadequate in most states in respect of the ability to dispassionately assess quality of construction, and the management of the system by the SQC who may be part time is not always satisfactory. In a few states, the SQMs are not really independent, being serving engineers from adjoining Divisions of the Department. Even where they are retired senior engineers, the perception of independence is somewhat reduced when one considers the substantially lower percentage of “unsatisfactory” roads graded by SQMs in relation to NQMs in some states, or the large number of roads purportedly inspected by a few of the SQMs in a single day as part of the ATR verification process. The fact that in some states, SQMs are paid on the basis of the number of roads inspected further detracts from the credibility of the process.

(iv) While the 3rd tier of quality management is relatively better, it is under high stress. Expansion at this level to deal with the inadequacies of the 2nd tier of SQMs may send a wrong signal to the State Government regarding ownership of quality for the PMGSY roads, unless it is done as an adjunct to improving the 2nd tier.
10.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to quality control and management in order to enhance the effectiveness of PMGSY in achieving its objectives, with the objective of moving towards “quality assurance”:

(i) The three tier Quality Management (QM) system established under PMGSY needs urgent attention. The system is oriented more towards ensuring quality at the execution stage. Quality management at the DPR stage is inadequate because the PIU capacity is inadequate. The system of DPR Consultant and PIC has become quite widespread and the Operations Manual does not adequately address the process of ensuring quality in this respect. The inspection by SQM and NQM should include observations on the quality of the input of the DPR consultant and the PIC with respect to specific items.

(ii) Along with the issue of quality is the issue of cost. The fact that there is 100% central funding provides no incentive to the state to jointly optimize both quality and cost. This allows contractors the headroom to take risks with regard to unauthorized sub-contracting which may adversely impact quality. In PMGSY-II, since there is a state share, the opportunity for optimization of costs must be fully leveraged.

(iii) The first tier of Quality Management i.e. the PIU, has serious shortcomings in terms of capacity and knowledge. The institutional restructuring suggested in Chapter 1 of this Report should substantially address the former while the Training Framework should address the latter.

(iv) To put the matter on a firm foundation, the OMMAS should provide for a distinct “1st tier QM” module, in the same way that it provides for an “SQM” module and an “NQM” module. This will ensure better focus on quality monitoring at the PIU level. Correspondingly, the contractor’s data entry portion in OMMAS (for which a separate recommendation has been made) should also have a separate “Quality management” module for data entry relating to quality.

(v) The dates of Quality Control tests at site in the presence of the PIU/SE/CE should be captured in the data entry in OMMAS as already recommended. At the same time, NRRDA may review the number and frequency of the tests and issue fresh Guidelines to ensure that they are realistic and doable. The Guidelines may also prescribe the process for taking photographs for uploading to OMMAS.

(vi) The “Site Order Book” should also be available in the 1st tier QM module for entry based on EE/SE/CE visit and reporting of ATR.

(vii) The number of NQMs is insufficient to do the tasks currently assigned to them. However, increasing the number of NQMs will be at the cost of the SRRDA’s potential to engage SQMs from the same talent pool. It is important to ensure that the state takes ownership for the quality management process and its outcome and that the 3rd tier of NQMs does not operate to dilute this or to substitute for the 2nd tier. NRRDA may issue Guidelines for SQMs similar to that for NQMs, regarding the inspection framework and honorarium.

(viii) To strengthen the 2nd tier, NRRDA needs to also ensure the following:

a) Developing a clear norm between the number of active SQMs and the number of ongoing projects, so that capacity of the 2nd tier is not exceeded, and new projects are cleared within capacity.
b) Promoting a state-specific mix of individual independent SQMs and institutional SQMs procured on a QCBS basis as per NRRDA guidelines to increase capacity to optimum levels, and ring fencing the payment for the QM system from within the administrative expenses. Developing a scalable model is important as the QM system has applicability across the rural road sector, and NABARD has already expressed interest in using the system for RIDF roads.

c) Incorporating into OMMAS, all the processes of quality monitoring for the 2\textsuperscript{nd} tier as in the case of the 3\textsuperscript{rd} tier. Specifically, the processes should include identification of the Blocks for the visit; shortlist for selection of appropriate mix of road works; downloading of road level information including previous visits; uploading of photographs and inspection reports; registration of grading; and uploading of the ATR on the report.

d) Ensuring the participation of all SQMs (and NQMs in rotation) in PMGSY regional reviews. It must be emphasized that regional reviews afford a unique opportunity for all the main participants in the management and monitoring process to get together and discuss problems and strive to improve quality. Non-inclusion of SQMs in this process will seriously reduce their effectiveness, and only such SQMs should be allowed to continue who attend the regional reviews. Needless to say, the event will also enable NRRDA to better evaluate the competence of the SQM.

e) Operationalizing a Claims Module in the OMMAS to enable SQMs (as is being done in the case of NQMs) to lodge their travel expense claims online, based on filing of their Report. This will enable better monitoring of all aspects of the process.

f) Introducing an annual review process for SQMs on the lines of NQMs.

(ix) NRRDA may also develop Guidelines for Accreditation/Certification of SQMs so that they can be engaged by neighbouring states for bringing in independence and objectivity. In the case of the NE states, NRRDA may in fact centrally engage an institutional SQM if so requested by the states. This will ensure better quality and better control, leveraging NRRDA’s status. Table 2 of the Statistical Appendix brings out that there is surplus SQM capacity in Andhra Pradesh, Telangana, Gujarat, Haryana, Karnataka, Maharashtra, Sikkim, Tamil Nadu, and Tripura, which can be tapped through suitable policies.

(x) In the PMGSY scheme of things, the SQC is responsible for:

a) Supervising the 1\textsuperscript{st} tier of Quality Management
b) Liaising with STAs and PIUs for the systematic, scheduled scrutiny of DPRs
c) Managing the 2\textsuperscript{nd} tier of QM
d) Facilitating and coordinating, at state level, the NQM visits and the ATRs thereon
e) Preparing the Annual Quality report.

To ensure that this is done methodically, and to promote synergy, it should be ensured that the SQC organizes on an annual basis, Circle-level workshops of all stakeholders, i.e., PIUs, DPR consultants, PICs, PMC, STAs/PTA, SQMs and representatives of NRRDA (who may nominate a few NQMs with experience of inspections in that state for the purpose).
(xi) In most states the SQC is not a full time post, which is the main reason why the leadership role envisaged for him in the Operations Manual in the QM process has not been realized. The SQC must be full time, and his remuneration as part of the administrative expenses must be ring fenced and paid only when a full time SQC is in position. The SQC must be supported by a small Cell to ensure systematic management of quality. The SQC must be jointly selected by the State Nodal Secretary and DG NRRDA out of a shortlist of SE/CE level officers to be given by the state, and should have tenure of at least 2 years.

(xii) The OMMAS should enable the generation of the monthly SQM abstract report for the SQC. The Annual Quality Report required to be prepared by the SQC on the basis of the SQM reports, for making recommendations to the SRRDA and SLSC on systemic and procedural deficiencies must be uploaded to OMMAS, and made a prerequisite for generation of the State Profile for consideration in the Empowered Committee.

(xiii) The NQMs are currently the bulwark of the independent quality management system. As originally envisaged, the NQMs were to look at road work quality and interact with PIUs and contractor personnel in order to understand systemic problems and help in improving the overall quality of the programme. However, by perforce doing much of the work expected to be done at the 2nd tier, NQM Inspection Formats have got reoriented and the outcomes also reflect this de-facto change. It is necessary to build up the 2nd tier and to restore the 3rd tier to the original position of providing system level quality assurance. NRRDA may therefore review the formats for both the 2nd and 3rd tier in a concerted manner. While doing so, the pro forma for:

a) Hill Roads may be differentiated from those of Plains
b) Completed works may be differentiated from ongoing works
c) Maintenance may be differentiated from those for original works

(xiv) NRRDA must hold regular regional reviews and ensure the participation of all NQMs in rotation in the regional reviews. It must be emphasized that regional reviews afford a unique opportunity for all the main participants in the management and monitoring process to get together and discuss problems and strive to improve quality. Non-participation of NQMs in this process will seriously reduce their effectiveness, and attendance at such events should be made mandatory. Needless to say, the event will also enable NRRDA to better evaluate the competence of the NQM.

(xv) Since NQMs were shouldering much of the responsibility for the QM process, NRRDA has invested a lot of effort in incorporating the process into OMMAS. Appropriate segments of the OMMAS process should now be opened up for the SQMs (as is already the case with NQMs), with the SQC doing the necessary coordination. The NQM module should be consequently modified so as to capture the systemic issues flagged by the NQMs during their visits, so as to enable analysis in NRRDA. In addition, the ATRs on the NQM visits, which should be uploaded to OMMAS along with the verification of the SQM, should be made available to the NQMs for their information under their login, along with SMS alerts.

(xvi) For both SQMs and NQMs, interaction with the PIU, DPR consultant, PIC and contractor personnel is an important but neglected component of QM. On the one hand, SQMs and NQMs will better understand the ground realities and be able to assess the nature and extent of the knowledge and expertise of the stakeholders at this level. On the other hand, on the basis of the site visit, they can improve practices and help build up capacity at this level. It would be very useful therefore if during the NQM/SQM visit, one day is kept apart for such interaction and
report writing and the main issues emerging from the discussion as well as the Inspection Report are uploaded to OMMAS.

(xvii) Different states have developed best practices in different aspects of PMGSY such as design, DPR preparation, procurement of contractor or consultant, good quality execution by contractor, execution monitoring, QM, maintenance, OMMAS etc. It would be useful if NRRDA can annually pick up one or more of the subjects, document and disseminate the best practices, and arrange for visits from other states to study such practices for adoption, as part of QM. Visits may be arranged not only for the SRRDA/PIU, but for consultants also (and contractors’ engineers as well where the best practice is of hiring a contractor). Such expenses should be part of the head “Training and capacity building expenses”. A comprehensive document on best practices comprising each of these aspects should be prepared by NRRDA together with its dissemination and regular update.

(xviii) As in the case of the SQC in the SRRDA, the Central Quality Coordinator (CQC) in NRRDA must be full time. PMGSY-II guidelines already provide for this, but the administrative systems to define the scope of the CQC’s remit needs to be laid out and enforced. In addition to the QM system, the CQC must be responsible for the regional review mechanism which has fallen into disuse, and the review must be the occasion for the NQMs, STAs, PTAs, and SQCs, SRRDAs, State Nodal Department and the NRRDA to jointly review in depth on a quarterly basis, the entire gamut of the programmatic requirements, including quality.

(xix) As with the SQC for the 2nd tier, the CQC also needs to hold an annual workshop of NQMs to review the 3rd tier and improve systems. In particular, the CQC needs to develop a system within NRRDA to be able to analyse NQM reports for use in strategic decision making, and for improving design and specifications, quality assurance and contract management.

(xx) The SQMs and NQMs should spend some time during their project visits in training the field engineers as to ‘best practices’ based on their experience.

(xxii) Reorientation programmes of newly inducted SQMs and NQMs should be mandatory so that they are abreast of the latest programme guidelines, specifications, quality assurance handbook, expectations during their inspections and ethics and governance regimes.
The Online Management, Monitoring and Accounting System (OMMAS)

11.1 The Framework:

A Web-based, Online Management, Monitoring and Accounting System (OMMAS) developed in 2001 by Centre for Development of Advanced Computing (C-DAC) is the digital backbone of the PMGSY. The system was initially loosely modelled on the MahaPWD of Public Works Department of Maharashtra, on the basis of the Report of the Rural Roads Committee (2000), but has now evolved over time to include the following components:

- Database of rural roads.
- An end-to-end work flow based system for planning, scheduling, monitoring and tracking projects.
- A simple and transparent Accounting System for Program fund, Administrative Fund and Maintenance Fund.
- Mobile Application Based Quality Monitoring System (MABQMS) for NQMs and SQMs for providing the grading details of projects along with geo-tagged photographs.
- Receiving feedback from citizens through “Meri Sadak” Mobile Application.

The basic principle of OMMAS is that:

- Data is entered at the point of origin, e.g. at PIU level. Additions and modifications to data and status are made through role-based login by PIU/STA/SRRDA/NRRDA/MoRD etc.
- The same data is available in processed form at SRRDA and NRRDA levels; with the facility to drill down data to basic units i.e. road, habitation and rupee.
- MIS output from the common database can be structured to suit PIU, SRRDA, and NRRDA needs thus eliminating paper reporting and reconciliation of data.

Habitation, Village and District Rural Roads Plan (DRRP)

The Habitation sub-module shows the list of habitations in the selected Blocks and Districts. The habitation details contain habitation name, habitation code, connectivity status as on 2001, SC/ST population, total population as per Census 2001/2011 (for PMGSY-II); education services available, health services available, communication and transportation services available. Similarly, the village sub-module shows the list of villages in the Block. The village details contain village code, village name, village population as per Census 2001/2011 (for PMGSY-II).

