EXECUTIVE SUMMARY OF RRNDP

Overview. This Final Impact Evaluation Report presents an impact evaluation of the Rural Network Development Project (RRNDP), a road improvement project covering national secondary roads and related structures. It was implemented over the period 1991 – 2012, in three phases. The Project, financially supported by the Government of Japan (GOJ), built over a thousand km of roads in 26 provinces throughout the country.

Evaluation method. The method for impact evaluation is patterned after a World Bank study for similar rural road project in Vietnam (Mu and van de Walle, 2011). The theory of change posits that household living standards will increase, through an increase in farm income as farmers gain better access to input and output markets; as well as easier access to employment opportunities and markets for non-farm enterprises. Data collection is limited to nine provinces to keep costs within budget; the nine provinces, selected based on road length of RRNDP sub-projects; representation of island groups (Luzon, Visayas, and Mindanao); and representation of the three project phases. The provinces are: Nueva Ecija, Masbate, and Pangasinan (Luzon); Antique, Eastern Samar, and Iloilo (Visayas); Agusan del Norte, Agusan del Sur, and Compostela Valley (Mindanao).

The quantitative impact evaluation adopts a treatment-control comparison between households clustered into barangays. The influence area of the RRNDP are defined as rural barangays immediately adjacent to RRNDP sub-projects. These define the set of **project barangays**, representing the treatment group, located in **project municipalities.** Meanwhile, non-project barangays represent the control group. Impact of the project will be measured by difference in average household incomes in project versus non-project barangays, with an adjustment for endogenous selection of project barangays. The resulting impact measure is **average treatment effect on treated** estimated using propensity score kernel matching.

The quantitative impact evaluation is accompanied by a process evaluation to give deeper insight on how the project was implemented; how well the project outputs were maintained; and shed light on other study objectives outside the scope of impact evaluation, such as modal shifts; and other before-after comparisons in project areas. These entailed an engineering assessment and a qualitative assessment of project areas in the nine provinces.

Findings of process evaluation. Engineering assessment found that almost all the projects have undergone improvement in some way. The extended interval from RRNDP project completion until now means that enough time has elapsed for either DPWH or Provincial Engineer to develop a road improvement project from other funding source (mainly from the national budget). Hence, identification of project barangays is now confounded with post-RRNDP road improvements; a similar process of improvement has also likely taken place in some (or even most) of the non-project barangays.

Engineering assessment found that eleven sub-projects were well-maintained; four are moderately well-maintained; five are fairly well-maintained; and only three are

poorly maintained. Of the three RRNDP sub-projects that are not well-maintained, all are provincial roads damaged by a big flood back in 2015.

Qualitative assessment finds that the major expected outcomes based on the TOC has materialized in the sub-project sites. Changes in **travel time** are quite significant: something like 67 to 75 percent reduction in travel time has occurred in most areas. Hence, **traffic volume** has increased. After the project, regular jeepneys and tricycles could now ply the route leading to increased traffic. Increased vehicular traffic would also arise from **increased ownership of private motor vehicles**. Farmers would typically invest in their own tricycles to carry their produce to market. Health care delivery became more efficient. Health care workers are are now able to visit more communities more frequently and regularly. Most likely, student absenteeism and even dropout rates declined, and the time available to study increased.

Findings of impact evaluation*. Descriptive statistics from the household survey find the following:

- By household characteristics, households are highly similar between project and non-project barangays. Household heads tend to have up to third year secondary schooling on average. Only a fifth are farm operators.

- The dominant agricultural activity is farming of crops, with annual or temporary crops being more common than permanent crops. The most common crop planted is palay. Among the permanent crops, the more common types are assorted fruits, followed by coconut.

- Households in project areas incur lower travel cost per week, as well as average travel time per week. Heavy rain prolongs travel time but does not prevent travel.

- Total household income is double the poverty threshold, but still lower than average family income (because confined only to rural households). Farm income is only a minor share of household income; the share is higher for project areas. Over two-thirds of household income originates from wage and salary employment.

- Across vehicle types, households in project areas own fewer motorbikes and tricycles, though slightly lower number of cars/vans, and trucks. Overall in project areas, there are fewer vehicles per hundred households, compared to non-project areas.

Quantitative impact evaluation finds the following:

- The ATET on household income for sample households is -10,495 pesos, opposite the expected sign. However, the standard error of the estimate is so high, it does not reach statistical significance. Meanwhile ATET for per capita is 6,900 pesos in project areas, which is the correct sign. However, the probability of Type 1 error is much higher than the 5 percent threshold. Hence, **the impact evaluation finds no compelling evidence for a positive, significant impact of RRNDP on household living standards**. Similarly,

impact of RRNDP on years of schooling per household member; average traveling time per member per week, and average traveling cost per week per member, do not rise to the level of statistical significance.

- We check for the robustness of the findings on ATET by re-estimating it using standard propensity score matching. Similarly, the ATET estimates for household income, per capita household income, years of schooling per household member, average traveling time, and average travel cost, are not statistically significant, although ATET for household income is positive and close to 5 percent level.

Recommendations. Under evaluation design, we recommend the following:

- Adopt GIS in mapping the inventory of all roads and road quality indicators.

- Implement GPS-enabled driving test for road quality monitoring.

- Design an evaluation study prior to road project implementation, incorporating a baseline study of relevant household-level variables**.**

- Implement an endline study within 2-3 years after the end of the road project

- Include an adequate set of controls subjects in the baseline study.

- Identify control areas in such a way that the remaining credible control areas at least until the endline study.

Under road investment policy, we recommend the following:

- Support for investment allocation towards rural roads should emphasize long term economic returns from income diversification.

- Consider directing investments towards areas traditionally bypassed by road investment projects.

Lastly, to promote sustainability of benefits from road investment we recommend:

- Enable LGUs to reach at least DPWH-level of resources in implementing road maintenance.

- Given the challenge of climate change and high frequency of disaster, allocate adjustable funding for rehabilitation in response to calamity-induced road damage.