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The PNPM Rural program was first established in 2007, building upon a predecessor program, the Kecamatan Development Project (KDP), which was established in 1998. PNPM Rural is a core component of PNPM Mandiri, the Government of Indonesia’s (GOI) main program for community-based poverty alleviation efforts. It is based on the principles of community demand-driven development and stresses community empowerment. Presently, PNPM Rural operates throughout Indonesia in approximately 5,000 sub-districts and 63,000 villages. Previous evaluations have shown that villagers express a high level of satisfaction with the works built with funding from KDP and PNPM Rural. The last technical evaluations were conducted in 2005 and 2007.

This Technical Evaluation (TE) was conducted by a team of seven engineers and an architect. The evaluation covered all sub-projects within subject villages funded by PNPM Rural, PNPM Green, PNPM Generasi, BKPG (Bantuan Keuangan Pembangunan Gampong, Fund for Village Welfare Assistance), PNPM’s post-disaster recovery and post-crisis programs, and other associated sources of funding. The TE team visited following
twelve provinces: Aceh, West Sumatra, Lampung, West Java, Central Java, West Kalimantan, West Sulawesi, North Sulawesi, Maluku, North Maluku, East Nusa Tenggara (NTT), and Papua. The TE team was accompanied by social sector, financial management and safeguard specialists, who have prepared separate reports of their own findings. These reports are included in this evaluation as Annexes.

The provinces included in the evaluation were carefully selected to ensure a wide geographic coverage across Indonesia and to include both ‘poor’ and ‘less poor’ provinces. Districts and sub-districts were chosen using a partially randomized process to ensure the inclusion of a wide geographic range within each of the selected provinces. A total of 165 sub-districts were visited, of which approximately 45% can be classified as ‘poor’ and less than 19% classified as ‘less poor’. In the field, the TE team conducted the selection of villages to ensure that remote villages were well represented in the sample.

To conduct its survey, the TE team used a field instrument developed for this task, called the Sub-project Inspection Form (SIF). This one-page form contains the full menu of PNPM sub-project types (roads, buildings, water systems, etc.) with each being rated according to a unique set of criteria (design, drainage, maintenance, environmental safeguards, etc.). The SIF also collected other pertinent information, including information related to budgets, number of beneficiaries, source of funding, and so on.

The Technical Evaluation assessed the following criteria:

• Process of selection and technical verification;
• Design and budget of the sub-project;
• Construction and construction supervision;
• Operations and maintenance;
• Functionality and utilization of the works;
• Quality of facilitation and supervision;
• Quality of bookkeeping and documentation;
• Environmental and social safeguards; and
• Financial management.
This report presents the technical findings, conclusions, and recommendations from all 12 subject provinces. However, the findings from Papua have been presented and discussed separately, because the situations and conditions in Papua are significantly different from the rest of Indonesia.

For the purposes of this evaluation, the TE team evaluated 1,765 sub-projects. Of these sub-projects, road-work sub-projects constituted 42%; buildings sub-projects constituted 20%; and drainage/irrigation sub-projects constituted 12%. The other sub-project types, including MCK (public laundry/toilet facilities); bridges; water supply; jetties and electricity; each constituted from 1% to 10% of the total.

Analysis of the field data indicates that based on an aggregate of all technical aspects evaluated, the construction quality of infrastructure developed through the PNPM Rural program can be classified as ‘High Quality’ in 82% of cases; as ‘Acceptable Quality’ in 14% of cases; and as ‘Failed’ in 4% of cases. Additionally, it was found that 90% of sub-projects inspected were still functioning as intended and are being utilized by beneficiaries as intended.

However, the Technical Evaluation also found that a significant proportion of sub-projects were negatively affected by poor drainage. This was particularly apparent with roadwork sub-projects, although also apparent with sub-projects involving public buildings and water supply facilities. Poorly planned or implemented drainage infrastructure clearly can create large problems for the long-term viability of road sub-projects. Inadequate drainage within villages and around public areas creates dissatisfaction amongst users and has a number of potentially serious negative impacts related to insect disease vectors and dirty, possibly unhealthy environment.

In addition, the TE team found many of instances of inadequate design, particularly involving water supply sub-projects, in some provinces. It also found a significant number of sub-projects in which there was a lack of adequate slope protection/retention measures on roads and bridges.
As part of the evaluation process, the TE team noted the details of the budgets for PNPM sub-project during files inspection. Where available, the team also gathered details of the budgets for comparable government-funded projects to enable a comparison. A comparison of the two data sets showed that **PNPM-sponsored infrastructure projects are on average at least 15% to 25% cheaper for design and implement than similar line Ministry-funded projects.** In cases where PNPM sub-projects involve large unskilled work forces from the recipient village or local district, the savings can be significantly higher, sometimes exceeding 50%.

The evaluation also covered the level of sub-projects’ adherence to environmental safeguards. Of the aggregate total of sub-projects shows, in terms of their adherence to environmental safeguards, 78% achieved a ‘Sufficient’ ranking, while 21% achieved a ‘Slightly Below’ ranking. In cases of sub-projects where the ranking was ‘Slightly Below’, the team collected comments to determine the cause of the lower ranking. These comments have been collated in order to serve as input for program design improvements and other purposes.

In conclusion, the evaluation found that the overall quality of the design and execution of sub-projects was in full compliance with the project’s technical goals. Below is a summary of this report’s technical recommendations. These recommendations are fully discussed in Section 8 of the report.

The fiduciary team’s main goals were to assess the level of compliance with fiduciary rules; to determine the quality of administrative support for infrastructure activities; to identify main problems; and to recommend actions for improvement. The fiduciary team consisted of four personnel who visited 11 of the 12 evaluated provinces. Overall, the fiduciary team found that the fiduciary aspects of PNPM’s projects were often not in compliance with the requirements, although the risk that will affect the quality or rate of utilization of infrastructure is judged to be low to medium. In general, the fiduciary team found high levels of non-compliance in procedures related to design preparation, budget planning and procurement, bookkeeping and administration of documents. Records of financial transactions are often neither valid nor accountable, with budget planning being dominated by Technical Facilitators and with the limited involvement of the community. There were some indications of minor fraud and financial irregularities. It is recommended that PMD review the current fiduciary requirement to assess whether they are
appropriate seeing that their non-compliance does not affect the technical quality of the infrastructure.

The safeguards team consisted of four personnel who visited 11 of the 12 evaluated provinces. Generally, the team’s findings indicate that the Implementation Guidelines for Social and Environmental Safeguards (distributed in September 2011) have not been fully understood nor taken into consideration during the design, construction, and maintenance of PNPM sub-projects although there appears to be an improvement in recent months. The level of inclusion was found to be limited in many villages, with participation being dominated by local elites. The level of citizen empowerment and ownership continues to be limited in remote and marginal areas of Indonesia’s poorest regions. Sub-project files frequently contain no records of land donation certificates, prompting misunderstandings and social conflict related to land ownership claims. There needs to be additional focus on gender equity issues within communities’ decision-making processes, with most of the reviewed proposals being generated by mixed gender groups of villagers.
Executive Summary of Recommendations
(see Section 8. Recommendations on page 43 for discussions of each)

1. **Drainage**: Design and construction techniques need to be improved for most of the Road sub-projects that are undertaken by PNPM.

2. **Hydraulic Design**: Senior technical personnel should be responsible for examining and signing off on all sub-project plans that involve actively flowing water.

3. **Slope Protection**: More attention to maintaining sustainable cut slopes should be made in senior engineer inspection of plans, including bridge and road sites.

4. **Connections and Drawing Details**: Standard bridge and building drawings should be reviewed by senior personnel to verify that adequate and correct connection detailing is present and that high quality fixtures and doors, etc. are specified.

5. **Road Openings**: PNPM is encouraged to move very carefully when approached with a suggested sub-project to create a new road alignment. Senior levels of technical expertise within PNPM must be involved in sub-projects of this kind.

6. **Annual Technical Evaluation**: Technical evaluations of all sub-projects should take place on the first year after completion.

7. **Improved Technical Facilitation**: PNPM must address the lack of Technical Facilitators in the field.

8. **Maintenance**: The importance of maintenance on the longevity of rural infrastructures should be stressed in community training and extension materials.

9. **Quality of Design**: Senior design personnel at the province and district levels need to pay more attention to the technical designs coming across their desks.

10. **Land Donation Certificates**: PNPM administrative and technical personnel are aware of the heightened interest and requirements for this documentation to be in place before sub-projects begin construction.

11. **As-Built Record Drawings**: Spot checks by Provincial Engineers should be performed from time to time to ensure these drawings are properly created and filed in the appropriate place.
1. Background

The PNPM Rural program was first established in 2007, building upon a predecessor program, the Kecamatan Development Project (KDP), which was established in 1998. PNPM Rural is a core component of PNPM Mandiri, the Government of Indonesia’s (GOI) main program for community-based poverty alleviation efforts. It is based on the principles of community demand-driven development and stresses community empowerment. Presently, PNPM Rural operates throughout Indonesia in approximately 5,000 sub-districts and 63,000 villages. The program has an annual budget of approximately $1.4 billion. The GOI has indicated that PNPM will be continued at least until 2014.

PNPM Rural provides sub-districts with block grants to a value ranging from approximately US$ 65,000 and US$ 330,000 per year, with the value dependent on the population and assessed level of poverty of each participating sub-district. Under the program, members of rural communities determine their own development priorities, allocate funds and themselves construct the small sub-projects that they have decided on. Approximately 75% of the block grants provided to sub-districts have been used to
develop basic village infrastructure, including roads, water systems, drainage, irrigation, schools and health facilities.

The program provides technical assistance to facilitate the planning and implementation of sub-projects by local communities through the deployment of two facilitators, a social facilitator and a Technical Facilitator, or field engineer, in each sub-district. Across Indonesia, the total number of the facilitators amounts to approximately reach 11,000 personnels. The sub-district levels facilitators are supervised and assisted by facilitators at the district and provincial levels.

Previous evaluations have shown a high level of satisfaction by members of local communities with the works built through the KDP and PNPM Rural programs. This Technical Evaluation generally confirmed these evaluations, finding that the infrastructure developed through these programs generally good in quality and reasonably well designed and supervised by PNPM facilitators. In cases where members of local communities feel that they derive direct benefit from the works and where they are able to undertake the work, maintenance on sub-projects has been performed satisfactorily. This evaluation has found that the majority of PNPM’s works are still functioning and being utilized as intended a number of years after construction. The last technical evaluations were conducted in 2005 and 2007.
2. Technical Evaluation Scope

The evaluation covered all sub-projects within subject villages funded by PNPM Rural, PNPM Green, PNPM Generasi, BKPG, PNPM’s post-disaster recovery and post-crisis programs, and any other source of funding. The evaluation was conducted in the following twelve provinces: Aceh, West Sumatra, Lampung, West Java, Central Java, West Kalimantan, West Sulawesi, North Sulawesi, Maluku, North Maluku, NTT, and Papua. The Technical Evaluation assessed the following criteria:

- Process of selection and technical verification;
- Design and budget of the sub-project;
- Construction and construction supervision;
- Operations and maintenance;
- Functionality and utilization of the works;
- Quality of facilitation and supervision;
- Quality of bookkeeping and documentation;
- Environmental and social safeguards; and
- Financial management.

Two previous preliminary reports have been issued during this Technical Evaluation, with the first being issued after the completion of the evaluation in three provinces, and the second being issued after the completion of the evaluation in nine provinces. This report contains the final technical findings, conclusions, and recommendations from all 12 subject provinces.
3. Field and Office Team

The Technical Evaluation team consisted of Team Leader Neil Neate and Technical Evaluators Wawan Herwandi, Boedhi Wibowo, Eka Hasfi Adha, Ghufron Effendi, Andi Yoga Tama, and Suudi Noor. Octaviera Herawati joined the field team during their visits to a number of provinces and also provided assistance to the Team Leader in Jakarta on special assignments. The field team was also accompanied by social sector, financial management and safeguard specialists on their visits to a number of provinces.

4. Site Selection Procedure for Technical Evaluation

The 12 provinces included in the evaluation were carefully selected to ensure a wide geographic coverage and to include both ‘poor’ and ‘less poor’ provinces. Each of these provinces was examined to determine how many districts it contains. A sample of three districts was selected for those provinces which has ten or more districts. Two districts were selected from provinces which has less than 10 districts. The sole exception was in Central Java, where four districts were selected. In total, across the 12 provinces, 34 districts were selected using this method, in a partially randomized manner to ensure that sampled districts represented the range of geographical conditions in each province.

Following the selection of these districts, it was decided to sample four sub-districts in each district, resulting in the selection of 136 sub-districts. Access to these sub-districts is categorized as: normal, hard, very hard, and extreme. While the process of selection of sub-districts was randomized, it was also adjusted to ensure that the sample included sub-districts in an appropriate range of these categories.

The site evaluation target for this Technical Evaluation was considered at this stage of the sub-district selection process, with a further 29 sub-districts being added to the list, distributed across the provinces in a roughly even manner. With the inclusion of these ad-
ditional sub-districts, the final sample included 165 sub-districts, of which approximately 45% can be classified as ‘poor’ and less than 19% can be classified as ‘less poor’.

The selection of the villages within each of these sub-districts was left to the Technical Evaluation team to determine in collaboration with UPK (Unit Pengelola Kegiatan, Sub-district Management Unit) offices in each sub-district. To facilitate this process, team members obtained a map of the sub-district and used it to identify villages to be included in the assessment. Villages were chosen at random, although local knowledge regarding the level of difficulty to accessing certain villages was used to plan each day’s travels. Efforts were made to include ‘remote’ villages in the assessment. A minimum of two villages, and up to three if time allowed, were visited in each sub-district. All sub-projects sponsored by the funding agencies cited above were examined in the selected villages.

5. Technical Evaluation Methodologies

The Technical Evaluation (TE) team was equipped with a Sub-project Inspection Form (SIF) that had previously been tested in the field in Central Java. In the field, inspectors used the forms in paper format and manually filled these out at sub-project sites. The size of the form was restricted to a single page, given the limited amount of time that the TE team members were able to spend at each individual sub-project. The SIF is included in Annex 1 of this Final Report.

The checklist included on the SIF was divided into two sections. The upper section of the form contains a list of eight sub-project types. For each of these sub-project types, the SIF covered four to six aspects that it was considered feasible to assess during a brief inspection visit. The eight sub-project types are as follows:

1. Road or Structure (often referred to as ‘Roads’ throughout the report, since individual Structures are rare);
2. MCK (public bathing, toilet, and laundry facility);
3. Bridge;
4. Clean Water Supply;
5. Drainage/Irrigation;
6. Jetty;
7. Building/Market;
8. Electricity.

A discussion of each of the sub-project types is included in Annex 2, entitled *Sub-Project Inspection Form: Discussion of Each Entry Item*.

For each of the eight sub-project types, the aspects assessed through the SIF are somewhat unique. In either case, these aspects are related to design, construction, operation and/or maintenance, and the environment. For example, for ‘Road or Structure’ sub-projects, the assessed aspects include road surface, side slopes/wall, drainage, culverts, maintenance, and environmental safeguards. A comprehensive description of the inspection criteria and protocols which the TE team members used in completing these field assessments is included in this report as Annex 3.