Master data (state, district, block, village, and habitation) for the district needs to be entered before entering DRRP information. By default, all the data of DRRP is locked and finalized on OMMAS based on the inputs provided by respective states. For any correction and making any new road data available on OMMAS, the DRRP Module needs to be unlocked. The Module is now enhanced with the “Finalization” functionality which is mandatory.

Once the Core-Network road is identified and entered on OMMAS, the OMMAS will be able to
produce the CNCPL, once the Pavement Condition Index has been entered. Once the candidate roads are identified and entered on OMMAS, the OMMAS will produce the Priority List for PMGSY-II.

Annual proposals and their scrutiny

Currently, after the DPR is prepared, the essential data of the DPR is to be entered by the PIU after login into the Proposal module of OMMAS. For each road work entered in the proposal module, the habitations being benefitted by the road (selected from the Core Network) are linked to the proposal. The traffic intensity details and CBR details on the basis of which the design is proposed are also to be entered. Finalization of the proposal is made mandatory, without which it is not available for scrutiny by STA. After finalization of the proposal by the PIU, if before, during or consequent to scrutiny by STA, data is to be edited, only the ITNO can authorize the changes. The scrutiny of proposals by the STA is to be performed for each proposal individually by going through the proposal details by selecting the respective tab. Only proposals which are scrutinized and entered as such by the STA under its login are available for sanctioning by MoRD (STA-wise Honorarium and Service tax amount will also be generated by OMMAS, based on DPRs scrutinized by individual STAs).

OMMAS will produce the Pre-EC and EC Brief once the Proposal for the batch is scrutinized by the STA and the Check List data for EC/pre-EC is entered under the SRRDA login. On EC/MoRD clearance, OMMAS will also produce the sanctioned road list for the roads that are entered as approved. A Clearance letter along with a pdf of the sanctioned list of roads can then be generated. As soon as the pdf is generated, the approved roads are moved into Project Mode under the SRRDA/PIU login, so that further data entry for tendering (packaging or splitting of projects) can be done by the SRRDA/PIU.

Electronic tendering has been made mandatory under PMGSY since April 2009. Based on the feedback received in a National workshop held in March 2009 for assessing the preparedness of states in this regard, NRRDA in collaboration with NIC developed a separate stand alone GePNIC e-tendering platform for procurement of PMGSY projects. Presently 26 states have migrated to this system and the remaining three states (Chattisgarh, Haryana and Telengana) are in the process of migration. For the purpose of seamless data flow from OMMAS to GePNIC and vice-versa, the integration of the two systems is in final stage. Post integration, the data for tendering would directly feed into GePNIC from OMMAS and the data of successful and other bidders would flow into OMMAS for creating procurement related reports.

Quality Management (QM)

The inspections carried out by SQMs/NQMs are to be entered into the Quality Management module of OMMAS after selecting the particular road. Details to be entered include inspection date, chainage of inspected length and road completion status work (Completed/In-progress) and grading related to and quality of work in terms of Satisfactory/Satisfactory requiring improvement/Unsatisfactory as on inspection date. Recently (2013), a Mobile Application Based Quality Monitoring System (MABQMS) has been implemented and integrated with OMMAS, which can be used by NQMs/SQMs for inspection of rural roads. The solution is based on Smart phones on Android platform interfaced with OMMAS to upload the observations as well as geo-tagged photographs from the mobile. In 2015, “Meri Sadak”, a mobile app, was launched, to enable members of the public to send photographs and text to bring to notice deficiencies in PMGSY roads requiring rectification through maintenance work.

Project Monitoring:
Agreement Module

Details of the Works which are awarded to the contractor are captured in this module - which include
amount put to tender, date of NIT, date of work order, awarded amount, name of the contractor, expected date of completion and five years’ maintenance costs. The Agreement sub module contains four types of Agreements:

▶ Contractors
▶ Suppliers
▶ Others for Roads
▶ Others for DPRs

Agreement executed with the contractor for construction and maintenance of road for five years is updated in “Agreements with Contractors”. The details captured are Agreement Number, Agreement Date, Date of Award of Work, Agreement Start Date, stipulated Agreement End Date, Agreement Amount and the roads which are the part of the agreement. The “Agreement with Contractor” can be updated only after the details in “Award of Work” sub module and contractor master are updated. Once the details are updated, it should be finalized, without which the agreement is not available for making payments in the accounts module and also not available for capturing the details of physical progress and assigning the projects for inspections of SQMs/NQMs. Provision to capture the lab details against each package with the geo-referenced photographs of the lab is provided in PIU login, which is to be validated by the concerned SQC.

Agreements executed for preparation of DPR with the consultants are captured using the “Agreement with Others for DPR”. Details of the consultants are to be updated in the contractor master before updating the agreement details. The details captured are: Agreement Number, Date of Work Order, Agreement Date, Agreement Amount, Agreement Start Date, Agreement End Date and the name of the consultant. For making payments towards DPR, “Agreement with Others for DPR” is mandatory.

▶ Execution Module: Monthly entry of physical and financial progress of each work is entered here at PIU level.
▶ Maintenance Module: Physical and financial data regarding 5 years’ contract-based maintenance (to be entered at PIU level).

Accounting:

The Receipts and Payments module deals with accounting of the expenditures occurring during the construction/maintenance of roads and for managing office expenses. Three types of Fund are maintained in OMMAS, viz. Programme Fund, Administrative Fund and Maintenance Fund, and the module provides for recording of transactions in accordance with the provisions governing the respective fund.

In the Programme Fund, the posting of accounts for the state starts at the SRRDA with the entry of Bank account details and details of PIU wise authorized signatory followed by opening balances as per the audited balance sheet for the specified financial year from which the state starts maintaining the accounts online. Accounting of the PIU starts with the opening balances as per the audited balance sheet for the specified financial year from which the state starts maintaining the accounts online and entry of cheque books received. Entries of receipts or vouchers are not allowed without the details of Bank accounts and Opening Balances.

Payments made to the consultants for preparation of DPRs are to be transferred to respective roads after the roads are sanctioned online by the MoRD.
Based on the entries of the Cash Book, all the financial statements are generated. The district level authority can monitor the expenditure incurred on the new connectivity roads, upgradation of existing roads and other expenditure incurred on plantation, placing sign boards etc. The details can be verified contractor wise, agreement wise and package wise. The authorization amount received from the Nodal Agency and the balance amount can also be monitored before placing a request for further authorization. During the final payment to the contractor, the details of the deductions can be ensured.

The state level authority can monitor the financial progress of the works; amount of authorization issued as well the balance authorization available with the implementing unit. Contractor wise, Agreement wise, Package wise expenditure can be monitored and can be used to monitor the contractor’s performance as well as the implementing unit’s financial progress.

Officials at the national level can monitor the states’ as well as implementing units’ balances by going through the authorization balances, expenditure incurred on the works, both new connectivity and upgradation, expenditure incurred on preparation of DPRs, balance available in the Bank as well as amount pending at the state level in lieu of non-issue of authorizations.

**Bank module:** The Bank module is used by bank personnel, where the SRRDA has an account related to PMGSY works. Cheques issued to contractors by DPIUs of that state are listed here. When the Bank clears cheques/e-payments related to a voucher, the Bank authority logs in and reconciles it, and the same reflects in DPIU and SRRDA reports. The Bank has the provision to view the fund wise and PIU wise un-reconciled cheques for a specific month. On selecting the un-reconciled cheques, it is required to provide the date of cheque reconciliation and remarks if any. Based on this, a Bank Reconciliation report is generated enabling the PIU and SRRDA to reconcile their accounts. The Bank also has the provision to view the cheques which have been reconciled earlier, fund wise and PIU wise.

**Programme Monitoring:**

► **Report on State Profile and District Profile:**

The National State Profile (NSP) report has been redesigned to improve the performance, readability and analysis of data presented. The data is presented with a provision to compare batch wise details and new vs upgradation based on cleared Vs completed works - in terms of number of works, length, habitations and cost.

Phase wise work summary details are provided in a tabular form divided into four sections. The first section provides the allocation and amount released. The second section provides sanctioned details comprising value of proposals, total number of road works, total number of habitations benefitted, total length of road works, total value of LSB works and total length of LSB works. The third section provides the completion status under total number of road works completed, total number of habitations benefitted and total length of road works completed. The fourth section provides expenditure details as per MPR and as per accounts.

Details are provided column wise for enabling comparison of works completed against sanctioned roads, length completed against sanctioned length, and habitations connected against sanctioned habitations.
Batch wise details are provided in two sections: “Proposals Cleared” and “Works Completed”, which provide the details in a readable format for analysis and review. The details are provided with a scroll option to adjust them in line with summary details, and these can be compared with the phase wise summary and phase wise bifurcation details.

► **Report on New Technology R&D works:**

State-wise or technology-wise road works sanctioned under R&D are shown in this report. The report also shows length in km in each R&D technology and cost corresponding to that technology. Performance report uploaded by the STA/SRRDA can also be seen.

► **Report on State-Wise List of Works:**

Year wise sanction with completion status, construction expenditure, stage of progress with maintenance liability and maintenance expenditure are shown in this report. The SRRDA can use this report to publish the year-wise road list.

► **Report on Habitation Coverage:**

Total unconnected, connected through PMGSY scheme, connected through state scheme, not feasible, dropped and balance unconnected habitations are shown in this report.

► **Progress of Work Sanction during Each Year:**

The state reports the progress achieved against PMGSY works sanctioned during each year. Monthly progress reports and physical progress of works (road) are available as an output from the system.

► **Report on Financial Closure of Physically Completed works:**

List of works physically completed but pending financial completion can be taken as an output from the report.

► **Report on Quality Inspection of Works:**

Grading and photographs of the work inspected by NQMs or SQMs can be taken as output from the report. If grading and photographs are uploaded by mobile application for NQMs/SQMs, then geo-tagged photographs are shown on Google Map.

► **Report on Monthly-Closing of Accounts By SRRDA for Program Fund, Admin Fund and Maintenance Fund:**

This report enables monitoring of the accounting data entry for Programme Fund, Administrative Expenses Fund and Maintenance Fund.
Analysis of Cost per Km of PMGSY Works:

This report enables an analysis of the cost per km of PMGSY works, but it is useful only in case the OMMAS data is complete and accurate.

11.2 The Assessment:
In so far as the basic architecture of OMMAS is concerned:

(i) OMMAS needs to be upgraded and enhanced so as to more closely parallel the work flow of the PMGSY guidelines, Operations Manual and other guidelines. OMMAS should provide for more exception-reporting and SQL-based queries. It should also throw up ‘red lists’ state/district/block-wise. OMMAS provides for project monitoring but it does not provide checks to ensure that the contractual consequences of delay or non-performance of any of the parties are taken into account in accordance with the conditions of the contract. Workflow based management through OMMAS should endeavor to close the “accountability” part of the loop where there is a deviation from the norm.

(ii) OMMAS focuses on the “core” process of the road design, construction and maintenance, whereas with slight changes it can easily incorporate sub-workflows relating to other stakeholders, including DPR consultants, PICs, etc. In fact, it can ensure better contract management of these players and close the accountability loop in this aspect as well.

(iii) The architecture of OMMAS should also be suitably expanded to capture the workflow in respect of non-PMGSY rural roads, including variations in procedure, so as to provide an option to any State Department to migrate to this platform for project management. The DRRP must be the database for this purpose, and any process or application in any Department which impacts on the DRRP must provide for suitable updating of the DRRP.

(iv) Rural road data is basically in the state domain, and OMMAS cannot be seen as conferring on MoRD or NRRDA, exclusive ownership of such data. The data should be seen as “National” rather than “Central” for purposes of ownership and access. Keeping in mind the experience in other cases, the architecture of an expanded OMMAS must be flexible enough to be able to meet the aspirations of some of the states who may wish to link rural roads with other road networks (e.g. MDRs) as part of a larger database for transactional purposes, and may also wish to incorporate other applications based on the road and other infrastructure and geomorphological data (e.g. GIS applications for area-based planning). This may require that states with such applications may be facilitated in suitably interfacing with OMMAS for the purpose of transferring rural road related data that may have been accumulated through transactions (including tendering and contracting) in applications outside OMMAS, and vice versa.

11.3 Recommendations for enhancement:

(i) Expanding OMMAS to cover all rural roads: The architecture of OMMAS should be suitably expanded to capture the workflow in respect of non-PMGSY rural roads, including provisions for variations in procedure (subject to NRRDA’s approval), so as to provide an option to any State Department to migrate to this platform. The DRRP must be the database for purpose, and any process or application in any Department which impacts on the DRRP must provide for suitable updating of the DRRP.
(ii) **Improving planning by focusing on an Annual List of proposals:** The current process of the STA checking for the road on OMMAS from the Core Network while scrutinizing the DPR may be replaced by a process of checking for the road from the Annual list of proposals to be uploaded well in advance (say 30 days) by the SRRDA on the OMMAS and locked. This will ensure on the one hand that the planning processes in the state are improved; on the other it will give a better idea to the STAs of the total likely workload, enabling them to plan their scrutiny.

