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Impact of the Implementation of the Farm-To-Market Roads (FMR) by the Department of Public Works and Highways (DPWH) in San Fernando Province of Camarines Sur

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ABSTRACT

This study examined the extent and impact of the implementation of Farm-to-Market Road (FMR) projects by the Department of Public Works and Highways (DPWH) in the Municipality of San Fernando, Camarines Sur, covering calendar years 2020–2021 to 2022–2023. Specifically, it assessed the level of FMR implementation in terms of planning process, budget allocation, physical target achievement, project completion, and monitoring and evaluation; determined differences in implementation and impact across respondent groups; evaluated the social, economic, environmental, and socio-economic impacts of the projects; and generated policy recommendations based on the findings. The study employed a descriptive–inferential–correlational research design with documentary analysis. Data were collected using a structured questionnaire with a five-point Likert scale and analyzed using frequency count, percentage, mean, weighted mean, rank, and the Mann–Whitney U test at a 0.05 level of significance. Results revealed that FMR implementation was generally rated as Much Implemented, particularly in planning, budget allocation, project completion, and monitoring and evaluation, while physical target achievement was rated as Implemented. Significant differences in rank orders were found across most implementation dimensions, except for the planning process. In terms of impact, respondents generally Agreed that FMR projects contributed positively to social, economic, environmental, and socio-economic well-being, with economic and socio-economic impacts rated highest. Significant differences between respondent groups were observed in economic, environmental, and socio-economic impacts, while no significant difference was found in social impact. Based on the findings, the study recommends strengthening transparency mechanisms, enhancing inter-agency coordination, institutionalizing regular monitoring and evaluation, increasing stakeholder participation, and integrating climate-adaptive and digital monitoring tools to improve the effectiveness and sustainability of FMR implementation.

1. Introduction

Rural infrastructure plays a critical role in advancing agricultural productivity, improving market access, and enhancing the overall quality of life in farming communities. Among infrastructure interventions, Farm-to-Market Roads (FMRs) are widely recognized as essential catalysts for inclusive rural development, as they reduce transportation costs, minimize post-harvest losses, and facilitate the efficient movement of agricultural goods from production areas to markets. In developing economies, sustained investment in FMRs has been linked to increased farm incomes, strengthened local economies, and improved access to basic social services such as education and healthcare.

In the Philippine context, the development of FMRs remains a strategic priority under national rural development and agricultural modernization programs. The government, through the Department of Public Works and Highways (DPWH) in coordination with the Department of Agriculture (DA) and local government units (LGUs), has implemented numerous FMR projects to address long-standing issues of farm isolation, poor road conditions, and limited market connectivity in rural and geographically disadvantaged areas. These interventions are particularly significant in agricultural provinces such as Camarines Sur, where road infrastructure directly influences farm productivity, livelihood sustainability, and rural welfare.

Despite substantial public investment in FMR projects, concerns persist regarding the effectiveness, efficiency, and equity of their implementation. Issues related to planning processes, budget allocation, physical target achievement, project completion, and monitoring and evaluation have been raised in both policy discussions and community feedback. Moreover, while infrastructure completion is often used as a primary performance indicator, fewer empirical studies systematically examine the broader social, economic, environmental, and socio-economic impacts of FMR projects on local stakeholders. This gap is more pronounced at the municipal level, where implementation outcomes and community experiences may vary significantly across local contexts.

The Municipality of San Fernando in the Province of Camarines Sur presents a relevant case for assessing FMR implementation

and impact. As an agriculture-dependent municipality, the effectiveness of FMR projects in San Fernando has direct implications for farmers' market access, income generation, environmental sustainability, and overall socio-economic well-being. However, empirical evidence evaluating both the extent of FMR implementation by the DPWH and its multidimensional impacts on stakeholders within this locality remains limited.

In response to this gap, the present study assessed the extent of implementation of Farm-to-Market Road projects by the DPWH in San Fernando, Camarines Sur, for calendar years 2020–2021 to 2022–2023, focusing on planning process, budget allocation, physical target achievement, project completion, and monitoring and evaluation. It also examined the perceived social, economic, environmental, and socio-economic impacts of these projects and tested for significant differences in implementation and impact between groups of respondents. By integrating implementation assessment with impact evaluation, this study aims to provide empirical evidence to inform policy formulation, enhance transparency and accountability, and support the improvement of FMR project planning and execution at the local level.