For each individual sub-project, each aspect was assessed in terms of the following five categories: ‘Sufficient’, ‘Slightly Below’ (Sufficient), ‘Below Spec.’ (Specification), ‘Not Inspected’, or ‘Not Applicable’.

These aspect ratings are defined as the following:

**Sufficient**: This aspect of the sub-project meets the design/operational/maintenance/or environmental criteria necessary to ensure the longevity and usefulness of the infrastructure for the recipient community.

‘Slightly Below’: This aspect of the sub-project has certain characteristics that could be improved upon in terms of its design/operations/maintenance or environmental criteria. This aspect rating can be applied where the sub-project was largely constructed according to the approved plans, but where the inspector feels that certain elements of the sub-project could be improved upon in the future. Sub-projects receiving this rating for any aspect were provided with a written comment on the SIF explaining the unique situation and setting out potential remedial action.
Below Spec. (Below Specification): The sub-project was either (i) not constructed according to the approved plans; or (ii) presents a clear and present danger to the life or safety of users. Sub-projects receiving this rating for any aspect will be provided with a written recommendation on the SIF. This box is intended to draw attention to the specific sub-project to avoid repetition of mistakes.

Not Inspected: It may occasionally be impossible for the TE team to inspect a certain aspect of a sub-project. In such cases, the TE team will ask sub-district personnel to gather information related to that aspect of the sub-project as much detail as possible.

Not Applicable: Some aspects will not be applicable to certain sub-projects. For example, a retaining wall examined under one Road or Structure will not feature the aspect ‘Culverts’.

For the purpose of analysis, when a particular aspect of a sub-project was rated as ‘Slightly Below’ according to the SIF rating system, the associated comments were examined to determine whether this aspect should be categorized as ‘High Quality’ or as ‘Acceptable Quality’. It was generally found in around half such cases, the criticisms contained in the comments were not sufficiently significant to justify a rating of ‘Acceptable Quality’. In such cases, these aspects were rated as ‘High Quality’. These comments have been collated, based on a listing of typical or generic comments that have been repeatedly entered by the inspectors. For example, many recorded comments refer to poor drainage practices or conditions alongside roads. Such comments have been collated under the generic comment ‘poor drainage’. In total, in the assessment of 755 road sub-projects, 170 comments of this nature were recorded, amounting to approximately 23% of the total. This indicates that PNPM technical personnel should devote more resources to dealing with drainage issues on road sub-project. A sample of this Comments Database, with data from North Sulawesi, is included as Annex 4. The full comments database will be available on the PSF website (www.pnpm-support.org). Further discussion regarding the Comments Database also follows in Section 7.14.
6. Field Information Analysis Procedures

The field data gathered on checklists was transferred to digital versions of the spreadsheet and collected by the data analysts in Jakarta, with each sub-project recorded as a separate file and with a unique name based upon the government’s BPS number for the village. These spreadsheets will be maintained in a Technical Evaluation 2012 file on the PSF website.

The first step of the analysis involved aggregating all of the aspect ratings and related information for all of the sub-projects inspected into single files for each of the eight sub-project types. For instance, the master file for road sub-projects contains all of the ratings and information derived from the SIF for sub-projects of this sort, enabling team members to organize this information in various ways to isolate subsets of the data for analysis. Thus, in the case of the ‘Roads and Structures’ sub-projects, it was possible to isolate and further refine a number of data subsets:

- **By proximity to main road:** (Remote, In-between, or ‘Near Main Road’);
- **By construction year:** (2007 to 2011);
- **By road use:** (Two-Wheel, Four-Wheel, or Trucks and Buses).

Based upon the criteria that was isolated, the resulting data could then be analyzed for trends in terms of the ratings assigned to the various aspects for each sub-project type. For example, the hypothesis that ‘Remote’ road sub-projects might be relatively low quality due to their distance from sub-district centers can be examined by examining the road surface or side slope aspect ratings. In this case, the following table seems to indicate that the condition of the surface of a road is not particularly affected by the sub-project’s distance from sub-district centers. In terms of the road surface aspect, 67 – 71% of all roads inspected received a ranking of ‘Sufficient’. In terms of the same aspect, the proportion of ‘Remote’ road sub-projects receiving a ranking of ‘Sufficient’ was only 4% lower than those categorized as ‘Near a Main Road’. Similarly, the proportion of ‘Remote’ road sub-projects with a surface rated as ‘Below Spec’ at 6%, was roughly similar to the proportion of road sub-projects categorized as ‘Near a Main Road’, at 7%. This analysis suggests that
in terms of the road surface aspect, PNPM’s methods of construction management and supervision are functioning properly and are not impacted by distance from a sub-district center.

Table Remoteness Factor in Comparison with Road Aspects

<table>
<thead>
<tr>
<th></th>
<th>Sufficient</th>
<th>‘Slightly Below’</th>
<th>Below Spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remote</strong></td>
<td>67%</td>
<td>27%</td>
<td>6%</td>
</tr>
<tr>
<td><strong>In-between</strong></td>
<td>64%</td>
<td>33%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>‘Near Main Road’</strong></td>
<td>71%</td>
<td>22%</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Remote</strong></td>
<td>59%</td>
<td>39%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>In-between</strong></td>
<td>77%</td>
<td>19%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>‘Near Main Road’</strong></td>
<td>81%</td>
<td>18%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Notes – Data from 661 road sub-projects in eleven provinces used in above ratios (not including Papua).

However, an examination of the data related to the side slopes aspect shows a distinct trend towards a lower quality in cases where road sub-projects are categorized as ‘Remote’ compared to road sub-projects categorized as being ‘Close to a Main Road’, with 39% of road sub-projects in remote areas recording a ‘Slightly Below’ ranking compared to 18% of such sub-projects in areas categorized as being ‘Close to a Main Road’. This finding is interesting and encourages further analysis of the remaining technical aspects for ‘Roads and Structures’ sub-projects. An analysis of the data related to the other aspects of road sub-projects and to the other types of sub-projects may or may not confirm the hypothesis that distance from a sub-district center impacts the quality of infrastructure developed through the PNPM program. If confirmed, the debate can then turn to how PNPM can address this trend during the next cycle. This examination of how a sub-project’s proximity to population centers might affect its technical quality is more fully described and discussed in Section 7.10 of this report.
7. Technical Analysis

7.1. Sub-Project Types

Under the PNPM program, ‘Roads and Structures’ sub-projects have been found to be the most popular type of sub-project chosen by village selection committees, comprising 42% of the total. Such projects account for more than twice the number of the next most popular category of sub-project, constituting almost half of the rural infrastructures evaluated. The second most popular type of rural infrastructure evaluated were ‘Buildings and Markets’, which accounted for 21% of the total number of sub-projects evaluated, followed by ‘Drainage/Irrigation’ sub-projects, which accounted for 13% of the total.

However, these proportions were distinctly different in the case of Papua, where ‘Roads and Structures’ constituted 28% of the total; while the figure for ‘MCK’ sub-projects stood at 18%, ‘Bridge’ sub-projects at 10%, ‘Water Supply’ sub-projects at 15%, ‘Drainage/Irrigation’ sub-projects at 5%, ‘Jetty’ sub-projects at 1%, ‘Buildings/Markets’ sub-projects at 16%, and ‘Electricity’ sub-projects at 7%. Given the distinct differences characterize the implementation of the PNPM program in Papua, a separate study of Papua is presented as Annex 9 of this report.
An earlier evaluation of the predecessor to the PNPM Rural program, the Technical Evaluation of KDP Cycle IV conducted in 2005, found that ‘Roads and Structures’ sub-projects comprised 43% of the total, a proportion roughly unchanged from the present. The earlier evaluation showed that sub-projects related to schools, health facilities and some economic infrastructure (assuming some markets in this item) each comprised approximately 13% of the total.

The type of sub-projects selected by village committees varies across the archipelago and in terms of the socio-economic status of the sub-district and province. Communities in sub-districts in less poor provinces tend to select a higher proportion of road, bridge, and buildings, presumably because they are usually already equipped with water supply, sanitation, and electrical systems. Sub-districts in poor provinces tend to select sub-projects involving the development of these more basic municipal utilities, as well as roads and buildings. When a community in a less poor province requests funds to facilitate the development of a building, these funds are often used to add additional rooms to an existing school campus or to build a new building in a separate neighborhood to relieve overcrowding. In poorer provinces, it is more likely to see an old wooden structure replaced by a new
PNPM-funded school building. There is also a distinct difference in the nature of road sub-projects proposed by provinces at different economic levels. For example, relatively well off provinces will make proposals to fund the asphalting of four-wheel vehicle roads, while poorer communities are more likely to make proposals involving gravel or narrow concrete pathways that will accommodate pedestrians and motorcycles.

The following table shows the relative percentages of sub-project types evaluated in the provinces visited to date:

**Table Sub-Project Type by Province (%)**

<table>
<thead>
<tr>
<th>Province (%)</th>
<th>Roads</th>
<th>MCK</th>
<th>Bridges</th>
<th>Water Supply</th>
<th>Drainage/Irrigation</th>
<th>Jetty</th>
<th>Buildings</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aceh</td>
<td>40%</td>
<td>4%</td>
<td>6%</td>
<td>7%</td>
<td>31%</td>
<td>0%</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>Central Java</td>
<td>50%</td>
<td>1%</td>
<td>8%</td>
<td>5%</td>
<td>15%</td>
<td>0%</td>
<td>21%</td>
<td>0%</td>
</tr>
<tr>
<td>Lampung</td>
<td>47%</td>
<td>2%</td>
<td>5%</td>
<td>10%</td>
<td>12%</td>
<td>0%</td>
<td>23%</td>
<td>2%</td>
</tr>
<tr>
<td>Maluku</td>
<td>44%</td>
<td>5%</td>
<td>1%</td>
<td>13%</td>
<td>14%</td>
<td>3%</td>
<td>19%</td>
<td>0%</td>
</tr>
<tr>
<td>North Maluku</td>
<td>43%</td>
<td>6%</td>
<td>8%</td>
<td>13%</td>
<td>5%</td>
<td>8%</td>
<td>15%</td>
<td>3%</td>
</tr>
<tr>
<td>North Sulawesi</td>
<td>47%</td>
<td>6%</td>
<td>3%</td>
<td>14%</td>
<td>14%</td>
<td>1%</td>
<td>14%</td>
<td>1%</td>
</tr>
<tr>
<td>NTT</td>
<td>40%</td>
<td>3%</td>
<td>6%</td>
<td>5%</td>
<td>12%</td>
<td>0%</td>
<td>30%</td>
<td>4%</td>
</tr>
<tr>
<td>Papua</td>
<td>28%</td>
<td>18%</td>
<td>10%</td>
<td>15%</td>
<td>5%</td>
<td>1%</td>
<td>16%</td>
<td>7%</td>
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<tr>
<td>West Java</td>
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<td>8%</td>
<td>8%</td>
<td>5%</td>
<td>10%</td>
<td>0%</td>
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<tr>
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<td>5%</td>
<td>0%</td>
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<td>3%</td>
<td>18%</td>
<td>7%</td>
<td>0%</td>
<td>40%</td>
<td>3%</td>
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<tr>
<td>West Sumatra</td>
<td>40%</td>
<td>3%</td>
<td>6%</td>
<td>5%</td>
<td>12%</td>
<td>0%</td>
<td>30%</td>
<td>4%</td>
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### Table Sub-Project Type by Province (Number Evaluated)

<table>
<thead>
<tr>
<th>Province (%)</th>
<th>Roads</th>
<th>MCK</th>
<th>Bridge</th>
<th>Water Supply</th>
<th>Drainage/Irrigation</th>
<th>Jetty</th>
<th>Building</th>
<th>Electricity</th>
<th>Total Prov.</th>
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<tr>
<td>Aceh</td>
<td>77</td>
<td>7</td>
<td>12</td>
<td>14</td>
<td>60</td>
<td>19</td>
<td>4</td>
<td>193</td>
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<tr>
<td>Central Java</td>
<td>83</td>
<td>1</td>
<td>14</td>
<td>8</td>
<td>24</td>
<td>35</td>
<td>165</td>
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<tr>
<td>Lampung</td>
<td>84</td>
<td>3</td>
<td>8</td>
<td>17</td>
<td>22</td>
<td>40</td>
<td>3</td>
<td>177</td>
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<tr>
<td>Maluku</td>
<td>34</td>
<td>4</td>
<td>1</td>
<td>10</td>
<td>11</td>
<td>2</td>
<td>15</td>
<td>77</td>
<td></td>
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<tr>
<td>North Maluku</td>
<td>34</td>
<td>5</td>
<td>6</td>
<td>10</td>
<td>4</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>79</td>
</tr>
<tr>
<td>North Sulawesi</td>
<td>83</td>
<td>11</td>
<td>5</td>
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<td>25</td>
<td>2</td>
<td>25</td>
<td>2</td>
<td>178</td>
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<tr>
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<td>18</td>
<td>7</td>
<td>40</td>
<td>3</td>
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<tr>
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<tr>
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<td>11</td>
<td>7</td>
<td>14</td>
<td>33</td>
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<tr>
<td>West Kalimantan</td>
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<td>12</td>
<td>11</td>
<td>6</td>
<td>22</td>
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<tr>
<td>West Sulawesi</td>
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<td>2</td>
<td>10</td>
<td>4</td>
<td>10</td>
<td>28</td>
<td>27</td>
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<tr>
<td>West Sumatra</td>
<td>45</td>
<td>3</td>
<td>6</td>
<td>13</td>
<td>34</td>
<td>5</td>
<td>113</td>
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<tr>
<td><strong>Total Sub-Project</strong></td>
<td><strong>739</strong></td>
<td><strong>97</strong></td>
<td><strong>118</strong></td>
<td><strong>172</strong></td>
<td><strong>209</strong></td>
<td><strong>14</strong></td>
<td><strong>348</strong></td>
<td><strong>68</strong></td>
<td><strong>1,765</strong></td>
</tr>
</tbody>
</table>
7.2. Technical Quality of The Sub-Projects

The data gathered through this evaluation shows that across all the different sub-project types and for all the varying aspects assessed for each of these different sub-project types in all areas excluding Papua, 82% of the aspects inspected were found to be of ‘High Quality’.

A further 14% of the aspects assessed were found to be of ‘Acceptable Quality’. An examination of the Comments Database (see Annex 4) shows that many of the sub-project aspects that received this lower rating displayed deficiencies that might threaten the viability of the infrastructure, thus reducing its usefulness and functionality. Finally, 4% of sub-project aspects were considered to be ‘Failed’, or completely deficient in their usefulness and utility.

The Technical Evaluation team used a three-level rating system in the field, ranking each aspect defined under each sub-project type as ‘Sufficient’, ‘Slightly Below’, or ‘Below Specification’. Aspects of sub-projects assessed to be ‘Sufficient’ are included in the ‘High Quality’ portion of the chart above. (Approximately half of aspects of sub-projects as-
sessed to be ‘Slightly Below’ are classed as ‘High Quality’, based on an analysis of specific comments recorded at the sites), with the other half being classed as ‘Acceptable Quality’. Aspects of sub-projects assessed to be ‘Below Specification’ are included in the ‘Failed’ category. When aspects of sub-projects received this rating, recommendations to address the failure were made, with some follow-up by project personnel.