(iii) **Ensuring the taking up of Stage-II works:** In the case of hill states including the Northeast, there is a provision for Stage-I (formation cutting, protection, and drainage) and Stage-II (WBM, blacktopping and completion) works, with a period of up to 2 years being allowed to intervene between the stages to allow the formation to stabilize. It is important that:

- Stage-II works are in fact taken up quickly to prevent deterioration of the Stage-I work;
- The guidelines clarify that the target habitation is “connected” only on completion of Stage-II; and
- The Empowered Committee monitors cases using OMMAS, where 2 years have elapsed after completion of Stage-I, and sequesters funds for Stage-II works before clearing new proposals, and sanctions these in a timely manner, as Stage-I works left without Stage-II are prone to serious damage and degradation.

OMMAS needs to be able to produce a list of works accordingly.

(iv) **Improving integrity of DPRs by linking to OMMAS:** PMGSY is a DPR based programme and the quality of the DPR is crucial for technical and financial reasons. To ensure better monitoring of the DPR preparation process as well as enable post-monitoring and analysis, the process of initiation of the survey, data gathering, transect walk, visits by PIU to site etc. should be captured in OMMAS, with checks to ensure that there is no “bulk processing”. Some key data parameters and photographs can be uploaded from the site itself using mobile technologies. Key milestones of the DPR preparation process (including survey data) should be included in OMMAS under the road code, and payment system linked thereto, similar to works contract management. The system should have an online check in terms of the district wise allotment of funds and schedule for submission, and an audit trail to analyze where delays and undue hurry is taking place. At present, entry of key DPR data is to be made in the OMMAS, and checked by the STA at the time of scrutiny. NRRDA may review the data requirements and add some data elements that need to be entered from mobile devices at site by the survey team, to ensure geo-tags with time stamps along the alignment during the survey and DPR preparation. The use of programme funds for the purpose would be subject to conformance with the systematic entry into OMMAS and subject to book adjustment within a specified period, e.g. 2 years.

(v) **Use of OMMAS for national empanelment/registration of consultants:** NRRDA should empanel the DPR and project implementation consultants, either nationally or regionally, particularly giving regard to their competency in the type of tasks such as survey in difficult terrain, use of total stations, soil investigations, bridge design etc. as may be required and also work out their capacity and allow SRRDAs to engage them only within the limits of their capacity so that quality does not suffer. OMMAS should be able to provide estimates of initial and residual capacity for the purpose, at least with respect to rural roads. A fair procedure of
dealing with complaints against consultants for undesirable practices, including blacklisting, may also be devised by NRRDA and operationalized, leveraging OMMAS.

(vi) **Empanelment of SQMs:** To ensure impartiality and objectivity among SQMs, NRRDA may facilitate states in engaging SQMs from neighboring states. This should include an OMMAS sub-module for their empanelment as well as transactions related to SQM visit planning and reporting. As is apparent from Table 2 of the Statistical Appendix, there is surplus SQM capacity in Andhra Pradesh, Telangana, Gujarat, Haryana, Karnataka, Maharashtra, Sikkim, Tamil Nadu, and Tripura, and central empanelment through OMMAS will enable this capacity to be tapped if supported by policies for the purpose.

(vii) **Red-flagging suspect DPRs and rating quality of DPRs/consultants:** PMGSY relies heavily on the DPR, and it is essential that the design is cost-effective. STAs and SQMs/NQMs must scrutinize DPRs carefully in this regard and bring all suspected cases to NRRDA’s notice, so that strict action including termination of consultant, disciplinary action and suspension of the programme can be considered. The OMMAS should have a provision so that if at clearance stage of a suspect DPR, in case time does not permit site visit, a flag can be placed, and a site visit can be done by the STA/SQM/NQM subsequently. There may be a case for evaluating the work of consultants and rating the quality of DPRs, with the ratings serving as input for award of further work to them.

(viii) **Devising and enforcing time schedule for scrutiny:** The Tamil Nadu standard procedure of fixing dates and number of DPRs for scrutiny district wise well in advance by the SQC in consultation with the STAs may be adopted and this may be made part of the OMMAS system with a system check which ensures adherence to the agreed schedule.

(ix) **Incorporating Transect Walk:** The process of the Transect walk should be incorporated into the OMMAS, with visuals of the walk and key points. The summary of the results of the walk, specifying the land, social and environmental issues and the outcome of the discussions, and the list of participants should be uploaded against the road code in OMMAS. Availability of the Summary on OMMAS should be a prerequisite to scrutiny of the DPR by the STA.

(x) **Geo-stamping of data uploaded from mobiles:** All photos of a road, whether taken during transect walk, DPR preparation, construction or quality monitoring should be uploaded (with geo and time stamping) to OMMAS under the road code, using the Android mobile app. DPR consultants, PIUs, PICs, Local Panchayats, etc. may also be given login access. This facility can also be extended to the maintenance management system, including reporting of potholes and other defects by the Panchayat.

(xi) **Checklist in OMMAS before scrutiny:** There must be a checklist for each DPR regarding extent of land availability, site inspection etc. which must be entered on OMMAS by the AE/EE concerned under his login before the proposal can be sent to the STA for scrutiny.

(xii) **DPR Audit leveraging OMMAS:** Soil survey and CBR determination, location and design of CD works, traffic survey and use of local and marginal materials are key to a cost-effective DPR. Though PMGSY has been DPR based as a matter of principle, the feedback is that the actual DPR content is often not as location specific as it should be, resulting in overdesign or mis-design, with all its implications for cost, quality and serviceability. NRRDA must institute a system of DPR Audits by PTA/STA (or other agency) as an independent activity, and in case of major diseconomies, the State Government rather than the Central Government
should bear the incremental cost of a sub-optimal design. To facilitate this, the OMMAS must enable a flag to be placed by the STA against a DPR that could do with a ground check at some stage, and such DPRs must be picked up by the SQM/NQM during their visit to the area. PIUs/DPR consultants who consistently prepare high quality DPRs which lead to economical roads with use of local materials should be recognized through suitable means.

The audit must, in particular, be able to analyze the differences in BOQ between the original estimates and “as constructed”.

(xiii) **Checking of DPRs at site to be generated /listed using OMMAS:** In many PIUs, many of the staff at JE level are on contract basis or part of the PIC, or do not have adequate experience in road projects. In addition to the JEs, all DPRs must be scrutinized by AE level officers. 30% of the DPRs (as well as DPRs of CD of span exceeding 15 meters) must be checked at site by the Executive Engineer in the manner prescribed in the Operations Manual. The selection of the DPRs for the purpose should not be done by the PIU, but rather by the SQC who must enter the selected list in OMMAS (in fact the selection can be made rule-based once key data at DPR preparation stage is entered in OMMAS) so that compliance is ensured during STA scrutiny or NQM/SQM visit.

(xiv) **Incorporation of DPR Consultant and PIC activity in OMMAS:** Mapping the data entry related to survey and DPR preparation to the DPR consultant and project implementation consultant, and incorporating data entry protocols with log in rights can easily enable the consultants to participate in the data entry process on the one hand, and ensure the authenticity of the data and the performance in relation to the contractual terms on the other. It will also then be possible to align this with an online payment system.

(xv) **Uploading of scrutiny proceedings:** During scrutiny by the STA, the PIU must be represented by the JEs who prepared the DPRs. In case of outsourced DPRs, the consultant personnel concerned and the AE must be present. The STA must draw up a summary of the scrutiny proceedings on a daily basis, mentioning the DPRs scrutinized, and the PIU officials present on the day, and upload it to OMMAS.

(xvi) **Uploading of pre-bid meeting proceedings:** The bidding and evaluation process including the pre-bid meetings as mentioned in the SBD are not being taken seriously enough in many states, with the result that the contractor’s capacity to ensure the essence of the contract, which in the case of PMGSY is both the time and the quality, is compromised. Pre-bid meetings must be held at Circle level and minutes uploaded to OMMAS.

(xvii) **Contractor Registration:** A centralized registration module should be created in OMMAS to enable capturing of contractor details, his works in-hand and those completed; his capacity including residual capacity etc., and this should be available for the entire rural road sector.

(xviii) **Linking milestones and conditions of contract with OMMAS for confirmatory data entry:** Just as the DPR and project implementation consultants should record some key (and time-stamped and geo-referenced) data on OMMAS to improve the credibility of the process, contractors should now participate in the workflow process of OMMAS at key points in order to improve efficiency and transparency of the process to supplement written communication, and this should be a condition of the contract, and mentioned in the tender notice. A separate module may be developed in OMMAS enabling role based inputs from the PIU, the contractor (or his authorized IT personnel) and other functionaries having a role under the contract. The entries made in this module may be treated as communication done under the contract, and shall form the part of the contract performance. This module may be made a
part of the agreement through the bidding document. Currently, enforcement of the conditions of the contract and field supervision is poor in many cases for various reasons, with direct consequences for quality. It is essential to define and incorporate key contractual milestones into the OMMAS workflow for improved project monitoring. This could be achieved by leveraging the availability of mobile technologies and the features of android-based smart phones, including geo-tagging of photographs documenting progress. The data entry would need to be done by the party with the onus of action, and confirmed online by the other party. Subcontractors too can be included in the process in a similar fashion.

(xix) **Data entry rights and responsibilities in OMMAS to contractor’s IT person:** The contractor should accordingly be given access to OMMAS (for a designated IT person who should be a “key person” under the contract and who will be provided induction training in OMMAS with respect to his role) and should, under his login, upload the details of technical personnel onto OMMAS at the time of mobilization, along with their personal details. He must also upload his work programme. He must also notify the setting up of the field laboratory on OMMAS with the contract specific list of lab equipment and upload a geo-tagged photograph. Data entry regarding work programme revision, work commencement, quality management, interruptions, stage completion, completion, etc. should be entered by them and checked/noted online by the PIU. The contractor will also need to upload photographs at key stages or with such frequency as may be specified by NRRDA in its Guidelines, for use by the QM system. In particular, geo-tagged photographs at each stage passing must be uploaded. The contractor can be asked to submit the information, by duly modified contractual conditions, in specified formats duly signed by him/his representative which can be entered and uploaded.

(xx) **Approval of Work programme:** The engineer should check the details of the entries made by the contractor online and after the handing over of the site and the working drawings, accord his approval to the work programme, with entry to this effect on OMMAS. Revisions to the work programme would also need to be uploaded and available in an integrated fashion for analysis. The work programme must be used as the operational document for monitoring as well as management purposes, and stage passing must be enforced and recorded in OMMAS for payment purposes. The recording of the pre-commencement levels, which is the first item in the work programme, should also be done by the Engineer, along with details of the contractor personnel present at the time. The OMMAS must ensure that the financial limits for the package can be made operational only after these pre-requisites are completed.

(xxii) **Integrating Lab work with OMMAS:** PMGSY as a DPR based programme depends crucially on testing in the contractors’ laboratory. Setting up of the laboratory and ensuring the presence of trained personnel as per the contract conditions, and verifying that the tests have been done as per the QC Handbook are the key features of supervision by the PIU, which are currently not always being followed. The QC Handbook should be brought into the ambit of contractual conditions through specifications. The setting up of the laboratory and availability of trained personnel must be reported by the contractor’s IT person on OMMAS. The dates of quality control tests at site in the presence of the PIU/SE/CE should be captured in the data entry in OMMAS. The guidelines may also prescribe the process for taking photographs of the sampling process for uploading to OMMAS.

(xxii) **Site visits and management meetings:** Details of site visit by PIU, SE and CE, changes in work programme, dates of management meetings etc. should all be entered on OMMAS by the contractor and confirmed by the engineer, enabling the SQC to generate exception reports...
for monitoring purposes. Failure of the PIU to hold regular management meetings must be a cause of disciplinary action for negligence in every case of delay beyond the contract period.

(xxiii) **Contract Management module:** All major contract management related information, including work progress, delays and stoppages, compensation events, levy of liquidated damages, running and final bill dates etc. should also be entered in OMMAS by the contractor/PIU in their respective sub-modules. The PIU/SQM/NQM/SQC would get appropriate reports for their respective purposes.

(xxiv) **BOQs and Bill generation:** The contractor module should be seeded with the BOQs as per estimation and he should be able to enter the BOQ as executed. Confirmatory entries should be made by the PIU through the contract management module (with flags in case of substantial variation). Bill generation should be managed through this process to ensure conformity.

(xxv) **Management of BGs:** The management of Bank Guarantees (BG) also may be included in the OMMAS, so as to ensure timely renewal etc.

(xxvi) **Recording of Completion:** The management of the process of recording completion, including issue of completion certificate and financial closure needs to be computerized for better management so as to progress towards bonus schemes for early completion if provided under the contract (An option of giving higher weightage in qualification evaluations in future works could also be looked into). The contractor should record the completion using his login, which may be accepted by the PIU unless deficiencies are pointed out for remediation. Completion certificate must be issued within 60 days of accepted completion, and entered by the PIU on OMMAS, and financial closure should take place within 90 days thereafter and recorded on OMMAS. Maintenance should start from the date of completion. In order to ensure that the bonus/penalty system works well, this has to be integrated with the work programme entry in OMMAS.