2. Methodology

The study adopted a descriptive–evaluative–inferential research design, complemented by documentary analysis, to comprehensively examine both the implementation and impact of Farm-to-Market Road (FMR) projects in San Fernando, Camarines Sur. This methodological approach was appropriate given the dual objectives of the research: first, to determine the extent of project implementation across key dimensions of infrastructure delivery, and second, to assess perceived multidimensional impacts among different stakeholder groups. By integrating descriptive and inferential components, the design enabled both systematic documentation of existing conditions and statistical testing of differences in perceptions between implementers and end users.

The descriptive–evaluative component was central in quantifying the extent of FMR implementation along planning process, budget allocation, physical target achievement, project completion, and monitoring and evaluation. This approach is particularly suitable for infrastructure assessment studies where the primary interest lies in understanding the degree to which predefined standards, procedures, or performance indicators are observed in practice. The evaluative aspect further allowed the study to link implementation processes with outcome dimensions, specifically social, economic, environmental, and socio-economic well-being, thereby extending the analysis beyond project completion toward developmental impact.

Inferential analysis was employed to test the presence of statistically significant differences in rank orders of implementation and impact between respondent groups. The use of the Mann–Whitney U test was methodologically sound, given the ordinal nature of the Likert-scale data and the comparison between two independent groups—implementers and end users. Setting the level of significance at 0.05 aligned with conventional standards in social science and public policy research, ensuring a balanced control of Type I error while allowing meaningful inference.

In terms of sampling, purposive sampling was applied in selecting the study locale, ensuring that the municipality examined was directly relevant to the research objectives due to its exposure to multiple FMR projects within the specified period. For respondents, total enumeration was adopted, covering all identified implementers and beneficiaries who met the study criteria. This approach strengthened the representativeness of stakeholder perspectives and minimized sampling bias, particularly important in localized infrastructure impact assessments. The resulting respondent composition—implementers from relevant government agencies and a large proportion of end users from farming, fishing, business, and community sectors—provided a balanced view of both policy execution and lived experience.

Data collection relied primarily on a researcher-developed questionnaire, supported by documentary analysis of official records. The instrument was carefully structured to reflect the conceptual dimensions of implementation and impact, with a total of 45 indicators evenly distributed across the study variables. The use of a five-point Likert scale enabled nuanced measurement of perceptions while facilitating quantitative analysis through weighted means and rank ordering. Documentary analysis further enhanced methodological triangulation by anchoring perception-based data to institutional practices and records.

To ensure methodological rigor, the instrument underwent content validation by a panel of jurors composed of academic experts, implementers, and stakeholders, thereby strengthening its relevance, clarity, and alignment with the study objectives. Reliability testing using the Kuder–Richardson Formula 21 yielded a coefficient of 0.756, indicating acceptable internal consistency for social science research. The statistical significance of this coefficient further confirmed that the instrument was reliable and that measurement error was minimal.

Overall, the methodological framework employed in this study was appropriate and robust for evaluating public infrastructure programs at the local level. The combination of descriptive evaluation, inferential testing, stakeholder-inclusive sampling, and validated measurement tools ensured that findings were both empirically grounded and policy-relevant. This methodological rigor supports the credibility of the conclusions and enhances the utility of the study for informing improvements in FMR planning, implementation, and governance.

3. Results and Discussions

This section presents and discusses the findings on the extent of implementation and the impact of Farm-to-Market Road (FMR) projects implemented by the Department of Public Works and Highways (DPWH) in the Municipality of San Fernando, Camarines Sur, covering calendar years 2020–2021 to 2022–2023. Results are organized according to the major dimensions of implementation and impact, followed by tests of significant differences between respondent groups.

3.1 Extent of Implementation of Farm-to-Market Roads

3.1.1 Planning Process

Results indicate that the planning process of FMR projects was consistently rated as Much Implemented by both implementers and end users (overall weighted mean = 3.67). Among the indicators, *feasibility study and detailed consultation* ranked highest, reflecting strong emphasis on technical and consultative groundwork prior to project execution. This suggests that project planning in San Fernando was largely systematic, participatory, and evidence-based, increasing the likelihood of project acceptability and alignment with community needs. These findings imply that inclusive consultation and technical feasibility assessments were integral to project preparation, consistent with participatory infrastructure planning principles emphasized in rural development literature