It is noted that the Technical Evaluation of KDP Cycle IV in 2005 found 70% of sub-projects to be rated ‘Sufficient’ or better (with ratings of ‘Good’ and ‘Excellent’ ranking higher than the ‘Sufficient’ rating). With this study’s five-level rating system, 16% of assessed sub-project were rated as ‘Fair’, while 14% were rated as ‘Poor’. A comparison of this earlier evaluation with the current evaluation suggests that the quality of technical aspects of sub-projects implemented through PNPM has generally improved in the interim period.

Additional analysis has been conducted to identify apparent rating trends between all of the sub-project types and the aspects rated. Within the aggregate total, it is possible to identify those individual aspects which are responsible for the majority of the ‘Slightly Below’ ratings. As discussed in Section 7.15 (Rating Trends), it is suspected that problems with drainage contribute to the bulk of these ‘Slightly Below’ ratings. If this is demonstrated to be the case from the data gathered, methodologies directed at improving this individual aspect can be developed in a focused effort to improve the technical quality of infrastructure developed through the PNPM Rural program.

7.3. Functionality and Utilization

The chart below shows that 90% of all sub-projects have been judged to be of average or better functionality and utilization. These two aspects are combined because, while they are measures of different things, they are also quite strongly linked.

Functionality is a relatively easy thing to assess: if the infrastructure is still operating as originally planned and intended, then a rating of ‘Average’ would be appropriate. A ‘High’ rating for this aspect of the assessment might involve a sub-project where the recipient community or users have independently added to or improved a sub-project to increase its usefulness.
Actions of this nature would represent a significant vote of confidence in the original PNPM work as a foundation for further self-directed community development activities.

The level of utilization was rated by our inspectors on the basis of two fundamental questions. The first is straight-forward: *Is an appropriate portion of the recipient community’s populace using the facility or infrastructure as intended?* If so, then a rating of ‘Average’ would be appropriate.

The second level of a sub-project’s utilization, however, requires more contextual and personal information to be gathered and assessed. The TE team members were instructed to make observations and ask questions regarding the community’s interest in the infrastructure and enthusiasm for its impact on their activities and daily lives. Statements of support for the addition of the infrastructure into the community’s social fabric as well as support for the PNPM’s community planning and construction mechanisms provided a basis for a ‘High’ rating. The final rating is an aggregate of the two findings, where one or the other would support a rating of ‘High’.
A School Building for the Children

Jorong Nan IX villagers in Salimpaung Subdistrict, West Sumatera, had been wishing for a school building for early childhood development (ECD) activity and kindergarten for the children in their village. Every year, more than 50 children had to go to improper temporary locations with very limited playing space.

Realizing the importance of early education for their children, the rural community had proposed for such building three times through PNPM as their priority. Unfortunately, it was rejected twice because the proposed locations were too close to the main road. However in 2011 they changed the location and their third proposal was approved!

A 570 m² land was donated to the village by an unnamed village resident. The rest of the community worked hand in hand to build the school with a facilitator guiding them for the technical requirements. In total, the whole school project cost Rp. 328,935,000 inclusive of community contribution, building materials, working man days, furniture, education and playground equipment.

Nowadays, 64 children, 26 kindergarten-age and 38 ECD-age, are provided with a safe and playful environment at the school. Forty-five of these children come from underprivileged families who attend school free of charge. The new school has also greatly contributed to the steady increase in number of children and regular attendance. Beyond education activities, outside of class hours, the village has also been utilizing the school space for the post of monthly health activities for under-five children and pregnant mothers and meeting venue for various community activities.
Where the rating for one or the other of these aspects was ‘Low’ or ‘None’, a written statement on the SIF normally recorded the circumstances. Thus, some of the entries that have been collected in the comments section of the SIF pertain directly to this aspect of the sub-projects. Examples of these include the following:

- A school where the toilet was not being used by the children at all, due to the local custom of children visiting the adjacent wooded area;
- A road which the inspector judged to be over-utilized, which was contributing to its premature degradation;
- A forest clearing sub-project for agricultural field expansion was criticized by our inspector due to the scheme’s total lack of use because of lack of sufficient water to grow anything.

It can be noted that the Evaluation of Infrastructure Quality undertaken for KDP Cycle IV found that 92% of the sub-projects inspected were found to ‘Function Completely’. In addition, this 2005 study found that 84% of the sub-projects provided the ‘Benefits as Hoped For’ while 13% provided ‘Benefits More Than Had Been Hoped For’. Arguably, the current TE finds that the proportion of sub-projects in this latter category may have increased.

7.4. Apparent Technical Problems

The TE team found the sub-projects inspected, for the most part, to be in good condition, well-received and well-used by the recipient communities. However, a number of problems were frequently observed. These problems are discussed in the following sections. Remedies and methodologies for overcoming these issues are presented in Section 8 (Recommendations).

7.4.1. Drainage

Poor drainage frequently give negative impacts on road sub-projects, and also, to a lesser extent, schools, clinics, MCK, and clean water facilities. This condition requires correction. The lack of proper drainage facilities in rural villages often detracts unnecessarily
from an otherwise well-planned and constructed facility. In the case of roads intended for four wheeled vehicles and with poor drainage facilities, the inadequate drainage can threaten the viability of the road. Roads must be properly cambered to encourage storm water runoff to flow off the road surface as quickly as possible. Poorly shaped roads that gather water in puddles or ruts will degrade rapidly, providing much less benefit and economic return to the recipient community.

Similarly, facilities such as buildings, water tap stands and small public water tanks require adequate drainage in their immediate surroundings to ensure that users can easily access and use the facilities. Constructing such public facilities in low-lying areas with poor drainage creates dissatisfaction amongst intended beneficiaries. It also has the potential to result dis-benefits by, for example, creating an ideal environment for disease bearing insects and for dirty, possibly unsanitary conditions generally.

7.4.2. Hydraulic Design Deficiencies

The lack of adequate technical supervision is evident in many water supply sub-projects (see 7.10 below), with a number of cases in which ditches have been excavated above the infrastructure that is to be drained.

Many cases of household water supply sub-projects were found in which no preliminary topographical survey has been undertaken to establish whether or not the headworks (normally a reservoir of some sort on the source stream) is suitably elevated above the recipient village for a gravity-based water system to operate correctly. Several sub-projects had on-line reservoirs within the village that could not be filled due to inadequate head pressure. Section 7.6 Quality of Design, below, provides more evidence of these circumstances.

7.4.3. Slopes and Erosive Forces

Many cases of sub-projects were found in which it was clear that designers and technical facilitators have given little consideration to how water, weather, and the inexorable passage of time will adversely affect slopes, compromising the sustainability and viability
of these projects. Slopes above or below roads; slopes beneath a bridge abutment; slopes beside an irrigation or drainage ditch will all tend to collapse under the forces of heavy rainfall or water flowing over or at their base if they are not constructed at sufficiently low gradients or protected with walls or suitable armoring. Examples of collapsed slopes are plentiful. Such collapses add to the burden of maintenance and can occasionally endanger users.

7.4.4. Cheap Building Materials

Many cases of sub-projects were found where cheap and low quality materials were used in the construction, probably as a cost-saving measure instigated by village leaders. In many such cases, fixtures or facets quickly break, fall into disrepair or create constant maintenance difficulties. Inadequate detailing on sub-project plans sometimes causes other instances of this. Bridges are frequently constructed using nails to join key components together, rather than bolts. Such connections are weak, susceptible to loosening and very prone to failure. Checking the plans, our inspectors have found no specifications for the connections, thus encouraging the builders to select the cheapest type of connection possible.

7.4.5. Heavy Equipment and Road Openings

A number of problematic sub-projects were found that involved the use of heavy equipment during construction, with two main areas of concern: (1) Local technical personnel do not always seem able to estimate how long this type of equipment will need to be used to complete the works, which has resulted in either significant under-estimations or over-runs. In the case of an over-run, additional work is often carried out in a hurriedly planned and poorly executed manner; and (2) Heavy equipment is often used for new road openings without expert direction or adequate field experience. This has resulted in some very poor sub-project execution, with potentially significant environmental damage. In order to prevent such occurrences, experience and appropriately qualified engineers must be involved in such sub-projects.
7.5. Maintenance

For all the different types of infrastructure sub-projects found in the sample villages, the TE team evaluated maintenance as an aspect of the sub-project. Villagers were asked questions related to maintenance, including the following: *How frequent were cleaning/maintenance activities scheduled? Was a maintenance fee collected from the users? Was there a maintenance committee and does it meet regularly? What level of efforts was asked or expected of users? Were the maintenance activities monitored by any senior levels of government?*

As can be seen by the following chart, the results of this survey and of the TE team’s own observations suggest that the quality of maintenance is uneven and not always sufficiently high to ensure the long-term sustainability of a significant proportion of the assessed sub-projects.

It can be seen that in cases of public infrastructure where members of the community realize a direct and personal benefit, such as with clean water facilities, jetties, electricity systems and some buildings, a higher level of attention is paid to the necessary and often mundane tasks of maintenance. In cases of public infrastructure where the benefit is perceived to be more widely spread and of less direct benefit, such as with some roads and drainage projects, maintenance activities are poorly executed, deferred or ignored. There may be a perception that some forms of maintenance, such as road maintenance, are too difficult for village com-
mittees to undertake (with road maintenance, there is some justification for this perception when it comes to proper surface grading, compaction and upkeep). Some buildings are clearly poorly maintained, maybe because members of the community believe that the maintenance of schools and health clinics should be the responsibility of the government.

In the case of most of these buildings, it is clear that little if any attention is paid towards keeping the facilities clean and in proper working order. The reason for this systemic problem is not readily apparent. However, in many cases it may stem from the users being disappointed or becoming impatient with unrepaired broken fixtures and tiles. The underlying problem may be that poor quality components were either specified in the plans or substituted during construction and that the community may be upset with the speed at which the facility started to degrade. One can perhaps sympathize with a community unwilling to ‘fix’ something that was poorly designed or constructed in the first place. The use of inappropriate materials to cut costs, as described in section 7.4.4 above, may be a contributing factor.
Better Transportation Access for Cikuya Village

Cikuya village in Culamega subdistrict in Tasikmalaya, West Java is known as a fruit and Albaizia wood producer. It is located three hours away from the city of Tasikmalaya. Before 2009, the village was only reachable through dirt and rocky paths which were harder to access on rainy days even for motorbikes. Transporting their products was an expensive and difficult feat.

Realizing that roads are a priority for their village, for three years in a row since 2009, the village had proposed connecting roads from PNPM Mandiri Rural. For three years also, after each yearly approval of the activity, the community worked hard hand in hand to build 1,067 meters of concrete road equipped with drainage and 245 meters of retaining wall. The total amount of expenditure for the infrastructures was Rp. 155,453,700, which more than Rp. 47,000,000 werecontribution from the local community. The village community further agreed to establish a maintenance saving for the roads through donations local businesses and application of retribution fees for passing cars.

These days, the community can easily transport their products with much less cost than before. The community members can also really feel the change after the road has brought into their life.
The 2005 KDP technical review found that only 38% of sub-projects have a maintenance committee that could be described as ‘formed and active’, while 60% have a maintenance committee that is ‘formed but less active’. Based on the chart below, there are some indications that levels of maintenance have improved somewhat since this earlier study, although there continues to be some large room for further improvement.

7.6. Quality of Design

The SIF was designed to enable the TE inspector to render judgment on the appropriateness of the design of a given sub-project. In these terms, almost 5.4% of the sub-projects inspected were not considered appropriate. The sub-project types most frequently found to be not appropriate were MCK facilities and clean water systems, where the rate was 9% and 8% respectively. In the case of road sub-projects, the figure stood at 6%.

A study of the ratings for the various aspects of MCK and water supply sub-projects shows that the ‘not appropriate’ assessments were mostly due to the community’s low levels of utilization, poor maintenance and inadequate or poorly executed water supply. In the case of two MCK sub-projects that received poor ratings, the cause for the poor ratings was the proximity of water sources to septic disposal areas and poor drainage.
in the immediate vicinity of the structure. Both of these circumstances are direct contraventions of standard design practice and are likely indicative of a local failure to provide adequate senior technical supervision or overview by district and sub-district personnel.

In the case of the 8% of water systems that received poor ratings, the poor ratings were primarily due to bad or non-existent hydraulic design, resulting in unusable or poorly used water infrastructure. In the case of road sub-projects that received poor ratings, these poor ratings were mainly due to issues related to drainage and to the fact that designers often do not make any budgetary provisions for the development of an adequate storm water infrastructure. Further comments and recommendations relating to this issue will be presented in Section 8 of this report.

7.7. Budget and Cost Comparisons

Several previous technical evaluations of KDP have found that the use of CDD methods to develop rural infrastructure produces useful and viable community infrastructure at costs less than those typical for line Ministry works of a similar nature. One of the purposes of this current Technical Evaluation is to confirm or deny these findings for PNPM’s current works and to gather evidence to support such findings.

In order to facilitate this task, the TE team collected and recorded dimensions and descriptions of sub-projects together with information related to final construction costs for each evaluated rural infrastructure sub-project. TE team members in Jakarta received this information and inserted it into a Budget Database (see Annex 7). The Budget Database is organized to enable an analysis of the data for each sub-project type and for each province. Using this information, it is possible to calculate the average unit costs for many sub-project types. For example, 17 schools/function buildings in Central Java were evaluated. These were found to cost an average of 1,080,000 IDR/m² (approx. US$115/m²), while those in West Kalimantan, where 14 buildings were evaluated, cost an average of 1,860,000 IDR/m² (US$198/m²). The data clearly indicates that there are significant variations in construction material costs in different areas across the Indonesian archipelago and that these variations have an impact on PNPM sub-project budgets.
At the same time, where available, the TE team collected and recorded line Ministry budgets for similar types of rural infrastructures. This information has been sorted and analyzed in a similar fashion as for the PNPM works and has been entered into a database referred to as ‘Government Costs’ (see Annex 6). A variety of infrastructure types were examined in comparison with PNPM’s full menu. However, budget information related to recent water or electrical systems was not available for this comparison.

In general, the comparison showed that PNPM infrastructure sub-projects are at least 15% to 25% less expensive to design and implement than similar line Ministry-funded projects. However, savings can be significantly greater than this in the case of PNPM sub-projects that involve large, unskilled work forces from the recipient village or local district. Examples of the types of sub-projects where savings are in the range of 15% to 25% include bridges, large retaining walls and school rehabilitation works, all of which require more skilled and trained workers than do other types of infrastructure construction works. It is likely that if data had been available to enable a comparison of the costs of water or electrical projects, these savings associated with such sub-project types would also have been in this range.

Examples of sub-project types where savings were considerably more significant, up to and sometimes exceeding 50%, include roads and simple buildings. Road works utilize large numbers of unskilled villagers and low cost labor-based construction techniques. Building construction is also a familiar trade to many villagers, which means that a single competent supervisor can often handle a large crew of local workers to produce satisfactory results.