(xxvii) **1st Tier of QM to be clearly specified in OMMAS:** OMMAS should provide for a distinct “1st tier QM” module, in the same way that it provides for an “SQM” module and an “NQM” module. This will ensure better focus on quality monitoring at the PIU level. Correspondingly, the contractor’s data entry portion in OMMAS (for which a separate recommendation has been made) should also have a separate “Quality management” module for data entry relating to quality.

(xxviii) **2nd Tier of QC to be integrated with OMMAS:** Incorporating into OMMAS, all the processes of quality monitoring for the 2nd tier as in the case of the 3rd tier would make the process more systematic and transparent and better enable scale up. Specifically, the processes should include identification of the Blocks for the visit; shortlist for selection of appropriate mix of road works; downloading of road level information including previous visits; uploading of photographs and inspection reports; registration of grading; and uploading of the ATR on the report. The OMMAS should enable the generation of the monthly SQM abstract report for the SQC. The Annual Quality Report required to be prepared by the SQC on the basis of the SQM reports, for making recommendations to the SRRDA and SLSC on systemic and procedural deficiencies, must be uploaded to OMMAS, and made a prerequisite for generation of the State Profile for consideration in the Empowered Committee.

(xxvii) **Claims module for 2nd tier of QC:** Operationalizing a Claims Module in the OMMAS to enable SQMs (as is being developed in the case of NQMs) to lodge their travel expense claims
online, based on filing of their Report will enable better monitoring of all aspects of the process.

(xxviii) **Capturing systemic issues for analysis:** The NQM module should be modified so as to capture the systemic issues flagged by the NQMs. While doing so, the ATRs on the NQM visits, which should be uploaded to OMMAS along with the verification of the SQM, should be made available to the NQMs for their information under their login, along with SMS alerts.

(xxix) **Recording of road condition survey in OMMAS:** Vehicle mounted road condition recording used for Road Condition Survey on the DRRP should be integrated with OMMAS for the recording of the result and for comparison of changes between successive survey cycles, at road and sub-network levels.

(30) **Asset management through OMMAS:** NRRDA should take the lead in getting an Asset Management system developed and incorporated in OMMAS, so as to provide a single index number at PIU/District/State level reflecting the health of the rural road network/sub-network, and to provide a time series for comparison. The intention is to enable states to rationally lay out maintenance funds under budget constraints and also to increase public awareness. In addition to the initial five-year maintenance, the second round of batch-based five-year maintenance may be provided for data entry in OMMAS to facilitate seamless asset management.

(33) **Capturing maintenance in OMMAS:** SQMs are reportedly being sent in some states specifically to check the 5-year post-construction paid maintenance work of the contractor. In states such as Madhya Pradesh, the second round of five-year batch maintenance is also similarly managed for QM. An inspection report specific to this work stream needs to be used, and all states need to adopt a uniform practice that may be circulated by NRRDA and included as a separate OMMAS Module. Provision may be made for uploading photographs during maintenance inspection. NRRDA may as an additional facility devise a “Report a defect or road safety problem” application on OMMAS enabling a member of the public or a Panchayat representative to upload photographs of potholes, rain cuts, etc. with geo-tagging and time stamping, so that it can be used by the contractor for maintenance purposes, and by the PIU for monitoring or remediation.

(32) **Online payment:** Currently OMMAS provides for an accounting system where voucher data is entered. There is a need to decisively move towards an online payment system covering contractors, consultants, STAs, NQMs/SQMs etc.

(333) **System checks and exception reports:** As a general principle, there should be provision for generation of exception reports at PIU/state levels for management and monitoring with respect to all those transactions for which data is captured through OMMAS. The intention should be to use the exception reports to attain a level of compliance that enables emplacement of a system-check in the module itself.

(334) **GIS applications:** Spatial data associated with PMGSY (including the DRRP and the Core Network) should be appropriately captured and displayed on GIS platforms, with separate applications for:

- Proposals and design
- Project and contract management
▪ Quality management
▪ Maintenance
▪ Network planning
▪ Infrastructure and services planning
▪ Traffic and road safety etc.
Section: 12
Monitoring

12.1 The Framework

Effective monitoring of the Programme being critical, the State Nodal Departments are required to ensure that all aspects of the PMGSY programme in the state are systematically monitored, and feedback used for correcting deficiencies. The Online Management & Monitoring System (OMMAS) developed for the PMGSY is the chief mechanism for monitoring the Programme. Officials managing the various aspects of the programme are required to furnish online all the data in respect of road details and transactions carried out by them in the relevant module of the Online Management & Monitoring System.

The SRRDA has to appoint one officer of sufficient seniority and having adequate knowledge of Information Technology to function as the State IT Nodal Officer. His function is to oversee the regularity and accuracy of the data being furnished by the District PIUs.

12.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of monitoring systems and processes.

Currently, routine monitoring at the central level is done mainly through the OMMAS, using the following instruments. Monitoring at the state level is done using the corresponding district level summaries:

- Report on State Profile
- Report on Habitation Coverage.
- Progress of Work sanctioned during each year.
- Report on Financial Closure of physically completed works.
- Report on quality inspection of works.
- Analysis of cost per km of PMGSY works.

In actual practice, since the OMMAS parallels rather than replaces many of the analogue processes, the potential for use of flags, checks and confirmatory entries for “online” monitoring has not been adequately realized.

12.3 Recommendations for enhancement

Close monitoring of the project through its lifecycle, including strict monitoring of project completion is essential if the programme is to maintain its standards for quality and timeliness. This will contribute to better contractor development and improved competition, and consequently to the better quality of the asset. In case monitoring of completion is given the highest priority, it will not
only lead to quicker completion, but will also enable contractors who complete in time to be provided suitable incentives (such as providing a multiplication factor for work capacity). Similarly, ensuring that non-completion is suitably reflected in the residual capacity will dis-incentivize the practice of informal sub-contracting and enable formal sub-contracting to be better institutionalized. It will also have positive knock on effects on the quality of DPRs and the proper conduct of Transect Walk, and help ensure adequate land availability, since these are major contributory factors in delay beyond the contractors’ control. While in the normal course, it may be tempting to also reflect timely completion in the annual performance of the PIU personnel, this would be better avoided so that corners are not cut and quality not compromised.

The existing reporting system in OMMAS should be upgraded to a comprehensive work-flow based system covering the project cycle, enabling monitoring at multiple levels and for multiple roles, from a single road level to sub-network and network levels, with automatic generation of alerts, exception reports as well as performance reports.
Section: 13

Maintenance and Road Safety issues

13.1 The Framework:

The Seventh Schedule to the Constitution of India allocates subjects between the Central Government and State Governments. The subject “Highways declared by or under law made by Parliament to be national highways” is allocated to the Central Government, while the subject “Communications, that is to say, roads, bridges, ferries, and other means of communication not specified” (in favour of the Central Government) is allocated to State Governments.

The Central Road Fund Act 2000 (CRF Act 2000) was enacted to give statutory status to the existing Central Road Fund created by a Resolution of Parliament in 1988, for development and maintenance of national highways and improvement of safety at railway crossings. The Act empowers the Central Government to levy and collect by way of cess, a duty of excise and duty of customs on petrol and high speed diesel (HSD). The Schedule to the Act specifies the items and the rates of levy, which was Re 1 per litre on petrol and HSD when the Act was brought into force; the rates have been enhanced from time to time.

The Act also creates a Fund to be called as the "Central Road Fund" under the control of the Central Government into which the proceeds of the cess and other amounts approved by Parliament can be credited. The Fund can be utilized for the: (i) development and maintenance of national highways; (ii) development of rural roads; (iii) development and maintenance of other state roads including roads of inter-state and economic importance; (iv) construction of roads either under or over the railways by means of a bridge and erection of safety works at unmanned rail-road crossings; and (v) disbursement in respect of such projects as may be prescribed.

The Central Government administers the Fund and (a) takes decisions regarding investment on projects of national highways and expressways; (b) takes measures to raise funds for the development and maintenance of the national highways and for the development of rural roads; (c) allocates and disburses funds for: (i) national highways; (ii) rural roads; (iii) state roads; and (iv) construction of roads either under or over the railways by means of a bridge and erect suitable safety works at unmanned rail-road level crossings.

As per the original Act, the cess collected is to be allocated as follows:

(a) 50% of the cess on HSD for the development of rural roads in such manner as may be prescribed (including for the repayment of any loan taken for the purpose of development of rural roads in any State or Union territory); and

(b) the balance amount of 50% of cess on HSD and the entire cess collected on petrol as follows:- (i) 57.5% thereof for the development and maintenance of national highways; (ii) 12.5% thereof for the construction of road either under or over unmanned rail-road crossings; and (iii) the balance on development and maintenance of roads other than national highways and out of this amount, 10% shall be kept as reserve by the Central Government for allocation to state for implementation of state road schemes of inter-state and economic importance to be approved by the Central Government.

The Fund is the primary source of funding for construction under PMGSY.

Maintenance: PMGSY Guidelines require that State Governments undertake the maintenance of the entire Core Network, particularly the road works constructed/upgraded under the PMGSY. State Governments are required to develop sustainable sources of funding for undertaking the maintenance functions. In respect of roads constructed/upgraded under the PMGSY, as per the
Standard Bidding Document, 5-year routine maintenance is contracted out along with the construction itself to the same contractor who is constructing the road. In respect of Through Route subjected to PMGSY investments, further 5-year maintenance on Zonal contract basis needs to be done.

For the purpose of contracting out routine maintenance, cost estimation for routine maintenance is required to be done at the time of preparation of DPRs. As such, the estimates of every work are prepared in two parts. The first part of the estimate covers construction of road, CDs and related works, and the second part covers the estimates of routine maintenance for five years calculated separately for each year after the completion of work. Based on estimation of work to be carried out every year, a lump-sum amount is to be worked out for every work every year and this lump-sum amount is required to be put into the BOQ at the time of tendering. The contractor will be required to quote rates in lump sum only, for every year.

The PIU is the authority for managing the maintenance contract for five years after completion of the construction of the road. The JE, AE and EE are required to inspect the roads with the periodicity prescribed. All defects such as potholes, berms needing dressing, clearing of road side drains and weeds, cross-drainage works and repairs for road furniture should be identified, recorded and intimated to the contractor. The supervisory staff shall ensure that the repairs are carried out as per specifications with due regard to quality control. All maintenance work shall be noted in a checklist in the routine inspection card. A maintenance log book for each road under the contract package shall be maintained and the date(s) of inspection, defect and deficiencies noticed during each inspection and whether defects have been rectified or not shall be recorded in the log book. The DPIU shall verify every time the contractor submits his bill whether the defects noted during the inspections have been rectified. If the contractor has failed to carry out an item of work ordered, the DPIU shall withhold the payment of the bill in that month.

The SRRDA is required to implement a simplified Rural Road Maintenance system, which consists of a road condition survey (based on simple visual inspection), which yields a Pavement Condition Index (PCI). The PCI data is an integral part of the OMMAS and the data will be included in the “Road Master” for each kilometre. The PCI data collected will be entered in the OMMAS database by the PIU and a district wise output generated, copy of which will be furnished to the State Rural Road Development Agency. The states shall get the PCI survey of the Core Network conducted in a continuous cycle of two years.

Routine maintenance operation will be carried out for the entire Core Network on the basis of maintenance prioritization, based on application of the PCI to produce a Routine Maintenance Priority List (RMPL) and taking into account the availability of funds with the state. However, it must be ensured that the execution of various maintenance activities is carried out as per “Specifications for Rural Roads”. States with a comprehensive Rural Road Maintenance System already in place may continue with the present practice in consultation with NRRDA.

The PMGSY Guidelines also require the State Government to build up the capacity in the District Panchayats to maintain rural roads and to devolve funds and functionaries on to the Panchayats in order to be able to manage maintenance contracts for rural roads.

Road Safety: PMGSY provides for appropriate safety design standards and features in the rural roads so as to enhance road safety. However, road safety has a second component, relating to the operational use of the road and associated risk factors. In the case of rural roads, in view of the occasional and miscellaneous nature of the traffic and lack of mitigating measures, additional engineering provisions may need to be in-built into the design of rural roads, and buttressed with
social and behavioural measures to promote safety-consciousness. PMGSY requires that these issues be considered at the time of the transect walk so that the local community alerts the engineers at the design stage itself to local traffic and pedestrian movement patterns that may have road safety implications, and in turn, the community is made aware of the limitations of engineering solutions and the need to improve safety-conscious behaviour.

PMGSY Guidelines provide for designating the Head of PIU to be the **District Rural Roads Safety Officer** (DRRSO). To ensure operational safety, the DRRSO should ensure that:

- Routine maintenance of rural roads is regularly carried out.
- All safety issues out of maintenance inspection are properly addressed.
- In all cases of accidents and inquiry/investigation thereof, safety issues are resolved, and a report is made to the SQC for examination on whether standard design features need to be incorporated in other rural roads.
- All resolutions of Panchayats regarding safety issues are acknowledged and action proposed/taken intimated to the Panchayat.
- Road safety awareness camps are organized involving Panchayats, schools, rural road users (inhabitants as well as drivers), in accordance with programmes drawn up by the State Quality Coordinator. The State Quality Coordinator will be the State Rural Road Safety Officer and shall ensure:
  - There is adequate coordination with the State Road Safety Council and road safety programmes.
  - Rural road safety awareness programme proposals are formulated for funding under PMGSY.
  - There is implementation and coordination of rural road safety awareness programmes in the field.