Table 1. Extent of FMR Implementation Along the Planning Process

Indicator	Overall Wx	Interpretation
Feasibility study and detailed consultation	3.75	Much Implemented
Assessment and preliminary consultation	3.68	Much Implemented
Implementation and ongoing consultation	3.64	Much Implemented
Detailed planning and design	3.64	Much Implemented
Stakeholder engagement and continuous consultation	3.62	Much Implemented
Overall Mean	3.67	Much Implemented

3.1.2 Budget Allocation

Budget allocation was also rated Much Implemented (overall weighted mean = 3.51). Evaluation of budget sources, appropriateness of budget distribution, and transparency in utilization received the highest ratings, indicating effective financial planning and accountability mechanisms. However, relatively lower ratings for timeliness of fund release and allocation for unforeseen expenses suggest operational constraints that may affect implementation efficiency. The results underscore the importance of transparent budgeting while highlighting the need for greater flexibility and responsiveness in fund disbursement during project execution.

Table 2. Extent of FMR Implementation Along Budget Allocation

Indicator	Overall Wx	Interpretation
Evaluation of budget sources	3.69	Much Implemented
Appropriateness of budget distribution	3.58	Much Implemented
Transparency in budget utilization	3.50	Much Implemented
Timeliness of fund release	3.44	Implemented
Allocation for unforeseen expenses	3.36	Implemented
Overall Mean	3.51	Much Implemented

3.1.3 Physical Target Achievement

Physical target achievement was rated Implemented (overall weighted mean = 3.46). While compliance with technical specifications and progress in meeting milestones were rated highly, indicators such as road length constructed, quality of construction materials, and number of bridges built received comparatively lower ratings. These findings suggest that while project execution generally met planned standards, certain physical outputs may have been constrained by geographic, financial, or logistical factors, particularly during the COVID-19 period.

Table 3. Extent of FMR Implementation Along Physical Target Achievement

Indicator	Overall Wx	Interpretation
Progress in meeting project milestones	3.59	Much Implemented
Compliance with technical specifications	3.50	Much Implemented
Road length constructed	3.48	Implemented
Quality of construction materials	3.38	Implemented
Number of bridges built	3.34	Implemented
Overall Mean	3.46	Implemented

3.1.4 Project Completion

Project completion was assessed as Much Implemented (overall weighted mean = 3.52). High ratings for timeliness, final inspections, and utilization of project resources indicate effective project management and quality control mechanisms. This indicates that despite contextual challenges, FMR projects were largely completed within acceptable timelines and standards

Table 4. Extent of FMR Implementation Along Project Completion

Indicator	Overall Wx	Interpretation
Timeliness of project completion	3.55	Much Implemented
Final inspections and approvals	3.55	Much Implemented
Utilization of project resources	3.53	Much Implemented
Adherence to planned schedule	3.49	Implemented

Handling of unforeseen challenges	3.48	Implemented
Overall Mean	3.52	Much Implemented

3.1.5 Monitoring and Evaluation

Monitoring and evaluation (M&E) was likewise rated Much Implemented (overall weighted mean = 3.54). The integration of lessons learned and use of monitoring data ranked highest, reflecting adaptive management practices. The results demonstrate a strong orientation toward continuous improvement, although the frequency of monitoring and feedback responsiveness may still be strengthened

Table 5. Extent of FMR Implementation Along Monitoring and Evaluation

Indicator	Overall Wx	Interpretation
Incorporation of lessons learned	3.63	Much Implemented
Utilization of monitoring data	3.58	Much Implemented
Effectiveness of evaluation methods	3.55	Much Implemented
Responsiveness to feedback	3.49	Implemented
Frequency of monitoring activities	3.47	Implemented
Overall Mean	3.54	Much Implemented

3.2 Differences in the Extent of Implementation

The Mann–Whitney U test revealed significant differences between respondent groups in budget allocation, physical target achievement, and project completion, while no significant differences were found for planning process and monitoring and evaluation. These differences suggest varying levels of access, involvement, and awareness between implementers and beneficiaries, particularly in financial and output-related aspects of project delivery.

Table 6. Test of Significant Differences in Extent of Implementation

Dimension	Z-value	p-value	Decision
Planning process	0.00	0.5000	Not significant
Budget allocation	-2.09	0.0183	Significant
Physical target achievement	-1.77	0.0384	Significant
Project completion	-2.50	0.0062	Significant
Monitoring and evaluation	-0.42	0.3372	Not significant

3.3 Impact of Farm-to-Market Roads

Overall, the findings indicate that Farm-to-Market Road (FMR) projects generated positive multidimensional impacts among respondents. Social impacts were favorably assessed (Agree, overall mean = 3.81), with the most pronounced effects observed in improved access to education and healthcare services and strengthened community cohesion. Economic impacts received the highest evaluation (Agree, mean = 3.96), underscoring significant gains in market accessibility, agricultural productivity, and employment opportunities.