Table 4 below provides an overview of the data related to the costs of PNPM and government sub-projects respectively, with a final column showing the ratio between these costs for each sub-project type. The PNPM unit costs as presented in this table are based upon results from all 12 subject provinces. No grouping of provinces according to economic status was conducted in this analysis, although this could be done to discern patterns between the provinces.
The government budgets used in the analysis come from information gathered for West Sulawesi, West Java, North Maluku, Maluku, Aceh, Lampung, North Sulawesi, and Papua.

Table PNPM vs. Government Unit Cost Analysis

<table>
<thead>
<tr>
<th>Type of Sub-Project</th>
<th>Unit</th>
<th>PNPM Costs (IDR/units)</th>
<th>Government Costs (IDR/units)</th>
<th>PNPM/Gov’t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>Average</td>
<td>High</td>
</tr>
<tr>
<td>Buildings</td>
<td>m²</td>
<td>920,000</td>
<td>1,220,000</td>
<td>1,590,000</td>
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<td>School Rehabilitation</td>
<td>m²</td>
<td>540,000</td>
<td>810,000</td>
<td>1,080,000</td>
</tr>
<tr>
<td>School Furniture</td>
<td>m²</td>
<td>50,000</td>
<td>138,000</td>
<td>280,000</td>
</tr>
<tr>
<td>Concrete Road</td>
<td>m²</td>
<td>80,000</td>
<td>132,000</td>
<td>257,000</td>
</tr>
<tr>
<td>Gravel Road</td>
<td>m²</td>
<td>20,000</td>
<td>30,000</td>
<td>40,000</td>
</tr>
<tr>
<td>MCK</td>
<td>m²</td>
<td>530,000</td>
<td>1,040,000</td>
<td>1,370,000</td>
</tr>
<tr>
<td>Bridge–wood/concrete comp.</td>
<td>m²</td>
<td>930,000</td>
<td>2,585,000</td>
<td>4,860,000</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>m³</td>
<td>244,000</td>
<td>674,000</td>
<td>1,620,000</td>
</tr>
</tbody>
</table>

Note: The gravel road ratio above likely reflects substantially different criteria or final product. Most PNPM gravel road sub-projects have been noted as receiving little if any compaction and often are lacking adequate or correctly built drainage considerations.

Note 2: Only a single government project was available for analysis in the School Rehabilitation and Bridge categories. Other categories featured between three and nine examples.

7.8. Environmental Safeguards

For all the different infrastructure sub-project types, the level of compliance with environmental safeguards was an assessed aspect. A study of the aggregate total of assessed sub-projects shows that 78% received a ranking of ‘Sufficient’ in these terms, while 21% were rated ‘Slightly Below’. Only 1% of sub-projects inspected were considered to be clearly unsatisfactory in terms of their level of compliance with environmental safeguards. A review of the Comments Database shows the majority of environmental issues observed related to the following: relatively minor storm...
drainage erosion difficulties; and inadequate retaining walls that may have the potential to cause slope collapse and disturbances to water courses and downstream lands. The very few serious environmental issues related to matters such as a gen-set exhaust being discharged inside a structure; a protected forest being cleared for agricultural extension; and inappropriate MCK location, either because of poor drainage or close proximity to a water source.

The level of adherence to environmental safeguards for all sub-project types considered together is represented in the diagram below. Section 8 includes recommendations to enable PNPM to reduce the proportion of sub-projects recording rankings of ‘Slightly Below’.

The 2005 KDP technical report found that 84% of assessed sub-projects ‘did not harm the environment’, with almost 10% having ‘positive impacts’. From this comparison, it appears that the level of adherence to PNPM’s environmental safeguard standards has slipped somewhat. A detailed examination of the Comment Database may provide clues as to how and why this has occurred. PNPM may be able to arrest this apparent slide through the development of special training programs and design guidelines aimed at addressing specific problems. It can be noted from the Comments Database, for example, that ‘No erosion
protection’ has been cited as an area of environmental concern in 18 cases of 113 bridges inspected (16%). In 170 cases of 755 inspected road sub-projects, the roads were found to have poor or inadequate drainage (23%), while in 54 cases of 171 inspected water supply systems (32%), no laboratory tests were conducted to confirm that the water was safe for human consumption. The Comments Database is attached in Annex 4.

7.9. Land Donation Certificate

Many PNPM sub-projects are wholly or partially constructed on private land that has been donated for that use. For example, the widening of roads sometimes requires the redesignation of a strip of private land for public use. Similarly, buildings are often constructed in a central part of a village where existing community lands are not large enough to accommodate the structure or grounds, while water systems have reservoirs located within agricultural plots and pipes crossing private property.

In such cases, it is a requirement of the PNPM program that in cases where private land is utilized for sub-projects and has been donated to the community for such use. In the past, however, this rule was more vague and many sub-projects have been constructed on private lands based on statements by the landowners in public meetings that the landowner was prepared to donate to the community to support the development of the sub-project.

Land Donation Certificate
The chart Land Donation Certificate shows that sub-projects involving the development of bridges and water supplies are the sub-project types most likely to involve the use of private land without land donation certificates, with 28% of bridge sub-projects and 19% of water supply sub-projects involving the use of private land lacking such as a certificate. This is an area of the program which could benefit from increased vigilance on the part of the facilitators.

7.10. Remoteness Factor

As discussed above, it is an obvious hypothesis that those sub-projects constructed in remote areas might suffer from a low frequency or lack of facilitation, poor quality construction materials, lesser skilled tradesman and construction personnel, etc. The data gathered in the SIFs has been collected and correlated to determine if there is any validity to this hypothesis.

The following chart shows vertical bars representing the percentage of sub-projects in both ‘Remote’ and ‘Near Main Road’ locations where ratings of ‘Sufficient’ were recorded. For example, 62% of MCK facilities in ‘Near Main Road’ villages were rated as being ‘Sufficient’, while 58% of those in ‘Remote’ villages received a similar rating.

Note – all Jetty sub-projects in Maluku and Maluku Utara were considered to be in ‘Remote’ locations.
As can be seen, a significantly lower proportion of the sub-projects in ‘Remote’ locations were ranked as ‘Sufficient’ compared to those in ‘Near Main Road’ locations, with a greater number of ‘Slightly Below’ or ‘Below Spec’, sub-projects in remote areas. However, the difference is not great, and for some sub-project types, notably water supply and drainage/irrigation sub-projects, the proportion of sub-projects in remote regions to receive a sufficient ranking was actually higher than for those in areas near main roads.

This finding seems to indicate that the quality of PNPM’s facilitation and sub-project execution methodologies in ‘Remote’ locations may be at least partly responsible for a slightly greater percentage of poor or unsatisfactory sub-projects in such regions. This finding may encourage PNPM to search for ways to improve the delivery of its technical services to the more remote areas of Indonesia.

7.11. Improvements Over Time

A series of sorting procedures were used to categorize sub-projects into Construction Year subsets. This data reveals a mild trend towards improved outcomes for several sub-project types, while the opposite trend is apparent for some other sub-project types.

The data for roads and bridges sub-projects shows a slight increase in the proportion of projects assessed as ‘Sufficient’ for all aspects rated (see graphs below). However, the data for clean water sub-projects shows a decline in the proportion in both West Kalimantan and West Sulawesi.

It might be argued that the increased proportion of sub-projects receiving a ‘Sufficient’ ranking over time is explained by the fact that newer infrastructure has simply had less time to fall into disrepair. However, most of the deficiencies that were observed by the TE team are systemic nature and reveal themselves very soon after a sub-project is completed and put into service. Inspectors are also careful to factor in some normal wear-and-tear when assigning a rating.
An examination of the remarks in the Comments Database shows that the majority of issues that result in lower rankings are fairly easily corrected. Previous technical evaluations have consistently pointed out the same failures that this one has found. On the basis of such input, PNPM has developed training programs and methodologies to try to deal with these issues. The trend towards improved rankings for both Roads and Bridges may indicate that PNPM’s field forces are improving certain aspects of how sub-projects are executed.
For clean water sub-projects, the proportion of sub-projects in both Central Java and West Sulawesi to receive ‘Satisfactory’ rankings has not changed significantly over time, which is good, although the proportion of sub-projects in West Sulawesi receiving such rankings is lower than might be desired (see above graph). While the proportion of clean water sub-projects in West Kalimantan to receive satisfactory rankings was high for most of the period covered, it has declined dramatically over the past couple of years. It is likely that Comments on the SIF will provide some clues as to why this decline has occurred. It may be that a lack of quality design and technical facilitation is a contributing factor. Again, the data can be analyzed to see if these theories have substance. However, this report is not the appropriate place to exhaustively examine and report on findings of this nature. Additional work using this particular method of comparing the data gathered during this TE should be conducted to fully utilize this information.

7.12. Funding Source

Funding sources are noted in the SIF for each sub-project. A summary of the funding sources and sub-project types is presented in the following table:

Table PNPMP Funding Sources

<table>
<thead>
<tr>
<th>Type Sub-Project</th>
<th>PNPM Rural</th>
<th>Green PNPM</th>
<th>Generasi</th>
<th>BKPG</th>
<th>Post Disaster</th>
<th>RESPEK</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road or Structure</td>
<td>546</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>7</td>
<td>48</td>
<td>63</td>
</tr>
<tr>
<td>MCK</td>
<td>42</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Bridge</td>
<td>83</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Clean Water</td>
<td>136</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>Drainage/Irrigation</td>
<td>161</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>3</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Jetty</td>
<td>11</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Building/Market</td>
<td>288</td>
<td>0</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>Electricity</td>
<td>68</td>
<td>0</td>
<td>31</td>
<td>28</td>
<td>7</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1,335</td>
<td>1</td>
<td>36</td>
<td>96</td>
<td>22</td>
<td>145</td>
<td>135</td>
</tr>
</tbody>
</table>

The ‘other’ funding sources include Post Crisis, PIPP, and PNPM Integrasi (P2SPP).
7.13. Quality of Technical Supervision

TE team members were able to rate the overall quality of the PNPM technical personnel through several ways, including the following: questioning and observation of the personnel who accompanying the team to the field; conversations with village leaders and others in the community; inspection of the documentation at the UPK and the village; evidence of appropriate instructions being provided in a timely and frequent fashion to the construction workers (resulting in a high-quality structure with few flaws). The relatively high percentage of ‘Low’ rankings in the assessment of Technical Facilitation is worrisome, as sub-project quality highly depends upon this facilitation.

Quality of Technical Facilitation

Sub-project inspections provided evidences that in many cases, the local Technical Facilitators did not or were not able to visit the villages in which sub-projects were located very often. Several UPK reported that the position of sub-district level Technical Facilitator had been vacant for long stretches of time, and that Technical Facilitators from adjacent sub-districts were travelling long distances to cover areas in which Technical Facilitators were not available. In this situations, our TE team was told that many sub-projects had been constructed without this vitally important technical assistance being provided by the facilitators.

Another characteristic of superior technical supervision is the quality of documentation that is maintained at the UPK office. One easy test of the value of the data in these
technical files is the presence of an ‘as-built drawing’ in the file for completed sub-projects. An ‘as-built drawing’, is a copy of the construction drawing that has been changed or marked-up with alterations that were made during construction or a drawing based on accurate measurements of the completed works. Most sub-project are built with minor changes to the design or construction details: this is a normal response to changing site conditions, to the use of materials other than originally specified or to altered community requirements. However, it is the duty of the Technical Facilitators to approve of these changes (via Change Orders, etc.) and then to record these changes on a set of drawings. ‘As-built drawings’ are useful for future planning purposes, amongst other things.

The SIF recorded the presence or lack thereof of ‘as-built drawings’ and notes their quality. An examination of the data shows that only 27% of the sub-project files examined contained an adequate ‘as-built drawing’. A further 37% contained an unaltered copy of the construction drawing. It is doubtful that the majority of these sub-projects were actually constructed exactly as they had been designed: it is more probable that the facilitator simply copied the design drawing and inserted it as a record of the construction. Finally, 36% of the files examined contained no copy of the sub-project design drawing, altered or otherwise. The value and future usefulness of this file is considerably reduced as a result.

As-Built Record Drawings

- **27%** Sufficient
- **37%** Not Sufficient
- **36%** Not Done
It is worth noting that the Technical Evaluation of KDP Cycle IV found as-built records in 51% cases of inspected sub-projects, with a further 21% where the as-built drawing was considered inadequate (for reasons not stated). It would appear that PNPM’s performance in these terms has declined in the interim period.

7.14. Comments Database

We have referred to the Comments Database several times in previous sections. The SIF contains a section wherein the TE team member is required to record unique comments about each sub-project evaluated. The TE team member was obliged to enter a comment in cases where any aspect of a sub-project received a ranking of ‘Slightly Below’ or lower, providing the reasons for the rating and perhaps suggesting remediable actions.

When data from the SIF are entered into the WB database, these comments are manually tabulated and entered into the Comments Database with a separate entry for each sub-project type. Within each sub-project type workbook, separate worksheets are created for each province. A summation worksheet providing the total number of comments for all provinces is also included in each of these workbooks.

The comments within these worksheets are broadly generic in nature, so TE inspectors’ unique comments can be entered in a simple manner. For example, an inspector may describe the details of puddles on a road surface, or the lack of ditching alongside a road, or improper crossfall on road surface: all of these be subsumed under the category ‘Poor Drainage’. The generic comment ‘Poor Hydraulics’, under water systems, can cover many unique comments referring to more specific details, such as improper elevations, incorrect design techniques, or poorly located reservoirs, etc. A copy of this database is provided in Annex 4.

The Comments Database can be used to easily identify broad categories of issues affecting certain types of PNPM rural infrastructures. The comments recorded by our inspectors provide a ‘real-time’ glimpse of the most common problems encountered with each type of sub-project, along with many variations within each sub-project type.
7.15. Rating Trends

The database established by this Technical Evaluation has great potential to facilitate separate analyses for each aspect of each sub-project type visited through an examination of how the particular aspect was rated over each of the five years reviewed during this evaluation. A study of how the aggregated ratings for particular aspects either improve or decline over the years will indicate how PNPM personnel and methodologies have coped with workloads in the past. An inspection of the data in this manner may also suggest necessary changes to PNPM’s delivery strategy and training strategies.

Six charts showing how the proportion of sub-projects receiving ‘Sufficient’ ratings has changed in the period from 2007 to 2012 for building sites in Central Java have been developed. These charts have been developed on the basis of data gathered by visiting 35 building sites in that province. The charts indicate the proportion of sub-projects receiving rankings of ‘Sufficient’ for each of the six aspects evaluated: Layout, Design Criteria, Construction, Accessibility, Maintenance, and Environmental Safeguards.

**Jawa Tengah-Building: Layout**

The chart above shows that in terms of the ‘Layout’ aspect, all assessed building sub-projects in Central Java (schools, madrasah, and health clinics) received ‘Sufficient’ rankings in 2007, 2008 and 2009 (100%). In terms of the same aspect, the percentage of buildings receiving this
rating in 2010 and 2011 dropped to 90%. Evaluation of the ‘Layout’ aspect centers upon users’ ease of movement within the building, the appropriateness of its site and location in the village, the configuration of the rooms, location of the toilet and other amenities, etc.