PMGSY Operational Guidelines provide that in order to enhance road safety, coordination has to be ensured at all levels with the Road Safety Mission of the MORTH. At the state level, SQCs and DPIUs need to ensure coordination with the State Government’s Road Safety Programme, in particular through membership of the State Road Safety Council and District Road Safety Committees, created as per provisions of Section 215 of the Motor Vehicles Act, 1988 (Act No. 59 of 1988). For this purpose, the SQC needs to be nominated to the State Road Safety Council. The State Government should also nominate the DRRSO to the District Road Safety Committee. The State Government should also nominate the Panchayati Raj Institutions designated to take over maintenance to the District Road Safety Committee. As part of the rural road development and maintenance programmes, the State Government shall ensure road safety audit of construction and maintenance works along with quality monitoring.

13.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of both maintenance and road safety:

(i) The Central Road Fund does not currently fund the maintenance of the constructed roads. In 2005, for the first time, the 12th Finance Commission award, which apportions tax revenues between the Central Government and State Government, made additional provisions for maintenance of capital assets including road and bridges. The 13th and 14th Finance Commissions have further improved on the provisions and have provided incentives.
(ii) The 14th Finance Commission has increased the grant to Gram Panchayats for maintenance of community assets including roads. However, systems and policies have still to be developed in most states to take best advantage of these provisions. This is crucial as the Finance Commission has not provided corresponding finances at the Intermediate and District Panchayat levels. This may result in Through Routes passing through several Panchayats getting neglected for purposes of maintenance. It may also prevent the development of capacity at the Intermediate and District Panchayat levels for planning and supervision.

(iii) Many states have yet to take ownership for maintenance. There is undue reliance on the 5 year “defect-free” warranty, without a realisation that even defect-free roads need routine maintenance. This warranty may be adding to the cost of construction without improving the serviceability that maintenance expenditure would have ensured, and the fact that PMGSY was 100% centrally funded may have been a perverse incentive. Now that PMGSY (both the balance of PMGSY and the newly commenced PMGSY-II) is on a cost sharing mode, and MMGSY and other local network roads may be substantially funded by the states, there is an urgent need to review this approach, along with devising a process by which post construction routine maintenance can be better ensured.

(iv) An encouraging sign is that several states including Assam, Bihar, Chhattisgarh, Himachal Pradesh, Madhya Pradesh and Rajasthan have formulated a “Maintenance Policy” for rural roads. However other states need to follow suit.

(v) There is a neglect of the paid post-construction maintenance activity, with the contractor simply not raising the six monthly bills for maintenance in several states, and the PIU and the SRRDA neither supervising the maintenance nor querying the contractor. In Madhya Pradesh, the SRRDA has started generating an exception report for monitoring the raising of the bill, with encouraging results.

(vi) The second round of Batch or Zonal maintenance is in operation in very few states, and local contractor development to take care of such works has not been systematically attempted. The bigger contractors who execute construction works are not happy doing routine maintenance, but the system does not allow subcontracting maintenance out to local contractors.

(vii) Local community institutions are not made a stakeholder in ensuring maintenance or for road safety. In particular, State Governments have yet to develop capacity of Panchayati Raj Institutions for the purpose.

(viii) Under the ADB Rural Roads project, a Road Safety Audit Guide was developed for the states of Madhya Pradesh and Chhattisgarh in 2007. However, perhaps as mandated under the project, it focuses primarily on the design and engineering aspects, and not on the actual traffic or on the community interface with the road and the traffic.

(ix) Road safety concerns for rural roads are a low priority with State Governments; neither the SQC nor the District Rural Road Safety Officer of the PIU is actively involved in road safety activities.

13.3 Recommendations for enhancement

Accordingly, the following specific recommendations are made with regard to both maintenance and to road safety to enhance the effectiveness of PMGSY in achieving its objectives. In fact, the two issues
are closely related and in respect of the user or the citizen, poor maintenance is often the main road safety hazard:

(i) Under the Constitutional provision, all roads other than National Highways are treated on the same footing. Since the CRF Act provides for the use of the Fund for construction and maintenance of other state roads, there is clearly no constitutional bar for the cess to be used for maintaining rural roads, and if the CRF Act does not currently provide for it, the provision can be changed. States have been levying cess on Diesel for various purposes, and to the extent that the Central Government may have levied a cess for construction of roads through the CRF Act, it may have reduced the headroom to states to levy a cess for the purpose of maintenance. A planned apportionment between construction and maintenance is clearly desirable. For all these reasons there is a strong case to amend the CRF Act in order to enable the cess to be applied for maintenance of not only National Highways and State Roads of economic importance, but all roads including rural roads, particularly through routes for which Gram Panchayat funding may be less likely since they are mostly inter-Panchayat roads. It can even be argued that such rural roads too are roads of economic importance and are deprived of maintenance funding from CRF only because in the context of rural roads, the CRF Act states that the Fund can be used for “development” while in other contexts it states that it can be used for “development and maintenance”.

(ii) States should be encouraged to come out with a comprehensive “Maintenance Policy” for rural roads, and should incorporate “asset management” principles into these policies. NRRDA should take the lead in getting an Asset Management system developed and incorporated in OMMAS, so as to enable states to rationally lay out maintenance funds under budget constraints.

(iii) Defect liability should be for only one year from date of completion, which is more the general norm than the current five-year period. The routine maintenance period would also start at the same time, i.e. immediately after completion, but will not cover items in the nature of construction defects requiring to be remedied.

(iv) Construction contracts should include a provision that enables planned subcontracting of post-construction maintenance to registered local contractors (including micro-enterprises developed in the manner given below). Such contractors should be associated (through a retainership contract) through the construction period since they have a stake in ensuring good quality construction. The State Maintenance Policy must provide for the creation and growth of a strong local contracting system so as to ensure continued maintenance.

(v) Government Funds for maintenance should be placed at Circle level on a normative basis, and distributed PIU wise by the SE based on the road condition survey/Asset management system, with Through Routes getting priority (after meeting requirements of the post-construction five-year maintenance). The distribution can be linked to the extent to which Gram Panchayats provide funds for maintenance, as an incentive.

(vi) In addition to the initial five-year maintenance, the second round of batch-based five-year maintenance may be provided for data entry in OMMAS, since some states like Madhya Pradesh have introduced this practice. Whereas the first round of maintenance will be for the PMGSY roads included in the construction package, at the time of the second round, the package should include non-PMGSY roads also, and the idea should be to make packages for compact and contiguous areas. As has been recommended, OMMAS should be available for making entries with regard to all rural roads in the DRRP. The facility should be available not only for construction but also maintenance.
(vii) SQMs are reportedly being sent in some states specifically to check the 5-year post-construction paid maintenance work of the contractor. In states such as Madhya Pradesh, the second round of 5-year batch maintenance is also similarly managed for QM. An Inspection report specific to this work needs to be used, and all states need to adopt a uniform practice that may be circulated by NRRDA and included as a separate OMMAS Module. Provision may be made for uploading photographs during maintenance inspection.

(viii) Vehicle mounted road condition recording instruments may be funded by NRRDA liberally and allowed to be used for Road Condition Survey on the entire DRRP, with facility on OMMAS for the recording of the result and for comparison of changes between successive survey cycles. The idea should be that all the rural roads should be covered in a two-year cycle, and the requirement of vehicles should be based on this goal.

(ix) Maintenance Stations with facilities like storage and processing of materials to be used for maintenance tasks, workshop facilities for repair of maintenance equipment/plant, training facilities/audio visual aids etc. should be established at suitable locations e.g. block-level headquarters. Contractors with large inventories of roads to be maintained may be incentivized to acquire mobile units equipped with suitable maintenance equipment.

(x) A comprehensive approach to Road safety audit needs to be developed. The Road Safety Audit Guide already developed may be used as a starting point and applied uniformly in all states. Simultaneously the issue of road safety may be analysed from the operational perspective and a more comprehensive guide may be developed. The Odisha model of a dedicated Chief Engineer for the purpose may usefully be studied. Some of these issues will need to be addressed through the mechanism of the Road Development Board (ANNEXURE - I).

(xi) NRRDA may work out a system for test check of the Road condition surveys and for Road Safety Audits, and build capacity in the SRRDAs accordingly.

(xii) NRRDA may as an additional facility extend the use of the “Meri Sadak” mobile app “which enables a member of the public or a Panchayat representative to upload photographs of pothole, rain cuts, etc. with geo-tagging and time stamping, so that it can be used by the contractor for maintenance purposes, and by the PIU for monitoring or remediation, so that the contractor can also upload photographs and text after remediation”.

(xiii) There is a need for a comprehensive and well planned long term strategy to ensure sustainable routine maintenance of the rural roads network. Clearly, given the vastness of the area and the large lengths involved, routine maintenance capacity has to be developed on a mass scale, locally. The 14th Finance Commission recognizes this by making substantial allocations for maintenance of community assets including roads. However, PRIs as the local governance mechanism cannot be the maintenance agency; they can be the client and can supervise, but they cannot execute. Self Help Groups (SHGs) are sometimes seen as an option, but they may not really be able to provide the necessary service in a focused way; the scalability of this mechanism to cover the entire network is also an issue. Since rural roads are owned by various Departments, it would be best if the routine maintenance capacity is available as a paid service to all Departments, as well as the construction contractors (so that they can subcontract the post-construction paid maintenance for instance). This could take the form of training and skilling local educated youth to provide these services in small groups or micro-enterprises on an “approved rate” basis, with competition to ensure acceptable quality of service (similar to the practice among Utility agencies to train and empanel contractors for utility shifting on an
“approved rate” basis). A growth path may also be charted out, so as to provide for growth of the micro-enterprises from Gram Panchayat level to Mandal/Block and even District level road maintenance management, and their formalization as a society or similar organization. Such enterprises may be facilitated in getting registered as subcontractors for maintenance purposes. ILO may be associated with the process of preparing the Strategy paper on development of local routine maintenance capacity, and the organizational structures, in view of their expertise in community based maintenance practices.

(xiv) 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), and is funded on a 60:40 basis between MoRD and the state (90:10 for NE states). The skillling programmes are implemented in PPP mode by Project Implementing Agencies (PIAs) who engage with the State Government under the DDU GKY framework of MoRD. The programme gives a special emphasis to skilling of women by insisting on 30% participation. It also requires participation of excluded or socially vulnerable groups. Training poor rural youth in Routine Road Maintenance (RRM) activity is currently not included as a skill mainly because the demand has not been conceptualized and projected. Including this activity as a skill under DDU GKY and developing the training modules and partnerships with willing 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 acting as the platforms for launching the service. 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 major issue to be resolved is the model to be put in place for anchoring the groups of skilled persons and the ownership and management associated with this. The Gram Panchayat may not have the capacity, and Intermediate Panchayat may be too remote. A matrix arrangement of local institutions to take ownership and a stable institution to ensure sustainable management may be necessary at the initial stage, till capacity at lower levels develops. The micro-enterprise model, properly developed, with access to credit (perhaps under the RSETI scheme of the MoRD’s livelihoods programme Aajeevika), and policy support to ensure viability appear to hold the best promise in the Pan-Indian context.

Some details of the DDU GKY with specific reference to its potential for skilling in rural road maintenance are given in APPENDIX III (Refer Volume-II). Needless to say, the scheme can also be used for skilled trades relevant to rural road construction, provided volumes are adequate to make it worthwhile for the project implementing agency.

(xv) NRRDA and SRRDA should commission a Maintenance Manual for each state based on the state maintenance policy, incorporating the above mentioned issues in a suitable manner in accordance with the State Maintenance Policy, so as to enable the availability of an operational maintenance document.
(xvi) Annual maintenance contract may be implemented on pilot basis in selected districts as part of a skill enhancement strategy.
Section: 14
Training and capacity building

14.1 The Framework:

The architecture of PMGSY has been oriented towards the leveraging of knowledge to improve the quality of the road construction in particular and ensuring the poverty reduction outcome in general. As such the PMGSY Operations Manual makes a number of enabling provisions including:

(i) Regular training of PIU personnel in Technical, Accounting, Contract Management and Quality aspects of the programme to be arranged by the SRRDA in coordination with the STAs and NRRDA.

(ii) Assessment by the SQC of training requirements at PIU level and arrangement for training programmes in coordination with STAs. As part of the Quality Management process, the SQC shall also look after the training needs of the PMGSY staff and contractors’ personnel, drawing up an annual programme of training at various institutions such as the IAHE, CRRI, State Training Institutes, Engineering Institutes, etc.

(iii) STAs are required to conduct training of PIUs and other stakeholders at the request of SRRDAs/SQCs, as per standard funding arrangements worked out by NRRDA. In fact, for being identified as an STA, the institution should have the infrastructure/facility necessary for organizing training programmes.