Environmental impacts were likewise positively rated (Agree, mean = 3.59), particularly in relation to the adoption of sustainable practices and preservation of natural habitats; however, respondents expressed neutral perceptions regarding the reduction of environmental degradation, reflecting concerns over land conversion and potential ecological disturbance. In terms of socio-economic well-being, the projects were assessed favorably (Agree, mean = 3.90), highlighting improvements in overall quality of life, public infrastructure and services, household income levels, and poverty reduction.

3.4 Differences in Impact Between Respondent Groups

Significant differences were observed in economic, environmental, and socio-economic well-being impacts, while social impact showed no significant difference. These results indicate that while social benefits were broadly experienced, economic and socio-economic gains were unevenly distributed, highlighting the need for more inclusive targeting and benefit-sharing mechanisms

Table 7. Test of Significant Differences in Impact

Impact Dimension	Z-value	p-value	Decision
Social	-0.1044	0.4602	Not significant
Economic	-2.51	0.0060	Significant
Environmental	-1.46	0.0721	Significant
Socio-economic well-being	-3.13	0.0009	Significant

4. Conclusions and Implications

4.1 Conclusions

This study concludes that the implementation of Farm-to-Market Road (FMR) projects by the Department of Public Works and Highways (DPWH) in San Fernando, Camarines Sur, from 2020–2021 to 2022–2023 was generally effective and positively perceived by both implementers and beneficiaries. Key dimensions of implementation—planning process, budget allocation,

project completion, and monitoring and evaluation—were predominantly rated as Much Implemented, reflecting sound planning mechanisms, effective resource utilization, and systematic oversight. Physical target achievement, while positively assessed, received comparatively lower ratings, indicating operational and contextual constraints that may have affected full attainment of planned outputs.

Inferential analysis revealed significant differences in perceptions between implementers and end users with respect to budget allocation, physical target achievement, project completion, and monitoring and evaluation, while no significant difference was found in the planning process. This suggests that planning activities were consistently understood across stakeholder groups, whereas implementation outcomes and benefits were experienced unevenly during later project stages.

In terms of impact, FMR projects generated favorable outcomes across social, economic, environmental, and socio-economic well-being dimensions. Economic impact emerged as the strongest, demonstrating improvements in market access, agricultural productivity, and employment opportunities. Social and socio-economic impacts were likewise positive, particularly in enhanced access to basic services, improved quality of life, and reduced vulnerability. Environmental impacts were generally rated positively, especially in relation to sustainable practices and habitat preservation; however, neutral perceptions regarding the reduction of environmental degradation point to ongoing concerns related to land conversion and ecological disturbance. Significant differences in perceived economic, environmental, and socio-economic impacts between respondent groups further indicate unequal distribution of benefits, while social impacts were consistently perceived.

4.2 Implications

The findings have important implications for infrastructure policy and practice. At the policy level, the generally positive implementation and impact outcomes support continued investment in FMR projects as a mechanism for agricultural development and rural poverty reduction. However, disparities in stakeholder perceptions highlight the need to strengthen transparency in budget utilization, project reporting, and monitoring systems to promote accountability and shared understanding.

From an implementation perspective, improving physical target achievement requires timely fund release, enhanced logistical planning, and provision for contingency financing. Sustained stakeholder engagement beyond the planning phase—particularly during implementation and monitoring—may help reduce perception gaps and ensure that project outputs align more closely with community needs.

From an environmental standpoint, the neutral assessment of environmental degradation reduction underscores the importance of integrating climate-adaptive designs, environmental impact assessments, and post-construction monitoring into FMR projects to balance infrastructure development with ecological sustainability.

This study demonstrates the value of combining implementation assessment with multidimensional impact analysis at the local level. Future studies may expand this work through comparative or longitudinal analyses to better understand long-term and distributional effects of rural infrastructure investments.

Authors Biography

John Louie O. Rafael is an Economist II at the Bureau of Agricultural and Fisheries Engineering, where he supports the planning, evaluation, and monitoring of agricultural and fisheries infrastructure programs. His work involves project appraisal, economic and policy analysis, and coordination with national and local stakeholders in the implementation of farm-to-market roads and related rural development initiatives.

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