The following chart shows that in terms of the ‘Design Criteria’, the assessment of building sub-projects in Central Java has yielded uneven results. In 2007, for example, 75% of assessed building sub-projects in the province receive ratings of ‘Sufficient’, indicating that approximately one quarter of buildings had at least some questionable design aspects. However, in 2008, the proportion declined to 50%, before rising again to 90% in 2009.

Evaluation of the ‘Criteria’ aspect focuses on the degree to which the particular design meets with the village’s needs. In terms of a building sub-project, the size, location, and configuration of the building are examined by an evaluator to determine how well the design has met with the needs or requirements of the recipient community. Examples of poor design criteria might include a building very much bigger than it needs to be to satisfy the goals of the community; or a school constructed without a toilet; or a building constructed in a low and swampy area where higher ground is available.

Charts for the Construction, Accessibility, Maintenance and Environmental Safeguards aspects for sub-projects in Central Java, similar to those above, are included in Annex 5.
These kind of charts can be developed for all aspects of all sub-project types in all provinces. This would involve the production of 528 charts, with 44 charts for each of the 12 provinces. A comparison of observed trends in poor and less poor provinces is also possible. Such a comparison may be quite revealing of structural defects in PNPM's approach and methodologies in the disparate regions of Indonesia. Computer software can be developed to facilitate the creation of these charts in an orderly and accurate fashion.
8. Recommendations

This evaluation was intended as a wide technical evaluation examining broad-brush aspects of the eight types of sub-project rather than detailed assessments of each specific piece of infrastructure. The evaluation sought to gather information and draw commonalities amongst the sub-project types, rather than drill down to the essential design and construction practice of each sub-project. Such an in-depth study is certainly warranted for a program of PNPM’s magnitude. The recommendations of the PNPM Technical Evaluation 2012 therefore concentrate on the following key aspects:

8.1. Technical

8.1.1. Drainage

Design and construction techniques need to be improved for most of the road sub-projects facilitated through PNPM, particularly sub-projects involving four-wheel vehicle
roads. Standard designs often show properly shaped road cross-sections and roadside ditches, but in practice we have observed that practically these two facets are usually ignored during construction. Villagers often want to create longer roads and achieve this by sacrificing the quality of drainage work. Technical Facilitators often do little to prevent this condition. Technical personnel should be given a training course in which proper drainage design and construction techniques are explained and their need is reinforced. A short office seminar and field work course should be provided, involving the examinations of both good and bad drainage work. This would help to improve the quality of many sub-projects that currently receive ratings of ‘Slightly Below’ or ‘Below Spec’.

8.1.2. Hydraulic Design

Senior technical personnel should be responsible for examining and approving all sub-project plans that involve actively flowing water. This would include Clean Water, Irrigation, Drainage, and Road Culverts. With sub-projects of this sort, the majority of failures involve flowing water (which also relates to the drainage aspect, as discussed above). Senior design personnel should be able to spot those sub-projects that require some extra effort and due diligence on their part. These engineers should demand that topographic survey plans are complete and available, and make site inspection tours as necessary to verify the onsite conditions.

8.1.3. Slope Protection

More attention to maintaining sustainable cut slopes should be paid by senior engineers during their inspection of plans. Most bridge sites should feature erosion protection using rip rap or armored slopes.

8.1.4. Connections and Drawing Details

Standard bridge and building drawings should be reviewed by senior personnel to verify that adequate and correct connection detailing is present and that high quality fixtures and doors, etc. are specified. Standard drawing libraries at the district level should be updated and technical personnel should be reminded to use the most current standard
drawing, rather than recycling old sub-project drawings. District personnel should be reminded that no compromises should be made on these components of a sub-project, even though they might be petitioned by village committees eager to save money with lesser quality items.

8.1.5. Road Openings

Caution is required in the case of proposals for sub-projects involving new road alignments. Extensive and accurate topographical surveys should be performed and calculations conducted to determine that all road gradients are less than 5% and all resulting road cut slopes are at the native material’s natural angle of repose. No fill slopes should be permitted, since the nature of the native soils and their ability to take compaction is unknown. Senior levels of technical expertise within PNPM must be involved in sub-projects of this kind.

8.2. Bureaucratic

8.2.1. Technical Evaluation

Technical evaluations of all sub-projects should be conducted on the first anniversary of their completion. Technical Facilitators from neighboring sub-districts should rate the sub-projects using a field instrument similar to the SIF that used in this national evaluation, but tailored to each sub-project type. Many additional aspects of the sub-projects can also be rated in detail. The results of these annual evaluations should be entered into a national database that can be used to determine where and what kind of staff training programs or additional project inputs are necessary or required.

Annual assessments of this nature will provide PMD with technical information to allow it to improve its delivery of technical services to PNPM in order to more fully meet with the Government of Indonesia’s development goals.
8.2.2. Technical Facilitation

PNPM must address the lack of Technical Facilitators in the field. Numerous instances of cases where due to a lack of personnel, Technical Facilitators or other PNPM engineering personnel were unable to directly supervise sub-projects were documented. In particular, there was a disturbing number of long-vacant positions in several of the poorer provinces. One way that is being used to address this is the so-called ‘Bare Foot Engineers’ program in Papua, which is creating a local source of technical expertise that may be more likely to remain in place in a competitive job market.

In order to ensure that PNPM field personnel are able to conduct adequate and timely inspection visits, the provision of adequate travel and per diem allowances is essential. Technical facilitators in several sub-districts made frequent off the record complaints to TE team members regarding the level of compensation for some of these costs, with this reducing their activities in the field. Some sort of sliding scale for these allowances should be developed for instances where district and sub-district level Technical Facilitators and Provincial Engineers are required to travel extra distances or over longer periods due to vacant positions or larger than average sub-districts.

8.2.3 Maintenance

The maintenance of rural infrastructures is vitally important for ensuring its longevity. To improve maintenance, PNPM may consider reviewing its community training and extension materials with the results of this latest evaluation in hand.

8.2.4 Quality of Design

Inappropriate drainage and hydraulic design issues were the most prevalent cause for ‘wet’ sub-project types to receive ratings of ‘Slightly Below’ or worse. Senior design personnel at the provincial and district levels need to pay more attention to the designs they manage. They need to reject plans that do not feature the necessary elevations and topographical information necessary to be workable. PNPM should be encouraged to deploy specialists in different areas of technical expertise in provinces where their services are required for particularly challenging or high-profile sub-projects.
8.2.5 *Land Donation Certificates*

PNPM administrative and technical personnel are aware of the heightened interest and requirements for this documentation to be in place before sub-projects begin construction.

8.2.6 *As-Built Record Drawings*

The usefulness and value of accurate ‘as-built drawings’ should be re-emphasized to PNPM technical personnel. Spot checks by Provincial Engineers should be performed from time to time to ensure these drawings are properly created and filed in the appropriate place.
9. Conclusions

This Final Report for the 2012 Technical Evaluation of Infrastructure has found that the overall quality of the design and execution of sub-project works in the provinces evaluated to date to be fully in conformance with the project’s technical goals.

This study found that 82% of the sub-projects were of ‘high quality’, 14% were of ‘acceptable quality’, and 4% were ‘failed’. In addition to this, aspects of sub-projects related to maintenance, functionality, usefulness, quality, environmental safeguards and the appropriateness of the design of the sub-projects were also evaluated. The ratings for all of these aspects roughly equaled or exceeded the values from a similar study last conducted for KDP in 2007.
Annex 1: Sub-Project Inspection Form (SIF)
Annex 2: Sub-Project Inspection Form (SIF):
Definition and Discussion of Each Entry Item

The Sub-Project Inspection Form (SIF) will be completed by the Technical Inspectors with the information as outlined below (underlined words below signify SIF entry item titles). Protocols to be used by the Inspectors are described in Annex 4.

Sub-project location and background information:

The top portion of the SIF contains sub-project location and background information:

Province, Kabupaten (district), Kecamatan (sub-district), Village number: The official Badan Pusat Statistik (BPS, Central Agency on Statistics) code will be used to identify each village. The BPS code consists of a separate number for each province (between 1 and 91, for example), for each district, for each sub-district, and for each village. Recently created villages now often have four digit numbers. Village names will be entered to the right of the village number, for ease of use during SIF analysis.

Sub-Project number: Sub-projects inspected in villages will be assigned a number corresponding to the type listing below.

1. Road or Structure
2. MCK
3. Bridge
4. Clean Water
5. Drainage/Irrigation
6. Jetty
7. Building/Market
8. Electricity
The second sub-project of a particular type in a village will be numbered -2 (dash 2). Thus, the second water system inspected in a village would be labeled 4-2.

**Remote:** Sub-district maps will be consulted at the UPK office. Remote villages will be identified as being those most distant from main roads. Some sub-districts located far away from the district centre so that all villages might be rated ‘Remote’. The TE team members will develop a sense of ‘remoteness’ as this assignment progresses.

**In-Between:** Those villages off main roads but not considered ‘Remote’.

**Near Main Road:** Those villages on main roads.

**Construction Year:** This evaluation will examine sub-projects that were constructed between 2007 and 2011.

**Number of Households:** The number of households in a village or in a sub-project user group (MCK facilities, for instance, will be portions of a village. Irrigation sub-projects will show only those households that own land in the Benefit Area). This checkbox will be used for all sub-project types except for schools, madrasah (Islamic boarding school) and jetties. The actual number of beneficiaries will be calculated by using this number multiplied by the average household size for each province.

**Technical Information:**

The main part of the SIF contains technical information pertaining to each sub-project examined by the TE team:

The sub-project rural infrastructures constructed through the grants made available to rural communities in Indonesia by PNPM encompass a very wide spectrum of public civil works. They are most easily described as being any public infrastructures that is desired by communities except for a short list of forbidden items. The various infrastructures have been grouped for this technical evaluation in terms of the list above.

1. **Road or Structure:** This is one of the more popular sub-project types requested through this program. Roads can be gravel or stone, concrete, asphalt or a combina-
tion of these materials. Structure is a general term for roadside walls, channels, culvert works, and other civil infrastructures on public property. Road sub-projects frequently include new or existing drainage works.

2. **MCK**: This abbreviation stands for *mandi cuci kakus*, which means public washing, laundry and toilet facilities. They should contain a water source, potable or otherwise. These structures can take many forms depending upon a village’s requirements and the site’s characteristics.

3. **Bridge**: These sub-projects can be for pedestrians and motorcycles only (occasionally a suspension bridge in this case) or for four-wheeled vehicle traffic. Bridges can be made from wood, concrete, mortared stone, steel, or combinations of these materials. Load restrictions can be set for these by the community (due to funding constraints or other reasons) and design engineers must provide bridge elements to safeguard these load restrictions.

4. **Clean Water**: Potable water systems include wells, pumped water systems, gravity piping bringing water from nearby mountains and hills, reservoirs and distribution systems. Metering of the systems is encouraged to provide maintenance funds.

5. **Drainage/Irrigation**: Proper drainage of roads will allows villagers to conduct their activities more easily. Drainage can take the form of ditching or lined channels. Irrigation also utilizes ditches or mortared stone/concrete channels to manage and direct water to agricultural fields. Proper operation of these systems by the user group is vital to facilitate adequate and fair distribution of irrigation flows to the benefiting lands.

6. **Jetty**: Many islands in several of Indonesia’s provinces feature steep and inaccessible foreshores. A community jetty constructed on tall pilings will allow fishermen, children, and the elderly to safely access their fishing vessels and waterborne transportation links.

7. **Building/Market**: Public buildings supported by PNPM can include schools, *madrasah* (Islamic religion schools), health clinics, markets, and other public structures.
8. **Electricity**: Electrical generation sub-projects will include mini-hydro systems, fueled generators, and solar voltaic cells.

Each of the above sub-project types will be examined and evaluated according to several field assessment aspects. These aspects are unique to each sub-project type. A comprehensive description of the criteria that the TE team members will use in completing these field assessments is included in this BTOR (back to office report) as Annex 3. The origin of much of this information is via the NMC office of the PNPM. These descriptions have been used by PNPM Rural technicians in the past as they have examined proposed sub-project sites. Electrical sub-project criteria are not contained in this PNPM document. PNPM PMD has provided us with mini-hydro design and construction documentation that will be referenced by the TE team during an evaluation of electrical generation sub-projects.

Ratings:

Each of the field assessment aspects for each individual sub-project will be rated by the TE team members as being one of five choices: Sufficient; Slightly Below (slightly below sufficient); Below Spec.; Not Inspected; Not Applicable. TE team evaluations for these will be based on the following criteria:

**Sufficient**: The sub-project aspect meets the design/operational/maintenance/or environmental criteria necessary for the longevity and usefulness of the infrastructure for the recipient community.

**Slightly Below**: The sub-project displays certain characteristics that could be improved upon within its design/operations/maintenance/or environmental criteria. This will be a situation where the sub-project was largely constructed according to the approved plans but where the inspector feels something could be improved upon in the future. Sub-project Inspection Forms receiving this rating for any aspect will be provided with a written comment (see below for more on this item).
Below Spec. (Below Specification): The sub-project was either (i) not constructed according to the approved plans, or (ii) presents a clear and present danger to the life or safety of users. Sub-project Inspection Forms receiving this rating for any aspect will be provided with a written ‘Recommendation’ (see below for more on this item). This box is intended to draw attention to the specific sub-project in order that mistakes are not repeated again.

Not Inspected: It may occasionally be impossible for the TE team to inspect a certain aspect of a sub-project. The TE team will question the sub-district personnel in this instance to verify sub-project details to the fullest extent possible.

Not Applicable: Some aspects will not be applicable to all types of sub-projects. For example, a retaining wall examined under ‘1 Road or Structure’ will likely not feature any road crossing drainage structures, so the aspect ‘Culverts’ will be marked ‘Not Applicable’.

Use and Functionality:

The lower part of the SIF contains information about a sub-project’s use and functionality, funding sources, and data obtained from an inspection of the sub-project files.

Road and Bridge Data: Three checkboxes are provided here to identify the heaviest user group for sub-project types 1 and 3.

Functionality and Utilization: Four checkboxes are provided here: High, Average, Low, and None. Functionality will be based upon whether or not a sub-project is able to be used or continues to operate as originally intended. Utilization will reflect the local community’s rate of usage of the facility and whether or not extra improvements or extraordinary interest has been taken by a portion of the community in the facility.

Quality of Technical Facilitation and Supervision: TE team members will make a personal judgment regarding the local, district, and provincial attendance to the sub-project site before, during, and after construction in regards to the transfer of technical knowledge and general supervision. It is recognized that for sub-projects that was constructed years ago that memories fade and that personal attitudes or personalities may color opinions
regarding these matters. These data entry boxes will most often be used to record the simple presence or absence of technical facilitators.

**Funding:** Six funding sources are provided with checkboxes: PNPM Rural, Green PNPM, Generasi, BKPG, Post Disaster, and RESPEK. A box for other sources is also provided. Inspectors will make note of the other funding source in this instance beside the box.

**Budget:** A sub-project’s budget will be noted, either from a signboard or from an examination of the sub-project file. No community contributions (Swadaya) should be included in this total.