(iv) PTAs as premier technical institutions having in-depth knowledge of the technology of road design and construction are envisaged to provide additional R&D and higher level training inputs, and this is the main reason for their being selected as PTAs. They are expected to design and manage Regional Training Programmes for the engineers of PIUs and for contractors’ senior technical personnel by developing course material for different training modules and acting as resource persons/institutions. PTAs would utilize STA inputs for determining R&D activities, training requirements etc.

(v) The training modules designed by Principal Technical Agencies (PTAs) are to be operationalized by STAs who will draw resource personnel from their own as well as other suitable technical institutions. The STAs will conduct training, evaluate feedback and suggest future training needs. The training may include both routine and refresher programmes as well as specific technical programmes of local or special relevance. The STAs may also prepare audio-visual training material for dissemination and use under the overall specifications and guidance of Principal Technical Agencies.

(vi) The NRRDA has the nodal responsibility and is expected to review in detail, the training activities and plans in the Regional Review meetings held periodically with SRRDAs.

14.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organised for the purpose brings out the following principal issues, addressing which can significantly enhance the effectiveness of human resources among the stakeholders:
(i) The training needs of the stakeholders far exceed the available capacity in the current framework. In case the entire rural road network is to be considered as a unit, the gap is even greater.

(ii) The mechanism of PTAs and STAs is not being used to the optimum extent for training and capacity building. STAs are perceived by PIUs mainly as the agency for scrutiny of DPRs.

(iii) The SQC in many states is part time. In many others s/he is not the best person to take on the high levels of responsibility cast on the SQC under the scheme. As such the SQC is not adequately coordinating training activities, and the SRRDAs are not able to plan for the training needs of their PIUs.

(iv) At the national level NRRDA is similarly handicapped by inadequate staffing particularly at senior and middle levels. As a result, in the absence of a nodal institution generating momentum, training and capacity building activities are peripheral, and this is having an adverse impact on the quality of the programme.

14.3 Recommendations for enhancement:

As is clear, poor capacity development of the large and diverse stakeholder groups is seriously impacting PMGSY despite a relatively higher standard envisaged under the programme. The result may be unnecessarily high construction cost and poorer quality of the asset. It may even impact the quality of the outcome in terms of the poverty reduction effect, not only because road asset quality and serviceability is less than expected, but because engagement with local communities may also be sub-optimal. Investing in training infrastructure and services is highly cost effective, more so in a high-quality programme like PMGSY. The following recommendations are based on these perceptions, and an elaborate framework conceived, and the level of detail is reflective of the importance that needs to be attached to this area of PMGSY.

With this background and context, the following specific recommendations are made:

(i) Training has to be for all:

► MoRD and NRRDA are evolving into a role which covers the entire rural roads sector, because the network is indivisible. The natural unit of “rural roads” should be the basis for policy, standards, and national level management, so that there can be better synergy at the state level. This is particularly important from the “poverty reduction” focus and the management of urbanization which is a concern in the future. In a sense, the training should capacitate all stakeholders including non-engineering personnel of PRIs and non-officials from PRIs and NGO to better integrate poverty reduction outcomes into road development and road management strategies.

► There needs to be an institutional structure with a permanent presence at the national, state, district and sub-district levels, with the ability to access expert resources in the diverse fields that will be required for the various elements of the stakeholder universe.

(ii) Training has to be for all institutions in the sector:

► PMGSY-related institutions such as SRRDAs and PIUs

► Non-PMGSY rural works/public works institutions

► NABARD’s RIDF roads
State initiatives such as MMGSY

(iii) The primary stakeholders are the most important, but the group is larger than thought: While imparting training to NRRDA, State Nodal Departments, State Planning and Financing Departments, User Departments such as agriculture (and related sectors), transport, mining, urban development, rural infrastructure and poverty reduction related departments, and executing agencies like SRRDA are obviously important, the cutting edge is at the PIU, consultant and contractor personnel levels and their training needs should be as given below.

► PIUs: In many states, the PIUs consist of an increasing proportion of newly recruited personnel, or personnel from departments with little experience in road construction. 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:

► Structured Induction training
► Refresher training
► Periodical workshops at state level, and even at NRRDA level during Regional Reviews in a state.
► Close interaction with STAs during design phase.
► Mentoring interaction with SQMs and NQMs during execution.
► 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).

Induction and refresher training process must be made more inclusive, and decentralized to district or circle level in order to ensure participation. SRRDA must use the SIRD network of District Training Centres for the purpose, 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.

► Project Consultants:
Induction/orientation training of consultants must be built into the Hiring Contract. In addition, services of institutions like CRRI, IIAHE, and ARRTI in North-East can be utilised. STAs would be the best institution for training of design consultants. 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.

► Contractor personnel:
Due to excessive contracting and 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 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. Training of contractor and sub-contractor personnel is essential to address the problems mentioned above. In order to orient the contractors towards this initiative, Quality Control workshops should be organized for the contractors, so that they are aware of the quality requirements of the programme and the need to invest in training their personnel.

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, equipment operators, laboratory personnel as well as the engineers and supervisors. 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. 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. Such teams need to be developed by the SRRDA using the SIRD or STA and will have enormous value not only for knowledge development of contractor personnel but also for providing Induction Training for PIUs and consultants on the one hand, and local Panchayati Raj institutions and local communities on the other.

States who want to develop their contracting industry may also be encouraged and facilitated in using the DDU GKY scheme to develop a pool of skilled workers relevant to the industry (see Appendix III, Volume-II).

► Panchayati Raj institutions: The roles of the 3 levels of the Panchayati Raj System will generally evolve in the following directions:

► 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.
► Intermediate (Block) Panchayat: Local network-level planning, batch routine maintenance contracting, service standard complaint management, network-level road safety.
► 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.

(iv) Training of Trainers is necessary to ensure quality of training intervention:

► 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. In some cases, even the faculty of these colleges would require orientation seminars or workshops. 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.

► **SQMs and NQMs** PMGSY standards are not generally prevalent in the remaining rural roads sector 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.

► **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.

NIRD and NRRDA would need to maintain databases of “Master Trainers” in various knowledge domains in order to sustain the “Training of Trainers” initiative.

(v) **The main training areas cover the entire gamut of PMGSY, i.e.:**

► Soil and material surveys, geotechnical investigations, topographic surveys and preparation of DPRs
► Design, construction and maintenance of pavements, culverts, bridges, causeways, protective works
► Project management, contract management and supervision
► Quality Management (QM) and Quality Assurance (QA)
► New and cost-effective technologies and practices
► Maintenance and road safety
► Community based planning and management
► Planning for development

(vi) **Training needs similarly cover the entire gamut:**

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

► **Engineering Related** to survey, designing and quality, estimating, maintenance, etc.
► **Transportation:** Related to network planning, transportation related services, maintenance, etc.
► **Management:** Related to contracts, projects, programme, etc.
► **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.
► **Institution building:** In relation to NRRDA, SRRDA, PIUs, PRIs, etc

(vii) **Institutional architecture:**
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:

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

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. The same applies to SRRDAs at the state level.

For obvious reasons, specialized transportation/civil engineering training institutions will also not be able to develop a deep “reach” to district and sub-district levels on a pan-India basis.

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.

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. 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:

i. District and local area planning
ii. Livelihood and poverty reduction programmes
iii. Socio-economic studies
iv. Natural resource management
v. Environmental issues
vi. 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.

(viii) 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:

- Developing technical training resource reservoirs and training institutions
- Capacitating the physical infrastructure in NIRD/SIRDs (and DTCs thereunder)
- Further improving lab facilities in PIUs/STAs
Utilizing services of ITIs, RITIs and Polytechnics

Utilizing services of IAHE, CRRI and PTAs in technical training

Developing mentoring mechanisms in the form of SQMs and NQMs

Creating Peripatetic Training mechanisms to provide on-site learning

Organizing state/national level workshops/colloquiums

Coordinating online knowledge dissemination

(ix) **Developing a Centre of Excellence in NIRD for rural connectivity/infrastructure:** 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 engineering professionals as Full time Programme Coordinators. NIRD may also take on board a local Technical Adviser such as NIT Warangal.

(x) **Making Training a prerequisite:**

- Contract conditions with the contractor must provide for mandatory training at commencement of contract, prior to mobilization.
- Peripatetic Training (PT) at site must be a condition at crucial stages of execution.
- Similarly contract conditions with design consultants and PICs must specify mandatory training at commencement and PT at site at crucial.
- Staff at JE level in PICs must undergo induction training before they can be authorized to make entries in MBs.
- Staff deputed from other Departments and not familiar with PMGSY must also undergo induction training.
- Staff on promotion (JE to AE and AE to EE) must undergo orientation training commensurate with their higher responsibilities.
- STAs, NQMs and SQMs on appointment must undergo induction event.
- Staff of NIRD/SIRD inducted into the training framework must undergo induction event.
- Staff of SRRDA and NRRDA and RC Division of MoRD must undergo induction event.
- Training for career development must be made mandatory.

(xi) **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 training be designed on a modular “mix and match” basis, to ensure that all those who need training get it.

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.
(xii) **Arrangements in MoRD/NRRDA/SRRDA:**

- 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 training by CRRI, IAHE or foreign visits etc. which will be handled by NRRDA separately). NRRDA and SRRDA will need to designate a part time “Training Coordinator” and create a “training cell” to liaise respectively, with NIRD and SIRD.

- To ensure adequate focus, both NRRDA and SRRDA will need to create Training Coordination Committees (TCC), chaired by the DG/CEO, with representation from NIRD/SIRD, PTAs and STAs and others with a stake in the outcome. A Training Cell under a full time National/State Training Coordinator (of the rank of at least SE) should be created in NRRDA and SRRDAs to institutionalize the system.

- 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, Vic Roads, IFHREL, TRL, SANRAL etc.

- 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.

- 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.

(xiii) **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:

- MoU with a Technical Partner (PTA/STA)

- Engaging a full time training in-charge, preferably a transportation specialist/economist or civil engineer with expertise.

- Creating a committee under the DG/Director to approve the Training Calendar and monitor progress.

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

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

- CRRI and IAHE, as national institutions, would enter into separate MoUs with NRRDA, based on agreement on the workshops/seminars/colloquiums and training to be conducted, and the training material prepared by them. They would also provide leadership in helping disseminate new technologies or practices, including use of alternate materials and instruments/equipment. They can be given financial support by NRRDA on a projectized basis.

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In the case of STAs and PTAs, events organized by them would obviously need to be
projectized 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
projectized 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.

A Detailed Training Strategy Framework based on the above is at APPENDIX IV (Refer Volume-II).

(xv) Training Needs Assessment: NRRDA should engage a consultant who, in coordination with
NIRD, can conduct a Training Needs Assessment (TNA) in each of the states. The TNA
would not only estimate the volumes and the categories, but also the knowledge gaps, and
infrastructure gap that would need to be addressed.

(xvi) Young Professionals

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 that call for close academic and professional
study and analysis, at the local, state and national levels. The results of such study would
clearly provide 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.

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 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. The basic features of the scheme would be as
follows. 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/SDG/MDG related studies
► Energy and resource use efficiency
► Environmental and social impact assessments
► Systems design and organizational management
► Quality management
Any other discipline decided by NRRDA 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 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. Details of the Scheme are at APPENDIX V (Refer Volume-II).
Section: 15
Special provisions for North Eastern States and LWE Areas

15.1 The Framework

The implementation of PMGSY over the last 15 years has brought about a sea change in the way the sector is organized. Many of the benefits enumerated are however very variable and some states have shown much better impacts than others. There are also serious structural deficiencies in the sector in different parts of the country. North eastern states and LWE affected states in general are yet to reach the levels of the more advanced states. The PMGSY guidelines make the following specific provisions for North Eastern states, hill areas and tribal areas (including LWE areas):

(i) Providing all-weather road access to all villages/habitations of population greater than 250 in case of hill states (North-Eastern states, Sikkim, Himachal Pradesh, Jammu & Kashmir and Uttaranchal), the desert areas and tribal areas by the end of the Tenth Five Year Plan, i.e., 2007. This is recognition of the low population densities in these areas.

(ii) In the case of hill states including the Northeast, there is a provision for Stage-I (formation cutting, protection, and drainage) and Stage-II (WBM, blacktopping and completion), with a period of up to 2 years being allowed to intervene between the stages to allow the formation to stabilize. The target habitation is “connected” only on completion of Stage-II.

(iii) Generally, the technical, contracting and quality requirements in these areas are the same as in other areas, subject to local conditions.

15.2 The Assessment

The assessment, based on the responses to questionnaires and discussions in the various workshops organized for the purpose brings out the following principal issues, addressing of which can significantly enhance the effectiveness of the programme in the difficult circumstances obtaining in the North Eastern states and LWE areas. While in many areas, including North Eastern states, improving governance systems is the main approach to upgrade the quality of the programme, in the case of LWE areas, the absence of a road or other forms of communication is part of the problem, since it actually impedes the process of improving local governance, and accordingly calls for a special approach in such cases. As Table 2 of the Statistical Appendix shows, contracting capacity is the major constraint impeding speedy execution of PMGSY in the North Eastern states, LWE areas and in the hill states. However, in all these areas, the following issues are of concern:

(i) Poor contractor development, exacerbated by a preference for local contractors and invisible barriers to free movement of outside contractors. In some cases, the local climate and terrain, difficult working conditions and low volume of work also do not attract outside contractors.

(ii) Relatively lower levels of knowledge among the technical staff and contractor personnel, particularly in LWE areas. This impacts the quality of the DPR as well as the quality of the work itself.

(iii) Lack of sufficient support for capacity development, including low presence of STAs, lower visibility of NQMs and SQMs, etc.
(iv) Remoteness and difficult working conditions which make outsourcing of design and supervision work to good consultant firms also more difficult.

(v) In the case of LWE areas (but also some North eastern areas), the poor law and order situation and the limitations of the local governance institutions.

(vi) “Quality” as well as “Time” is the essence of PMGSY contracts. However, bid evaluation procedures in many states (particularly the NE states and LWE areas, but also some states with very large connectivity deficits), where contractor development is poor, and there may not be adequate competition, the capacity actually available with the contractor to execute the work is not adequately evaluated, solely to expedite award of work. This can lead to delays in starting and completing the works, and creates potential for disputes.

15.3 Recommendations for enhancement:

LWE areas:

Accordingly, the following specific recommendations are made with regard to LWE areas, to enhance the effectiveness of PMGSY in achieving its objectives:

(i) For purposes of PMGSY, LWE areas should be determined at block or police station level rather than district level, so as to preclude undue benefit (at the cost of the affected area) to relatively unaffected areas of the district.

(ii) The district administration should be kept informed of the award of works for security reasons, and to provide assistance to contractors when required. The district administration should closely monitor progress of works.

(iii) In inaccessible LWE areas, DPR preparation process needs to be simplified keeping in view the difficult working conditions and lack of sufficient qualified personnel, including DPR consultants.

In highly critical LWE areas, 3 Stage construction may be explored (Stage A to cover CD works, Stage B to cover earth work and metal work, Stage C to cover bituminous works).

(iv) In case, cost of CD works in a bid is below Rs. 50 lakh, the corresponding minimum annual turnover requirement for contractor eligibility may be accordingly reduced for construction being awarded for only Stage A.

(v) The State Government may explore feasibility of arranging for bulk procurement of bitumen, cement and steel from the manufacturers through a Central PSU, to minimize the risk to contractors of substantial price escalation.

(vi) Gravel /Moorum road (unsealed or with a thin bituminous seal) may be made the preferred option since it may be more feasible, and the local contractor may be able to execute the contract easily. Training of stakeholders in design, construction and maintenance of such roads may be given a thrust.

(vii) The SRRDA may assess insurance premium for manpower against death/incapacitation/injury and include the same in the cost estimates, which could be borne by the Centre and states on a sharing basis.
(viii) Maximum limit of Liquidated Damages (LD) be significantly reduced in LWE areas.

(ix) The "District Mineral Foundation", to be established in many of the mineral rich districts under the MMDR Act as amended in 2015 should earmark funds for LWE areas in the district so that the fund can then be used for maintenance of roads, skill development for road construction etc. It may also be used to pay for additional costs such as construction of CC pavements instead of bituminous pavements, in case the District level committee for the purpose (comprising the District Magistrate, Superintendent of Police, District Forest officer, District Panchayat Chairman and other District or Block level departmental heads), so recommends.

(x) In areas affected by LWE, contracting and execution of works is a major problem, and smaller and local contractors may need to be engaged. The programme may provide for a flexible architecture in such areas including alternative designs; liberal use of project implementation consultants on QCBS basis to supplement PIUs and ensure closer supervision; stage construction; and incentives to contractors. The architecture may be worked out between the State Government and the Ministry for the identified areas on a state by state basis.

(xi) In LWE areas, and other locations where sufficient competition is not available, a strategy for developing a cadre of local contractors needs to be worked out jointly by NRRDA and the SRRDA, based on analysis of bidding patterns.

(xii) The hill and NE states (and LWE areas) may be allowed to prepare a supplementary DPR to the 2nd stage DPR in case there are substantial changes (due to landslips, subsidence or other unanticipated causes), and bring it before the Empowered Committee along with the annual proposals. However, such supplementary DPRs will be brought before the Committee within 3 years of completion of the 1st phase, after which the state should be made to bear 10% of the supplementary cost per annum (or part thereof) of delay beyond the three-year period.

**NE States**

(i) NRRDA may create an online platform for contractors registered under PMGSY to enable equipment owners to put out availability of surplus equipment capacity along with time period as well as enable contractors to notify their requirement for equipment, enabling direct contact between the two for hiring out of spare or idle equipment. This will be particularly useful in remote areas including the North East.

(ii) Training of PIU and contractor personnel has to be given high priority. The NIRD Guwahati and the ARRTI, Guwahati both offer institutional support for training which must be exploited to the maximum.

(iii) In inaccessible areas such as in Arunachal Pradesh, the DRRP itself is not complete and the Core Network is accordingly quite inaccurate. A special drive should be undertaken with NRRDA support to complete this work using accessible remote sensing imagery.
Annexure - I

Government of............

Resolution

Subject: Constitution of the ... State Road Development Board

PREAMBLE

1.1 Rural road connectivity is a key component of rural development. It promotes access to economic and social services and generates increased agricultural incomes, productive employment opportunities and ensures sustainable poverty reduction. Most of all, it promotes inclusivity as a social and an economic concept. In this context, 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 being implemented by states through an institutional framework laid down in the PMGSY Guidelines. Each state has identified the Nodal Department for the purpose and has created the State Rural Roads Development Agency or a similar agency for the planning and executional management of the programme.

1.2 The Central Government, which funds the PMGSY programme through 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.

1.3 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. In this process, states have dedicated significant technical and engineering and management resources for the programme, both in-house and outsourced through consultant firms for designing and project supervision. Many stakeholders have developed around the various aspects of the programme, including industry and the service sector and local governance and community and civil society organizations interested in the poverty reduction outcome.

1.4 An emerging facet is that while PMGSY was aimed at providing the “last mile” connectivity to unconnected habitations of a particular size as a poverty reduction initiative, the logic applies to existing roads (which too have a poverty reduction impact) and also to even smaller habitations (which need road access for poverty reduction). As a result of PMGSY (now called PMGSY-I because of a follow on programme PMGSY-II), 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. Another feature is that the quality and construction standards of PMGSY are increasingly being adopted for the entire rural roads network so as to improve the sustainability of the service.

1.5 All these trends put together have long term implications for incomes and new livelihood opportunities not merely for the farm and off-farm sector but also for a range of people who directly or indirectly depend on the rural road network, and constitute new classes of stakeholders in the network, including industry, services sector, those who access local labour markets, primary producers including mining and quarrying; as well as manufacturers of consumer durables and consumer products.

1.6 For the proper management of what is now emerging as a huge asset class, clearly NRRDA at the central level and SRRDAs at the state level should become permanent bodies for laying down technical and management standards and ensuring that the rural roads network enables the physical
and socio-economic integration of the hinterland with the rest of the country. At the same time, the programme needs to integrate better with governance and planning systems for:

i. District and local area planning
ii. Livelihood and poverty reduction programmes
iii. Socio-economic services such as schools, health, etc.
iv. Public transportation services
v. Agriculture and industry related transportation
vi. Administrative services etc.

This involves a planned and structured coordination mechanism, and the SRRDA at the state level, as a programme management agency cannot perform such functions, which requires representation from a broad range of stakeholders for a variety of purposes.

1.7 Some of the specific cross cutting concerns that need to be addressed include:

(i) **Rural roads safety**: Since rural roads are generally low traffic volume roads and accident rates are perceived as being quite low, safety issues addressed so far relate mainly to design and construction features. At the central level, the Road Safety Mission of the Ministry of Road Transport & Highways and at the state level, the State Road Safety Council and District Road Safety Committees respectively created as per provision of Section 215 of the Motor Vehicles Act, 1988 are the formal mechanisms. PMGSY required the designation of the State Quality Coordinator at state level and the Head of the DPIU at district level as the road safety coordinators and sought their membership in the state and district level institutions. However, as the rural roads network develops and traffic grows, a much larger number of stakeholders will need to be involved.

Road safety is a multi-disciplinary activity. This involves joint and complementary inputs by the road agencies, transport, police, health, insurance, educational institutes, mass media, NGOs, etc. While the engineering aspects of road safety are relatively easy to address (at a cost), the issues arising out of individual and social behaviour are the most difficult to address.

It is also necessary to sensitize the communities and users of rural roads to road safety concerns and the role they can play in reducing the accident burden. The ABC of road safety is Attitude, Behaviour and Culture of our drivers and other users on the road. Safety consciousness has to be cherished as a social value and inculcated from childhood using all means available. Suitable educational materials should be developed and aimed at risk groups identified by specialists. School children, school bus drivers, two wheeler riders, agricultural tractor drivers are some of the groups needing special attention. School children may be made aware of simple precautions to be taken while moving on or crossing the roads. Help of NGOs may be sought for awareness campaigns for road safety. They are already doing very useful work on main roads but attention is required on rural roads also.

(ii) **Policing, accident prevention and casualty management**: Given the wide distribution of rural roads, preventive aspects of road safety must be used to the maximum possible extent, and in addition to engineering and educative measures, systematic road safety audits, based on inspection as well as accident data analysis must be used for creating a cost-effective road safety environment. This would mean close involvement of local Panchayati officials to identify the expected points of conflict. It also requires that all accidents involving serious injuries and loss of life need to be recorded, cause of accident analyzed and the safety audit report updated on the basis of such analysis.
Policing of rural roads is virtually non-existent now. With the rapid expansion of the rural road network and general prosperity that will take place in the rural areas in the coming years, enforcement of Motor Vehicle Rules should receive explicit attention. Panchayati Institutions can play an effective role in supplementing the police efforts in increasing awareness for observance of traffic rules, and in reporting accidents.

Simple but effective casualty management systems such as accident information signs should indicate about the location of the nearest trauma centres or hospitals so that help can become available at the time of emergencies.

(iii) **Maintenance**: The current situation on maintenance of rural roads is broadly as under:

(a) There is a multiplicity of agencies handling the work of rural roads but without nodal responsibility for many important aspects. A few states have taken the initiative recently in setting up dedicated funds for roads. Some other states have set up road funds for both development and maintenance. As a result, budget allotments for maintenance are now showing an upward trend. But there is still a wide gap between availability of funds and those required for proper maintenance.

(b) There is virtual absence of an institutionalized system of inventory and condition survey and planning and management system for rural roads, which can identify and prioritize maintenance interventions for the core network. Development of a simple Asset Management Systems (AMS) can at the very least, use existing resources more efficiently.

(c) The PRIs are not raising any funds for maintenance. Although they are expected to be ultimately made responsible for maintenance, they are not being provided with funds for maintenance by the state. Moreover, they do not have adequate technical support to undertake such activities; and

(d) About 80 percent of rural roads are in poor condition due to a combination of several factors, lack of funds and poor quality of construction. The culture of quality construction of rural roads is now improving with the PMGSY setting up three tier quality control systems.

In the context of a reliable all-weather farm to market connectivity, proper maintenance is essential if risks of long term investments, on-farm as well as off-farm, are to be taken by the rural entrepreneur. The same consideration applies to investment in the local industry. As traffic grows, vehicle operating costs (VOC) also become important in the local network for public as well as private transportation. Accordingly, the putting in place of institutional measures to plan, fund and ensure systematic maintenance of the rural core network, particularly the Through Routes, has been made a key conditionality to the continuance of the PMGSY programme in the state, and this approach needs to be adopted for the entire rural roads network. As advocated under PMGSY, the State Governments need to take steps to build up capacity in the District Panchayats and endeavour to devolve the funds and functionaries onto these Panchayats and build their capacity to manage maintenance contracts for rural roads.

(iv) **Off-road development**: PMGSY advocates the planned management of growth and development along the rural road as traffic and services develop and new opportunities arise. The rural road therefore needs to be seen as a "planned development" space, particularly
along critical stretches near habitations, junctions, “road-heads”, bus stops etc. Integrated local land use planning and leveraging the connectivity provided by the road to enhance socio-economic opportunities can improve the returns of the investment on the construction and subsequent maintenance manifold. These can include the siting of schools, public transport and goods transport parking or halting places, fair price shops, cooperatives, godowns, bank branches, Panchayat or other administrative and public buildings, allotment/leasing of space for petrol pumps, shops and commercial establishments etc. Such planning needs to be done by the District/Block Panchayat and District administration under a framework/policy of the State Government.