**Budget Efficiency:** Two checkboxes, Yes or No, are provided here. This item will normally be completed after the field inspection, during the evaluation technical team member will make review of sub-project information and calculation of a sub-project’s average cost. Information recorded in the ‘Dimensions’ area of the SIF will be key to calculations performed for this item.

**Appropriate Design:** The TE team member will make a judgment here as to whether or not the actual design made by PNPM technical personnel fits with the sub-project’s purpose and utilization by the recipient community.

**Beneficiaries:** The number of villagers using a sub-project will be noted here, especially for schools, madrasah, and jetties. Other sub-project types are more easily defined by village leaders by the number of households benefitting.

**Land Donation:** Three checkboxes have been provided here. Building and water reservoir sub-project types are the most kind of sub-project that require this certificate. The sub-project Final Report usually contains a copy of a letter or certificate showing the original landowner has donated the parcel to the community. Occasionally we have been shown meeting minutes that show this necessary step has been completed. The requirements regarding the official filing of the land donation certificate were changed at the end of 2011. Since this technical evaluation is dealing with sub-projects pre-dating this revision, inspectors will attempt to verify that the previous requirements have been met within the sub-project information examined.
Special Community Participation or Contribution: This box has been provided to encourage the TE team member to make note of any special circumstances that may come to light during the evaluation. This is mainly to highlight sub-projects that may be worthy of particular attention.

‘As built’ Drawings: Yes/No checkboxes are provided for this sub-project document. The TE team members will examine the Final Report for a copy of a construction drawing that has been revised to reflect the actual form of the final product. This record of construction, depicting any changes that might have come about through Change Orders, etc., is a useful drawing for future reference. Simple copies of the proposed construction drawing are most often found and are poor substitutes for accurate ‘as-built drawings’.

Dimensions: A brief description and the vital statistics of the various sub-project types will be recorded here. For instance, type of road (concrete, asphalt, telasah, etc.), the length and width of a road, the number of hectares irrigated (benefit area), the size of school (length and width but also number of classrooms, offices, toilets), etc. This information will be used in the calculations for the ‘Budget Efficiency’ item in the SIF. It will also used in the analysis of this technical evaluation to determine, for example, the average costs for different infrastructures, differences between these costs between province and between remote areas vs. communities on main roads.

Comments: Inspectors will write brief comments regarding any sub-project aspects that are rated ‘Slightly Below’. The intention with these comments is to document trends within the PNPM’s design or facilitation activities or within the recipient villages’ construction or ongoing maintenance techniques that could be improved upon in subsequent project cycles. This Technical Evaluation will summarize and look for trends in the comments noted, and provide appropriate advices and guidances where warranted.

Recommendations: Inspectors will make recommendations regarding any sub-project aspects that are deemed ‘Below Spec’. A sub-project receiving this rating will either (i) not have been constructed according to the approved plans, or (ii) presents a clear and present danger to the life or safety of users. All Recommendations will be cited in the final report for this assignment. Recommendations will also be presented in the BTOR after each provincial visit. It is expected that some follow-up by PNPM or PMD will take place based on these recommendations.
Annex 3: Field Evaluation and Inspection Protocols

Certain items on the Sub-Project Inspection Form (SIF) will require that the Technical Evaluation team members to make qualitative or subjective judgments regarding aspects of a sub-project’s design, facilitation, construction, or ongoing operations and maintenance. The following protocols for certain items on the SIF have been developed during discussions with members of the TE team and with World Bank Social Sector personnel. Underlined items are sub-project entry item titles from the SIF.

Sub-project aspects refer to assessable characteristics of particular sub-project types. For example, for the sub-project type Roads or Structures, one assessable aspect is Road Surface. Each aspect for each sub-project type is assessed according to the criteria laid out in PNPM’s existing field assessment checklists. These descriptions have been used by PNPM Rural technicians in the past during their examination of proposed sub-project sites. It is considered prudent to use the same criteria for this Technical Evaluation. These documents do not contain any inspection criteria for electricity generating sub-projects such as micro-hydro or solar voltaic cells, which have been provided separately.

Functionality and Utilization: Inspectors should carefully examine whether or not the sub-project is meeting the needs of the community and providing the function to the villagers that prompted them to choose the sub-project. In some cases, poor design or improper site selection will reduce the functionality of the sub-project. If a sub-project is not being utilized to its full extent, or not at all, then a Comment or Recommendation must be written to explain the situation and/or to propose remedial action. The Comments will be summarized and included in the BTOR and Final Report, as well as all the Recommendations. Understanding failures in functionality and utilization will aid PNPM in future designs.

Quality of Technical Facilitation and Supervision: TE team members will make a personal judgment regarding the levels of local, district, and provincial attendance at the sub-project site before, during, and after construction in regards to the transfer of technical knowledge and general supervision. It is understood that this opinion will sometimes be based on the comments by villagers and UPK personnel who have little or no direct
experience with the sub-project, or who have perhaps some personal reasons for making disparaging remarks. It is recognized that for sub-projects constructed years ago that memories fade and that personal attitudes or personalities may color opinions regarding these matters. These data entry boxes should most often be used to record the simple presence or absence of technical facilitators.

Budget Efficiency: The TE team will develop and expand its knowledge of PNPM infrastructure sub-projects as this assignment proceeds. The average costs for different types of construction will be assessed using the data gathered by the spreadsheets. This newly acquired information will be combined with existing cost estimation data that PNPM will provide to the team. Using these materials and also some ‘gut instinct’ the Technical Inspector will be able to occasionally rate a particular sub-project as being less efficient than similar sub-projects elsewhere. It will be very important that the Technical Evaluation inspector provide a Comment regarding the rationale for this assessment.
Annex 4: Comments Database

Following are example spreadsheets from the Comments Database. Comments entered onto each SIF by an inspector will be unique to each sub-project evaluated. These comments have been gathered and tallied under a variety of generic ‘comments’ that capture most ideas expressed by the TE team in the field.

The Comments Database is a very large file, comprising comments from 12 provinces and more than 1,800 sub-projects visited. This annex contains a small sampling of this information. The reader who wish to look over all of the information gathered, please contact the World Bank’s PSF office in Jakarta or can be seen on the PSF website.

This Comments Database can help planners understand where most problems lie with each type of infrastructure. Training programs or technical aids and materials can be designed to mitigate the main problems that are identified through this collection of SIF comments.
Province : NORTH SULAWESI
Type of Sub-project : ROADS (telford, gravel, asphalt)

<table>
<thead>
<tr>
<th>Type of Subproject : ROADS (Telford, gravel, asphalt)</th>
<th>No. of Sub-Projects Inspected</th>
<th>Total No. of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

**Quality of sub-projects**

- Good quality and condition when it was inspected: 25 (56%)
- Poor quality:
  - Non-specified materials used: 4 (9%)
  - Road surface has been damaged (aggregate coming loose, weaving, cracks, holes): 9 (20%)
  - Cracks on the retaining walls: 1 (2%)
  - Land settlement/poor compaction of road surface: 6 (13%)

**Maintenance**

- Maintenance team is available and work properly: 0 (0%)
- Maintenance team is available, but no maintenance has been done: 31 (69%)
- Maintenance team, but no fee, no written procedure: 1 (2%)
- No maintenance team, no maintenance: 1 (2%)

**Design and RAB**

- Design is done according to the standard design for the subproject: 0 (0%)
- Inappropriate designs:
  - No retaining walls or improper placement: 1 (2%)
  - Poor drainage: 8 (18%)
  - No shoulders had been built: 0 (0%)
  - Improper culverts/no culverts: 5 (11%)
  - No guard rail in the steep area: 0 (0%)
  - Miscalculation in budget costs: 0 (0%)
- Different between design and implementation (different in thickness of surface road): 0 (0%)
<table>
<thead>
<tr>
<th>Type of Subproject: ROADS (Telford, gravel, asphalt)</th>
<th>No. of Sub-Projects Inspected</th>
<th>Total No. of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community participation is high</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Community participation is low</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The road does not give much benefit to the villagers</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>‘As-built drawings’ are just copied from the initial designs</td>
<td>10</td>
<td>22%</td>
</tr>
<tr>
<td>Lack of monitoring from FTs and or FTKab</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>No final report</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Need more compaction on side slope</td>
<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>Unremoved framework</td>
<td>6</td>
<td>13%</td>
</tr>
<tr>
<td>Pesticide is used to clean up the grass</td>
<td>5</td>
<td>11%</td>
</tr>
</tbody>
</table>
Annex 5: Trends in Aspects—Central Java

Following are charts showing the trends observed in Sufficient ratings for Building sub-projects in Central Java.

These charts are referenced to Section 7.15 of the main report. They show a small sampling of the technical analysis that is possible with the data gathered during the 2012 Technical Evaluation of PNPM. Trend lines can be developed for each of the 12 visited provinces, for any of the eight types of sub-projects evaluated, for all of the various detailed criteria that were rated. Following is a very small sample of these trend lines within one province and one sub-project type (Buildings).

Buildings: Layout

![Graph showing trend in Building layout ratings from 2007 to 2011.]

Buildings: Design Criteria

![Graph showing trend in Building design criteria ratings from 2007 to 2011.]

Annex 6 - Example of Government Costs Database

Following is an example of the data gathered from three provinces for government-sponsored projects. The full database of this information contains data and calculations from eight provinces is available on PSF website.

### Cost of Projects Funded by Local Government (2010-2011)

<table>
<thead>
<tr>
<th>Location (Province/Kabupaten)</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Surface area</th>
<th>Cost *</th>
<th>Cost/m²</th>
<th>Cost/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kab. Polewali Mandar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. School building</td>
<td>6</td>
<td>9</td>
<td>54</td>
<td></td>
<td>273,790,000</td>
<td>5,070,185</td>
<td></td>
</tr>
<tr>
<td>Kab. Majene</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Drainage</td>
<td>173</td>
<td>1</td>
<td>173</td>
<td></td>
<td>72,000,000</td>
<td>416,185</td>
<td></td>
</tr>
<tr>
<td>2. Concrete road</td>
<td>296</td>
<td>3</td>
<td>888</td>
<td></td>
<td>232,052,106</td>
<td>261,320</td>
<td></td>
</tr>
<tr>
<td>3. School</td>
<td>24</td>
<td>9</td>
<td>216</td>
<td></td>
<td>313,500,000</td>
<td>1,451,389</td>
<td></td>
</tr>
<tr>
<td>Kab. Tasikmalaya</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Small dam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>94,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• preparation works</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,525,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• soil cutting for water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>106.24</td>
<td>45,695,269</td>
<td>430,114</td>
</tr>
<tr>
<td>collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• inlet - outlet channels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22.175</td>
<td>38,234,794</td>
<td>1,724,230</td>
</tr>
<tr>
<td>(incl.PVC pipes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location (Province/Kabupaten)</td>
<td>Length</td>
<td>Width</td>
<td>Height</td>
<td>Surface area</td>
<td>Cost *</td>
<td>Cost/m²</td>
<td>Cost/m³</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------</td>
<td>--------</td>
<td>--------</td>
<td>--------------</td>
<td>----------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>m</td>
<td>m</td>
<td>m</td>
<td>m²</td>
<td>per m²</td>
<td>per m²</td>
<td>per m³</td>
</tr>
<tr>
<td>4. Asphalt road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300,000,612</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil cutting</td>
<td>128.97</td>
<td></td>
<td></td>
<td></td>
<td>3,062,997</td>
<td>23,750</td>
<td></td>
</tr>
<tr>
<td>Lower foundation</td>
<td>129.2</td>
<td></td>
<td></td>
<td>22,690,223</td>
<td>175,621</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper foundation</td>
<td>275.6</td>
<td></td>
<td></td>
<td>53,755,918</td>
<td>195,051</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penetrasi (asphalt)</td>
<td>2755.96</td>
<td></td>
<td></td>
<td>163,582,265</td>
<td>59,356</td>
<td></td>
<td></td>
</tr>
<tr>
<td>drainage/ditch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20,862,126</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. School rehabilitation</td>
<td></td>
<td></td>
<td></td>
<td>140,000,000</td>
<td>933,333</td>
<td></td>
<td></td>
</tr>
<tr>
<td>building (2 classrooms)</td>
<td>135</td>
<td></td>
<td></td>
<td>126,000,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>furniture</td>
<td></td>
<td></td>
<td></td>
<td>14,000,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. School</td>
<td>9</td>
<td>7</td>
<td>63</td>
<td>100,000,000</td>
<td>1,587,302</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Kab.Bogor**

| 1. School                     | 58.38   |        |        | 108,500,000  | 1,858,513      |         |         |
Annex 7—Budget Database

Following is an example of the sub-project budget data gathered from PNPM records in three provinces for the sub-projects that were evaluated. The full database contains data and calculations from all visited provinces is available on PSF website.

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Name of subproject</th>
<th>Year of Construction</th>
<th>No. Unit</th>
<th>Dimension (in meter)</th>
<th>Surface area</th>
<th>Cost</th>
<th>Cost/m2</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S2 1 20 4 7-1</td>
<td>porangdu</td>
<td>2009</td>
<td>4 6</td>
<td></td>
<td></td>
<td>38,594,000</td>
<td>1,608,085</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>S2 1 20 4 7-2</td>
<td>porangdu</td>
<td>2010</td>
<td>2 4 6</td>
<td></td>
<td></td>
<td>204,681,000</td>
<td>5,326,571</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>S2 1 20 7 7-1</td>
<td>kindergarten</td>
<td>2009</td>
<td>5 7</td>
<td></td>
<td></td>
<td>182,685,800</td>
<td>5,219,594</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>S2 1 20 7 7-2</td>
<td>school</td>
<td>2011</td>
<td>3 classes</td>
<td>27 7</td>
<td></td>
<td>223,842,000</td>
<td>1,184,549</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>S2 1 60 1 7-1</td>
<td>kindergarten</td>
<td>2010</td>
<td>6 4</td>
<td></td>
<td></td>
<td>137,723,300</td>
<td>5,738,471</td>
<td></td>
</tr>
</tbody>
</table>

plumbing and sanitation

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Name of subproject</th>
<th>Year of Construction</th>
<th>No. Unit</th>
<th>Dimension (in meter)</th>
<th>Surface area</th>
<th>Cost</th>
<th>Cost/m2</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>S2 1 270 9 7-1</td>
<td>school</td>
<td>2009</td>
<td>3 classes</td>
<td>24 8</td>
<td></td>
<td>150,657,000</td>
<td>784,561</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>S2 1 270 11 7-1</td>
<td>porangdu</td>
<td>2011</td>
<td>3 6 4</td>
<td></td>
<td></td>
<td>127,442,500</td>
<td>5,310,104</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>S2 1 271 7 7-1</td>
<td>school - vary in size</td>
<td>2011</td>
<td>8 7 2</td>
<td></td>
<td></td>
<td>80,305,000</td>
<td>991,420</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>S2 03 01 011 7-1</td>
<td>school</td>
<td>2011</td>
<td>9 9</td>
<td></td>
<td></td>
<td>33,227,400</td>
<td>1,186,693</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>S2 03 090 005 7-1</td>
<td>porangdu</td>
<td>2011</td>
<td>4 7</td>
<td></td>
<td></td>
<td>84,082,500</td>
<td>3,180,438</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>S2 03 150 008 7-1</td>
<td>porangdu</td>
<td>2011</td>
<td>2 4 6</td>
<td></td>
<td></td>
<td>118,856,500</td>
<td>1,650,765</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>S2 03 150 010 7-1</td>
<td>porangdu</td>
<td>2011</td>
<td>8 9</td>
<td></td>
<td></td>
<td>6,192,500</td>
<td>164,826</td>
<td></td>
</tr>
</tbody>
</table>

retaining wall

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Name of subproject</th>
<th>Year of Construction</th>
<th>No. Unit</th>
<th>Dimension (in meter)</th>
<th>Surface area</th>
<th>Cost</th>
<th>Cost/m2</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>S2 03 180 007 7-1</td>
<td>market</td>
<td>2011</td>
<td>8 15</td>
<td></td>
<td></td>
<td>105,400,000</td>
<td>878,333</td>
<td></td>
</tr>
</tbody>
</table>

Toilet

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Name of subproject</th>
<th>Year of Construction</th>
<th>No. Unit</th>
<th>Dimension (in meter)</th>
<th>Surface area</th>
<th>Cost</th>
<th>Cost/m2</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>S2 03 180 009 7-1</td>
<td>porangdu</td>
<td>2009</td>
<td>4</td>
<td></td>
<td></td>
<td>20,000,000</td>
<td>10,000</td>
<td></td>
</tr>
</tbody>
</table>

Garbage bin

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Name of subproject</th>
<th>Year of Construction</th>
<th>No. Unit</th>
<th>Dimension (in meter)</th>
<th>Surface area</th>
<th>Cost</th>
<th>Cost/m2</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>S2 03 180 007 7-2</td>
<td>school</td>
<td>2009</td>
<td>11,517,2,5</td>
<td></td>
<td></td>
<td>6,968,500</td>
<td>1,749,936</td>
<td></td>
</tr>
</tbody>
</table>

Sewerage

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Name of subproject</th>
<th>Year of Construction</th>
<th>No. Unit</th>
<th>Dimension (in meter)</th>
<th>Surface area</th>
<th>Cost</th>
<th>Cost/m2</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>S2 03 180 009 7-3</td>
<td>porangdu</td>
<td>2010</td>
<td>5</td>
<td>12,5 m^2</td>
<td></td>
<td>82,157,500</td>
<td>6,672,600</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>S2 03 180 011 7-1</td>
<td>kindergarten</td>
<td>2010</td>
<td>12</td>
<td>6,5</td>
<td></td>
<td>72,082,500</td>
<td>923,750</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>S2 03 180 011 7-2</td>
<td>market</td>
<td>2009</td>
<td>2,5 2,5</td>
<td></td>
<td></td>
<td>76,945,000</td>
<td>5,742,233</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>S2 03 180 011 7-3</td>
<td>porangdu</td>
<td>2010</td>
<td>3 6 4</td>
<td></td>
<td></td>
<td>126,121,500</td>
<td>5,255,063</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>S2 03 180 011 7-4</td>
<td>porangdu</td>
<td>2011</td>
<td>4 5</td>
<td></td>
<td></td>
<td>38,258,000</td>
<td>1,912,900</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>S2 06 070 004 7-1</td>
<td>school</td>
<td>2009</td>
<td>2 15 7,5</td>
<td></td>
<td></td>
<td>128,637,300</td>
<td>1,143,443</td>
<td></td>
</tr>
</tbody>
</table>

Teacher room

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
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Sewerage tank

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**NORTH MALUKU**

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**BANDA ACEH**

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<th>Surface area</th>
<th>Cost</th>
<th>Cost/ m²</th>
<th>Location</th>
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<td>2,000,000</td>
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<td>market</td>
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<td></td>
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Annex 8: Evaluation of Fiduciary Aspect

The work of the technical evaluations was complemented by a fiduciary review, carried out by a team of PSF consultants, which considered of budget, bookkeeping, administration, and community procurement.

The main goal for the evaluation of the fiduciary aspect of PNPM infrastructure projects is to assess compliance with fiduciary rules and to determine the quality of administrative support for the infrastructure activities; to identify significant problems; and to recommend actions for improvement.

Evaluation of these fiduciary aspects was conducted by the Financial Management team in 11 provinces (Aceh, West Sumatra, Lampung, West Java, West Kalimantan, West Sulawesi, North Sulawesi, Maluku, North Maluku, NTT, and Papua), covering 145 villages in 72 sub-districts in 21 districts. The evaluation covers infrastructure sub-projects funded from a variety of programs under the PNPM Mandiri umbrella, including PNPM Rural, Post Disaster, Post Crisis, PNPM Green, Generasi, Respek/Papua and BKPG/Aceh.

Overall, the fiduciary processes at most of locations were not implemented in accordance with established standards and procedures. In total, in 79.6% of 145 surveyed villages, it was found that infrastructure sub-projects were being implemented with an unsatisfactory level of compliance with fiduciary standards. In general, the team found non-compliance in the following areas: the preparation of design, budget plan and procurement; bookkeeping and administration of documents; existence and/or availability of documents; invalid transaction evidence; the domination of the Technical Facilitator in the preparation of design and budget plan; low levels of involvement of the community; a lack of transparency; and poorly managed accountability meetings.

Despite the high level of non-compliance, in general the assessment found that the risk that this non-compliance would have an impact on the implementation of infrastructure sub-projects is low. The team found a very limited number of indications of fraud in 27 villages (18.6% of total villages evaluated), with the total estimated value of this fraud amounting to less than IDR 500 million (approximately $US 52,000), which represents less than 0.1% of the...
total infrastructure budget. All identified cases of fraud had been managed by the community or through other means. The risk that fraudulent practices had a negative impact on implementation was deemed to be low.

Most cases of irregularities related to infrastructure activity were detected quickly by members of the community, which then took action to resolve the issues promptly, thereby preventing delays to the completion of sub-projects. Problems related to infrastructure were not generally recorded in the complaints database, as members of the community and facilitators felt that reporting resolved problems would not be beneficial and would only create additional administrative burdens.

The main lessons learned from the fiduciary assessment are as follows: (1) although there is a high level of non-compliance to fiduciary standards, the community is nonetheless able to develop good quality infrastructure. This demonstrates that there are complementary social accountability mechanisms, such as accountability meetings and community monitoring, that ensure the effectiveness of infrastructure sub-projects; (2) different fiduciary standards and policies should be applied to remote areas, especially in the preparation of designs and budget plans and in the implementation of procurement to avoid high costs and to avoid creating the temptation for members of the community and facilitators to manipulate documents in order to fulfill requirements that they feel, with some justification, to be burdensome; (3) community monitoring work well in cases of infrastructure sub-projects which are technically well understood by the community (road, building, irrigation, etc) and for which there is a high level of perceived need. However, in cases of infrastructure sub-projects which are technically less well understood by the community (micro hydro, suspension bridges, etc) and for which the level of perceived need is lower, community monitoring is not as effective; (4) in cases where there is a high level of awareness amongst community members communities regarding their right to good quality infrastructure, there is a higher level of participation and better oversight. This prevents fraud and irregularities from occurring, and assists in its detection and resolution.

In order to address the issues revealed through this assessment, PMD should: (1) revise the policies and rules for procurement in remote areas to facilitate the application of local practices which have been proven to effectively facilitate delivery; (2) make efforts
to improve the capacities of members of the community and of facilitators in the areas of administration, procurement, and oversight through training, the provision of simple guide books and the implementation of improvements to incentive systems; (3) conduct a special study and pilot to test community mechanisms which ensure the effectiveness of results. This should involve the documentation of good practices in communities that can be replicated elsewhere; (4) improve the MIS (management information system) to include a component for monitoring community procurement.

The complete funding of the fiduciary review are available on the PSF website (www.pnpm-support.org/technical evaluation)
Annex 9: Papua Report

It has long been recognized that the situation and conditions in Papua are significantly different from the rest of Indonesia, with specific difficulties and challenges. For this reason, the findings of the technical evaluation in Papua are presented separately from the other eleven provinces.

9.1 Sub-Project Types

Members of communities and sub-project selection committees in Papua were found to select a significantly different mix of sub-project types than elsewhere, as the following table shows:

<table>
<thead>
<tr>
<th>%’s</th>
<th>Roads</th>
<th>MCK</th>
<th>Bridge</th>
<th>Water</th>
<th>Drainage</th>
<th>Jetty</th>
<th>Building</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papua</td>
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<td>18</td>
<td>10</td>
<td>15</td>
<td>5</td>
<td>1</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>11 Prov.</td>
<td>42</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>12</td>
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<td>4</td>
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Compared to the other eleven provinces, communities in Papua are less likely to select roads and drainage/irrigation sub-projects. By contrast, they are far more likely to select MCK and water supply sub-projects. They are slightly less likely to select buildings and slightly more less to select bridges and electricity.
The actual numbers of each type of sub-projects examined by the team in Papua are presented in the table below.

Sub-Project Type (number evaluated)

<table>
<thead>
<tr>
<th>Sub-Project Type</th>
<th>Roads</th>
<th>MCK</th>
<th>Bridge</th>
<th>Water</th>
<th>Drainage</th>
<th>Jetty</th>
<th>Building</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papua</td>
<td>78</td>
<td>50</td>
<td>29</td>
<td>42</td>
<td>13</td>
<td>4</td>
<td>45</td>
<td>21</td>
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</table>

9.2 Technical Quality of the Sub-Projects

The Technical Evaluation of sub-projects in Papua found their quality to be generally lower than that found in the other evaluated 11 provinces. When an aggregate of all of the technical ratings is conducted, the results are as shown in the chart below. It shows that only 71% of aspect ratings were considered as ‘High Quality’, whereas for the other 11 provinces, the average rate was approximately 82%. Also, and perhaps of more concern, at 8%, the proportion of sub-projects receiving the lowest ratings (‘Failed’), is twice that of the rest of the country (4%).
As mentioned in the main report, the Technical Evaluation was based on the ratings defined by the SIF, with each aspect of a sub-project being rated as: ‘Sufficient’, ‘Slightly Below’ or ‘Below Specification’. In the report, these ratings were re-categorized as ‘High Quality’, ‘Acceptable Quality’, and ‘Failed’. All sub-projects rated as ‘Sufficient’ are categorized as ‘High Quality’ portions in the charts above. A small portion of sub-projects rated as ‘Slightly Below’ were re-categorized as ‘High Quality’ on the basis of the comments collected by the assessors.

9.3 Functionality and Utilization

To assess the level of Functionality and Utilization of sub-projects in Papua, the Technical Evaluation examined 273 SIFs for sub-projects in Papua. For these sub-projects, the proportion receiving a rating of ‘High’ was only 45%. This was 20% lower than the proportion of sub-projects with this rating elsewhere in Indonesia, where 56% received a ‘High’ rating. In Papua, an additional 33% of sub-projects received a rating of ‘Average’. Thus, 78% of sub-projects in Papua received a rating of average or better. This compares to an average rate of 90% for the other 11 provinces.
At 8%, the proportion of sub-projects in Papua receiving a rating of ‘Low’ was significantly higher than the average for the other 11 evaluated provinces, where the proportion was 10%. Even more significantly, however, at 11%, the proportion of sub-projects in Papua that were considered to have no function or utility was five times higher than the average for the other 11 evaluated provinces, where the proportion was 2%. The following table indicates the number of sub-projects in Papua with low levels of functionality and utilization for each of the different sub-project types:

<table>
<thead>
<tr>
<th>Sub-Project Type</th>
<th>Roads</th>
<th>MCK</th>
<th>Bridge</th>
<th>Water</th>
<th>Drainage</th>
<th>Jetty</th>
<th>Building</th>
<th>Electricity</th>
</tr>
</thead>
<tbody>
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<td>Papua</td>
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<td>10/50</td>
<td>1/29</td>
<td>13/42</td>
<td>0/13</td>
<td>0/4</td>
<td>10/45</td>
<td>2/21</td>
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</tbody>
</table>

This table indicates that the proportion of sub-projects in Papua deemed to have a low level of functionality and utilization is particularly high for MCK facilities, water supply and public buildings sub-projects. A detailed review of the Comments Database may show why this problem exists.

9.4 Apparent Technical Problems

Back to office reports (BTOR) have been written by each of the TE team members for each of the provinces visited for the purposes of this evaluation. A review of the BTORs submitted during this TE from the other 11 provinces indicates that all of the common problems noted by the inspectors elsewhere in Indonesia are also common in Papua. Comments by inspectors and recommendations from these other provinces are all quite similar in nature to those from Papua. However, certain types of comments appear more frequently for Papua than for the other provinces.

The fact that the proportion of sub-projects receiving high ratings is lower in Papua than elsewhere in the country is probably due to the frequent absence of experienced and qualified technical facilitators to supervise the sub-projects. There are empty facilitator
positions in 22 of 34 sub-districts in Papua. Of 422 Technical Facilitator positions in Papua, 205 are currently vacant. With half of the technical positions being vacant, the capacities of currently employed Technical Facilitators are being stretched by the requirement that they cover a much broader territory to cover these vacancies. The team heard of a number of sub-projects being fully constructed without a single visit being made by a PNPM technical facilitator or engineer, which clearly has significant implications for the technical quality of these sub-projects.

The following chart on the left depicts the evaluation’s appraisal of the quality of technical supervision and facilitation in Papua.

![Quality of Technical Facilitation](chart1.png)

The above right chart shows that the quality of technical facilitation in Papua is significantly lower than elsewhere among the evaluated provinces. The average proportion of sub-projects with a high quality of technical facilitation elsewhere was: High 28%, Average 55%, and Low 17%. Thus, the proportion of sub-projects in Papua deemed to have a low quality of technical facilitation was more than three times higher than elsewhere.

The Barefoot Engineers skills-training program currently underway in Papua has been implemented by PMD to fill technical positions with local personnel who will stay in a position for a longer duration than technical facilitators recruited from elsewhere (see box below).

A further analysis of the data from Papua could be conducted to provide additional clues as to why the results there are consistently worse than in the rest of the archipelago.
Barefoot Engineers Program

As stated above, a major challenge facing the PNPM program has been a chronic shortage of qualified facilitators, particularly technical facilitators with engineering skills and qualifications. To address this issue, in August 2008, the World Bank on-granted approximately US$ 1 million to the University of Cendrawasih (Uncen) in Jayapura to design and deliver a six-month intensive training course combining classroom teaching with the practical application of new knowledge in the field on the most common small-scale infrastructure projects funded by the PNPM-Respek program.

The special training was very successful. Of the original class of 120, of whom 90% were indigenous Papuans and 30% were women, 106 participants graduated in March 2009. Graduates were then recruited as technical facilitators and deployed in their home district. Combined with 56 graduates of a similar training program conducted by Uncen in 2003 (Barefoot Engineers Wave I), the 2009 Barefoot Engineers (wave II training) make up more than half of the total field engineers for PNPM-RESPEK.

As well as providing much needed engineering support to Papuan villagers through PNPM-RESPEK, particularly to remote areas where it is more difficult to recruit and retain university-educated engineers, the Barefoot Engineers special training program provides young Papuans with new skills, confidence, and employment opportunities.