(v) **DRRP, land and land data:** Most of the rural roads and village tracks are in public use for a long time, in many cases since time immemorial. However, they are not always recorded as such in the Revenue Records. There is a need to record possession, and to the extent possible, ownership of all roads of the DRRP in the State Government/local authority after following the due process, based either on legal title or Elementary rights. PMGSY already states that all future acquisition/donation should not only be documented but should be given effect in the revenue record before work commences and this principle needs to be followed for all rural roads. In the case of Through Routes with heavy traffic, the importance of up-to-date and comprehensive data on land ownership of and around the road cannot be overemphasized, because any plan to upgrade the road to MDR status (as is contemplated in PMGSY-II) or to widen or improve the geometrics will place an immediate requirement on the land database. GIS applications are developing around land use, with outputs related to agriculture, soil erosion, general rural development and land use planning, etc. It is important that the road network layer is properly integrated into exogenous GIS applications and per-contra, GIS based planning for road connectivity is adequately integrated with other spatial data sets. Not only must the revenue record properly show the road per se, but a data coordination mechanism at state and district level needs to be put in place to ensure that the network character is adequately reflected, so as to maximize the information for planning purposes.

**Rural Road Financing:** Funds for roads development are provided through the State Government budget, and in the past, funding has tended to be preferentially applied to the higher order roads for construction, renovation and maintenance, particularly for State Highways, because of their economic importance. The extent to which the General Budget should be the source and the extent to which stakeholders, i.e. the road users, should bear the cost has to be balanced in each state based on state level dynamics. Some of the issues in this regard are:

(a) **Independent road fund:** The poverty reduction impact of rural connectivity and the need to reduce regional imbalances in road connectivity have been major factors for the intervention of the Government of India to provide 100 percent grant to states for rural roads under the PMGSY programme. The programme was initiated by the Central Government by levy of an additional excise duty of Re. 1.00 per litre on petrol and Re. 1.00 per litre on high speed diesel through enactment of the Central Fund Act, 2000 and earmarking the proceeds for development of the road sector, with 50% of the diesel cess being used for rural roads. Subsequent funding from the World Bank, Asian Development Bank and NABARD has all leveraged the funding stream created by the cess. Going forward, strategies to fund the different segments of the road network have to be carefully calibrated.

(b) **Access to Long-term Loans:** As part of the strategy of promoting rural investment, the banking sector has earmarked funds for rural credit and the unutilized portion of this credit is available at low interest as a long term loan to State Governments under a facility called
Rural Infrastructure Development Fund (RIDF) maintained by the National Bank for Agriculture and Rural Development (NABARD). As stated above, the World Bank and the ADB also extend loan assistance for the roads sector; including the rural roads sector as part of their poverty alleviation strategy.

c) Market Committee Funds: Some states levy cess on food grains through their market committees and utilize part of the proceeds for construction and maintenance of roads in rural areas, for example, in Punjab, Haryana, Rajasthan, Madhya Pradesh and Uttar Pradesh. In sugarcane belts, cess is levied on sugarcane, and roads are constructed and repaired out of such proceeds. It is also possible to levy market fee or rural development cess on agriculture produce, and a part of the funds can be used for maintenance of rural roads.

(d) Development grants: Funds for roads are also available from other employment oriented schemes such as MGNREGA, Command Area Development Agencies, Local Area Development funds of Members of Parliament and Members of State Legislative Assembly. However, in many cases the nature and quantum of the funds, conditions attached and the implementation mechanism available make them suitable only for non-engineered roads/tracks.

(e) Stamp Duty on Land Transactions: There have been suggestions that since land values close to roads tend to increase sharply, beneficiaries may be expected to share by way of paying stamp duty on sale of land.

(f) Vehicle Fees: In addition to taxes on fuels, additional funds can be generated through special purchase tax on two wheelers, cars and agricultural tractors, since such sales are a consequence to network development. Part of the funds so collected may be allocated for rural roads and provision of road transport services in rural areas.

(vii) Role of Panchayati institutions: Panchayati institutions can be entrusted with functions relating to “roads, culverts, bridges, ferries, waterways and other means of communication” in terms of Entry 13 in the Eleventh Schedule. Under PMGSY it was envisaged that the roles of the 3 levels of the Panchayati Raj System will generally evolve in the following directions:

i. Local Gram Panchayat: Local planning, alignment selection, facilitating land acquisition, supervision of road-level routine maintenance, feedback on road-related services and services on controlled width, ensuring environmental safeguards, local road safety and encroachment prevention.

ii. Intermediate (Block) Panchayat: Local network-level planning, batch-routine maintenance contracting, service standard complaint management, network-level road safety, rehabilitation of Project Affected Persons.

iii. District Panchayat: Planning/contracting for renovation and upgradation, providing support in Network Level Asset Management and Maintenance, provision and coordination of road-related services, road safety systems: preventive and regulatory management, including safety audits and awareness raising.

However, this has not happened despite 15 years into the programme for the reasons that:

a) PMGSY roads do not form a “critical mass” for the purposes of devolution of these functions
b) For effective delivery of rural infrastructure by the PRIs, they need to be provided with adequate technical support and funds

c) The PRIs in most cases have no source of revenues to maintain even local tracks. Clearly developing a policy and a strategy and roadmap for devolving maintenance functions on to PRIs requires a concerted effort at the state level.

2. Need for an overarching co-ordinating mechanism:

Rural transport 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 main highway network up to the local market. Development of rural roads cannot be viewed in isolation from the needs of higher categories of roads and even changes affecting the urban landscape. National highways serve the mobility function as they criss-cross the whole country connecting capitals of the states, major ports, industrial and tourist centres. 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 industrial development. It combines the mobility and access function. The road transport system can function efficiently only if all the three groups of roads are developed harmoniously and integrated into one another. No single class of road can function efficiently if its linkages with the other are deficient.

The Road Development Plan Vision: 2021 prepared by the Indian Roads Congress for the Ministry of Shipping, Road Transport and Highways (2001) has laid down targets for development and expansion of national highways, state highways and major district roads. A few states have accelerated the programme of upgrading the state highways with external assistance from the World Bank and the Asian Development Bank. Though a two-lane pavement is a minimum required for a State Highway, only about one-third of the length has such a width, the remaining being just single lane carriageway. Only a small length, about one percent, has four-lane width or more. The bulk of the state highway network has an inadequate pavement thickness and fair to poor riding quality. This results in inefficiency of transport movement. The condition of the Major District Roads is even worse. These roads are mostly single-lane and are in a state of disrepair. There is an urgent need to address the issue of maintenance and upgradation of this category of roads as part of network efficiency as well as for their own sake.

Each component of the hierarchy of roads in the country has its own administrative and management system. While the National Highways are the responsibility of the central government, all other roads including rural roads are financed and administered by the state governments. The presence, for historical reasons, of several agencies responsible for different segments and hierarchies of roads has often resulted in lack of planning, allocation of resources, setting of priorities and maintenance of assets. With the present emphasis on rural roads for poverty reduction, and the realization that this should encompass the entire road network to achieve the intended farm-to-market connectivity in an economic rather than a physical sense, a scientific and coordinated approach to network planning, construction and asset management is slowly evolving. The importance of involving all stakeholders, including community and local governance institutions is also being better understood. The momentum needs to be reinforced by institutionalized coordinating mechanisms, in the form of a State Road Development Board as hereinafter provided, explicitly recognizing the poverty reduction and infrastructure multiplying role of the road network, and the role of local community and governance institutions.

3. The Road Development Board:
3.1. Having regard to the above, the Government has resolved to create the ….. State Road Development Board with the following composition:

(i) Chief Minister ……………….Chairman
(ii) Minister of Rural Development…..Vice-Chairman
(iii) Minister of Transport…………Vice-Chairman
(iv) Chief Secretary ………………….Member
(v) Secretary PWD………………..Member
(vi) Secretary Finance………………Member
(vii) Secretary Transport……………..Member
(viii) Secretary Revenue……………..Member
(ix) Secretary of important stakeholder
depts. (e.g. Mining; Tourism; Forest)……Member
(x) Engineer-in-Chief, PWD……..Member
(xi) CEO SRRDA…………………..Member
(xii) DG Police/ADG (Traffic) ……..Member
(xiii) Representative of the Ministry of
Road Transport and Highways not
below rank of Joint Secretary……..Member
(xiv) DG NRRDA or his representative
not below rank of Director……..Member
(xv) 3 non official experts with wide
experience in the social, economic
and techno-economic aspects of the
transportation sector……….Member
(xvi) Secretary Rural Development & Member
Secy Panchayati Raj…..

3.2. The terms of reference of the Board shall be as follows:

a) To develop a Vision and Perspective Plan for the entire road sector in the state; to coordinate Departmental Plans for different segments and hierarchies of the Network in accordance with such a Plan and Vision; and to make recommendations on improving the organizational structure and management practices for the better achievement of the Vision and Plan.

b) To ensure optimum allocation of resources for development, improvement, upgradation and maintenance for all categories of roads in the state, within a rational “asset management framework” system and to identify new and innovative sources of funding.

c) To ensure development and enforcement of service standards for different categories of roads, with regard to road quality and maintenance and road safety, accident prevention and casualty management; and to create or strengthen regulatory agencies for the purpose.

d) To plan the development of rural areas based on the best utilization of the road connectivity for urbanization, agriculture and industry and livelihoods promotion, passenger transportation, access to socio-economic services etc.
e) To strengthen the local community and governance institutions to play a proactive role in planning, maintenance, public transportation services, and road safety.

f) To create, manage and operate Dedicated Funds such as Road Development Fund or Road Maintenance Fund or Asset Management Fund for the above purposes.

3.3 Operational matters:

(i) The Board may co-opt additional Members, invite experts and commission studies including evaluation studies.

(ii) The Board shall work in close coordination with the State Road Safety Council and other statutory and regulatory bodies in the sector.

(iii) The Board (and its Committees) shall be serviced by the Department of Rural Development through the SRRDA. The Government will make available the budget for the purpose.

(iv) The Board may decide its own procedures.

(v) The headquarters of the Board shall be located in … The Board shall meet at least once in 6 months.

(vi) The Board shall prepare an Annual report of its activities which shall be placed before the State Legislature within 6 months of the close of each financial year.

(vii) The Board shall maintain a public website and shall place all its information and reports in the website.

4. Committees of the Board:

4.1 There shall be the following permanent Committees of the Board:

(i) Committee on public transportation infrastructure:

► Secretary (Transport)… Chairman
► Secretary Rural Development
► Engineer-in-Chief PWD
► CEO SRRDA
► Commissioner Transport…Member Secy
► 2 experts
► 2 representatives of CSOs

The Committee will look into issues of adequacy of public transport services, and the associated infrastructure including public amenities, particularly for the remoter and far-flung areas. The Committee may also look into issues of road safety in so far as they impinge on the standards of public transportation services.

(ii) Committee on Asset management and maintenance:

► Secretary PWD… Chairman
► Finance Secretary or his representative
► Secretary Rural Development and Panchayats
► CEO SRRDA
► Commissioner Transport
The Committee will oversee the development of asset management principles and the operationalization of asset management systems (AMS) based on these principles. The Committee may also look into issues of adequacy of funds and potential for new and innovative sources of funding AMS.

### 4.2 Operational matters:

(i) The Board may set up Committees for various other purposes from time to time.

(ii) Committees shall meet at least once in 3 months.

(iii) The Committees may submit reports on specific issues from time to time and shall submit an annual report of activities to the Board each year within 3 months of the close of the financial year.

(iv) The proceedings of the Committees in the form of Minutes, and the Reports of the Committees shall be made available on the Board website.

(v) Committees may co-opt experts, make field visits, call for information from Govt. departments and get evaluation or other studies conducted.

**BY ORDER**

Chief Secretary
Govt. of……..
## STATISTICAL APPENDIX

### Table 1

Statement showing Physical & Financial progress under PMGSY (Phase - I to XIV + ADB/WB & PMGSY-II)

<table>
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<th>#</th>
<th>State(s)</th>
<th>Total Value cleared (Central / State Share)</th>
<th>Amount Released (Upto 31.03.2016)</th>
<th>Length of road works cleared</th>
<th>No. of road works completed (up to March’16)</th>
<th>Length of road works completed (up to March’16)</th>
<th>% Length Completed (up to March’16)</th>
<th>Exp. (up to March’16)</th>
<th>Exp. - State Share (up to March’16)</th>
<th>% Exp. to Amount released (up to March’16)</th>
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Table 2(b)
Projected Completion of PMGSY

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<th>Balance works in Hand (Rs crore)</th>
<th>Balance un connected habitations</th>
<th>New Connectivity Length of balance works yet to be sanctioned in Km</th>
<th>Up-gradation Balance Length in Km</th>
<th>PMGSY-II Balance Length in Km</th>
<th>Value of Balance works yet to be sanctioned (Rs crore)</th>
<th>Total value of work load in State (Rs crore)</th>
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**Total:** 49810 36402 31607 85338.9 62475.00 37192.75 98629.97 135031.50 33
Table 3
State-wise position of award of work in respect of clearances issued in the period 2010-2014

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<th>% of Works Awarded within 6 Months of Clearance</th>
<th>No. % of Works Awarded within 9 Months of Clearance</th>
<th>% of Works Awarded in Greater Than 9 Month</th>
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* Provisional

**Table-4**
Comparative Quality grading of PMGSY works by NQMs and SQMs (April 2013- March 2015)

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*Includes Telangana
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<td>Length in km</td>
<td>Value (Rs. in Crores)</td>
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