Initial findings conducted through World Bank supervision missions in Papua and West Papua and through other means suggest that the deployment of ‘Barefoot’ graduates as technical facilitators in PNPM-Respek has been effective. The technical quality of the infrastructure designed by the graduates is satisfactory to good, and the quality of facilitation has been satisfactory as
well. The ability of these facilitators to speak with local languages enables broader and more active participation in the remote areas in which they are deployed. Their new skills and the contributions they are able to make are also a source of great pride in their communities.

Although the 2003 and 2009 rounds of Barefoot Engineers training and mid of 2010 recruitment helped to fill vital program needs, PNPM-Respek continues to face significant shortages of technical facilitators. Approximately 300 technical engineers position are empty, and turnover of technical facilitators remains high. To meet the need for additional facilitators, a two-year project was approved in 2011 to train an additional class of 140 Barefoot Engineers.

Subsequent discussions took place and are ongoing regarding the need to train up to 300 Barefoot Engineers. Also being addressed is the need to improve mentoring and follow up support, after the initial six to seven-month classroom training, to ensure that these new, young community barefoot engineers are motivated to work in very remote and difficult areas and have the skills and confidence to do so. A decision on the number of Barefoot Engineers and the implementation modality, including the strengthening and readiness of the financial and fiduciary management systems from the Uncen team will be made before mid-2012 when implementation of the project, wave III, is expected to commence.
10.1. Introduction

A special study has been performed at the request of AusAID for analysis and comments to be developed regarding PNPM’s work in the rural sanitation and water supply activities of the portfolio. This annex contains materials and charts that have been created to answer these queries. It also includes some supplementary analytical results from the Technical Evaluations of the MCK (mandi, cucu, kakus, or public bathing, washing, and toilet facilities) and water supply facilities. These preliminary results demonstrate the potential for additional analysis of the data and information gathered during this recent Technical Evaluation. Further examination and manipulation of the database can be conducted to illuminate and illustrate conditions in the different regions of Indonesia, as discussed below.

10.2. PNPM’s MCK Activities

Our Technical Evaluation team inspected a total of 97 MCK sub-projects. This comprises slightly more than 5% of the total number of sub-projects visited during this assignment. Our evaluation visited random villages from within carefully selected sub-districts in each of several districts in 12 provinces. An effort was made in the selection of all of these administrative divisions to include both remote locations and more readily accessible locations. Thus, it can be estimated that MCK sub-projects likely comprise approximately 5% of PNPM annual sub-projects throughout the archipelago.

The following chart depicts the number of MCK facilities that were visited in each province. It can be seen that Papua villages selected this type of sub-project much more frequently than those in the rest of Indonesia. If the Papuan MCK sub-projects were to be discounted from the country total, the selection of this type of village infrastructure falls to approximately 3% of the total for the remaining 11 provinces. A full size, clearer version of this and other charts is included with this submission.
10.3. MCK Beneficiaries

The field instrument used during the Technical Evaluation team’s site visits invited inspectors to fill in either the number of beneficiaries or the number of households that made use of the subject facilities. Household figures were multiplied with the Susenas (National Socio-Economic Household Survey) 2010 figures for mean average household size in rural areas. These figures were between approximately 3.8 to 4.75 persons/household (e.g. lowest Lampung = 3.82; highest North Maluku = 4.74).
It should be noted that averages for Central Java and West Java have been omitted from this chart, due to reporting discrepancies arising from the field data gathered in those provinces. No MCK facilities were inspected in West Kalimantan or NTT (Nusa Tenggara Timor, or East Nusa Tenggara). These calculations and the data to support the rationale will be checked as soon as possible to verify these figures.

10.4. MCK Funding Sources

The predominant form of funding for MCK facilities was from PNPM Rural.

The funding from RESPEK represents such a large proportion of this chart because Papuan villages requested many more of such facilities than the rest of the country.
10.5. MCK Functionality and Utilization

The following chart shows that 69% of MCK sub-projects have been judged to be of average or better functionality and utilization. These two aspects are combined because, while they are measures of different things, they are also quite strongly linked. Functionality assesses whether the infrastructure is still operating as originally planned or intended. If so, then a rating of ‘Average’ would be considered. A ‘High’ rating for this aspect of the assessment might be represented by a sub-project where the recipient community or users have independently added to or improved a sub-project to increase its usefulness. Actions of this nature would be a strong vote of confidence in the original PNPM works as the instigator of further self-directed community development activities.

**MCK Functionality and Utilization—All Provinces MCK Sub-Project Aggregated**

Utilization was rated in terms of two fundamental questions by our inspectors. The first is straight-forward: *Is an appropriate portion of the recipient community’s populace using the facility or infrastructure as intended?* If so, then a rating of ‘Average’ would be considered.

The second level of a sub-project’s utilization, however, requires more contextual and personal information to be gathered at the site and assessed. The TE team members were instructed to make observations and ask questions regarding the community’s inter-
est in the infrastructure and enthusiasm for its impact on their activities and daily lives. Statements of support for the addition of the infrastructure into the community’s social fabric as well as support for the PNPM’s community planning and construction mechanisms may justify a ‘High’ rating. The final rating is an aggregate of the two findings.

**Functionality and Utilization—Aggregated of All Sub-Project Types in All Provinces**

As the above chart shows, the level of functionality and utilisation for MCK sub-projects is significantly below the aggregate for all sub-project types (which includes MCK). Much of this problem lies with the issue of maintenance of these facilities, which was found to be quite lacking for almost all of the evaluated sub-projects of this type.

10.6. MCK Technical Facilitation and Supervision

This section deals specifically with PNPM’s management processes in processing, dealing with, and helping to facilitate villages’ requests for and construction of MCK facilities. The following table shows the aggregated ratings for Technical Facilitation and Supervision, rated by our inspectors as high, average, or low.
Quality of Technical Facilitation and Supervision

<table>
<thead>
<tr>
<th></th>
<th>High (%)</th>
<th>Average (%)</th>
<th>Low (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCK</td>
<td>14</td>
<td>48</td>
<td>38</td>
</tr>
<tr>
<td>All Sub-project Types</td>
<td>28</td>
<td>55</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: all sub-project types figures include MCK ratings. These high and average figures would reach higher number if they exclude MCK results.

These results clearly show that PNPM’s efforts to facilitate the provision of MCK facilities in rural communities can be much improved to equal PNPM’s work in the development of other rural infrastructure forms. Most of the design/construction problems associated with MCK are associated with inadequate underground works: poorly constructed septic tanks, bad drainage in MCK vicinity, inadequate water supply, etc. Poor maintenance is also an omnipresent issue, although some arguments can be made that villagers may see little point in maintaining a poorly designed and constructed unit that starts to physically degrade as soon as it is completed (as a result of low quality fixtures, doors, etc.).

10.7. MCK Technical Analysis - Preliminary

All sub-projects evaluated during this exercise had a number of physical, operational and environmental aspects rated by inspectors. The following aspects of MCK facilities were rated: layout; building(s); septic tank/soak away; source of water; maintenance; and environmental safeguards.

Each of the aspects for each individual sub-project was in terms of five possible ratings: sufficient; slightly below (sufficient); below spec. (specification); not inspected; or not applicable.
These aspect ratings are defined as the following:

- **Sufficient**: The sub-project aspect meets the design/operational/maintenance/or environmental criteria necessary for the longevity and usefulness of the infrastructure for the recipient community.

- **Slightly Below**: The sub-project displays certain characteristics that could be improved upon within its design/operations/maintenance/or environmental criteria. This will be a situation where the sub-project was largely constructed according to the approved plans but where the inspector feels something could be improved upon in the future. Sub-projects receiving this rating for any aspects will be provided with a written comment on the inspection form explaining the unique situation and potential remedies.

- **Below Spec. (Below Specification)**: The sub-project was either (i) not constructed according to the approved plans, or (ii) presents a clear and present danger to the life or safety of users. Sub-projects receiving this rating for any aspect will be provided with a written recommendation on the inspection form. This box is intended to draw attention to the specific sub-project in order that mistakes are not repeated.

- **Not Inspected**: It may occasionally be impossible for the TE team to inspect a certain aspect of a sub-project. The TE team will question the sub-district personnel in such cases to verify sub-project details to the fullest extent possible.

- **Not Applicable**: Some aspects will not be applicable to sub-projects. For example, a retaining wall examined under ‘1 Road or Structure’ will not feature the aspect ‘Culverts’.

The results of these field evaluations were inserted into digital spreadsheets, enabling the quick and accurate summarization of data and comparison of data subsets. All sub-project locations were classified as ‘Remote’, ‘In-between’, or ‘Near Main Road’, along with the year of construction, beneficiaries, funding source, etc. The foregoing charts were developed using this administrative data.
The following charts show percentages based on an aggregate of all MCK sub-projects evaluated in 12 provinces, for each of the aspects evaluated.

The two charts above illustrate PNPM’s abilities to facilitate the construction of good and structurally sound buildings. Our Technical Evaluations of schools, markets, health clinics have also found this to be true in almost all cases.

The following two charts, however, show where problems start to arise.
For the ‘Water Source’ and ‘Septic Tank’ aspects, a lower proportion of MCK sub-projects received a rating of ‘Sufficient’ and an increased proportion received a rating of ‘Below Specification’. Septic tanks, though a very simple piece of infrastructure, are consistently constructed incorrectly. Too often, they are entirely omitted in the construction process. Contaminated flows from these structures are often discharged to the ground surface immediately adjacent to the MCK. This obviously creates an extremely unhealthy environment, detracting from the infrastructure’s value.

The final two charts, showing the ratings for MCK in terms of the ‘Maintenance’ and ‘Environmental Safeguards’ aspects, show a similar pattern: less than half of the sub-projects display qualities that are desirable in such facilities, particularly in the case of the ‘Maintenance’ aspect.

This brief examination of the technical quality of MCK infrastructure can be broadened through the use of other items of information that were collected during this Technical Evaluation. As mentioned above, each sub-project was classified in terms of its proximity to larger population centers via access to a ‘main road’. This allows us to explore the hypothesis that proximity to a vital transportation linkage may affect the quality or ‘budget efficiency’ of a particular sub-project. Technical quality, as determined by the proportion of sub-projects receiving a rating of ‘Sufficient’ or higher may be quite closely linked to the proximity of villages to ‘main roads’. The TE team has not had enough time to examine all of these postulations in detail. Some of our early work in this regard suggests that closeness to a ‘main road’ does not, in fact, guarantee better results, but more work needs to be done to study this and other associated issues in more detail.
10.8. MCK Budget Analysis and Community Contributions (Swadaya)

The Technical Evaluation team collected budget information for all sub-projects from sub-district records. This information has been collated in Jakarta and inserted into a database file maintained at PSF. Some preliminary analysis has been conducted on this information, which is included with the TE Final Report as Annex 9: Budget Database. The analysis was conducted for the first nine provinces covered in the evaluation and has not yet been updated for the full 12-province study.

For these nine provinces, the average cost of an MCK sub-project was found to be Rp. 1,040,000/m². Compared to the cost of similar government-sponsored projects, where the figure stood at Rp. 1,672,500/m². This information indicates that PNPM works cost on average 38% less than similar government-sponsored projects.

Our Technical Evaluation field instrument did not contain provisions for inputting the value of community contributions to each sub-project. Adding such provisions might be considered for future Technical Evaluation forms. Our inspectors did, however, take photographs of sub-project signboards where they existed. These signboards normally contain information related to the level of the community’s contribution to the sub-project budget, so that an examination of our Photo Database could yield this information. When time allows, we may be able to retrieve and report this information for the evaluated MCK sub-projects.

10.9. PNPM’s Water Supply Activities

Water supply sub-projects comprise approximately 10% of PNPM sub-projects in the period from 2007 to 2011. These sub-projects involved a wide variety of different techniques and methodologies, with everything from rooftop rainfall gathering systems to drilled borehole wells, and mountain spring-fed gravity systems to electric pumps in surface waters supplying village reservoirs, all being well represented.
The funding sources for these projects are thus:

### Funding Sources

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of Sub-Projects</th>
<th>PNPM Rural</th>
<th>BKPG</th>
<th>Respek</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Java</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>West Kalimantan</td>
<td>13</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>West Sulawesi</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>NTT</td>
<td>18</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>West Sumatra</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>West Java</td>
<td>7</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>North Maluku</td>
<td>10</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maluku</td>
<td>10</td>
<td>9</td>
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<td>2</td>
</tr>
<tr>
<td>Aceh</td>
<td>14</td>
<td>5</td>
<td>8</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lampung</td>
<td>17</td>
<td>15</td>
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<td>0</td>
<td>3</td>
</tr>
<tr>
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<td>25</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Papua</td>
<td>42</td>
<td>22</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>136</td>
<td>8</td>
<td>20</td>
<td>11</td>
</tr>
</tbody>
</table>
10.10. Water Supply Functionality and Utilization

The following chart shows that 82% of PNPM’s water supply sub-projects were evaluated as being of average or better functionality and utilization. The high proportion of sub-projects receiving such ratings is likely due to the users’ perception that a public water system is both important for their community and vital for their own personal interests in saving time and energy.

This existing awareness on the part of community members of the importance of these water systems can be used to expand the technical integrity of the systems. More efforts should be put into the training of Operations and Maintenance teams, along with simple written instructions of common problems associated with community water system and methods to remedy these problems.

![Water Supply—Functionality and Utilization](chart)

10.11 PNPM’s Technical Support to Water Systems

Here again, the quality of water systems sub-projects was noticeably low, with only 66% of such projects being assessed as of average or better quality. Many systems evaluated in the field display obvious signs that no senior, experienced personnel supervised or reviewed the designs. Preliminary surveys are lacking in a significant proportion of cases, with a lack of
understanding of simple hydraulics being quite evident in too many evaluated water supply systems sub-projects. PNPM’s recent moves toward the deployment of specialists in regions or provinces will be of great benefit in improving this situation.

**Quality of Technical Facilitation and Supervision**

<table>
<thead>
<tr>
<th></th>
<th>High (%)</th>
<th>Average (%)</th>
<th>Low (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Supply</td>
<td>21</td>
<td>45</td>
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</tr>
<tr>
<td>All Sub-project Types</td>
<td>28</td>
<td>55</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: All Sub-project Types figures include Water Supply ratings. These High and Average figures would be higher should they exclude Water Supply results.

10.12. Water Supply Beneficiaries

The following two charts illustrate the total number of beneficiaries of the evaluated sub-projects as well as an average of the number of users of the systems.

**Water Supply-Total Beneficiaries**
Two additional charts of Average PNPM Budget/Sub-project and Average PNPM Budget/User can be found in the attached Excel file, entitled Water Supply Analysis.

10.13 Water Supply Technical Aspect Analysis

Similarly, additional analysis and charts of the technical aspects of water systems is provided in the attached spreadsheet file Water Supply Analysis. A comparison of findings for Water Source, Design and Installation, Distribution Network, Maintenance and Environmental Safeguards are examined in this study.

Additional analysis can be conducted for these issues. Examining the Technical Evaluation’s results for trends over the years is possible, as well as for differences in sub-project quality by degree of remoteness of a subject village or sub-district.