

Does poor rural infrastructure constrain agricultural productivity?

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Jncreasing agricultural productivity is at the core of the government's growth and poverty reduction strategy. A sustained rise in agricultural productivity brings about lower food prices and benefits both urban and rural inhabitants who are net food buyers. Aside from its growth benefits, agricultural productivity also has significant poverty reduction effects.

It has been hypothesized that rural infrastructure raises agricultural productivity, which in turn induces growth in the rural areas and brings about higher agricultural wages and improved opportunities for nonfarm labor. What does the literature say about the effect of infrastructure on growth and in particular, on agricultural productivity? How critical indeed is rural infrastructure in raising agricultural productivity? Which particular rural infrastructure acts as a major support to agricultural productivity?

This *Policy Notes* reports on recent empirical findings that tend to support the hypothesis that

rural infrastructure has a significant impact on raising agricultural productivity. As such, the *Notes* recommends the need for government to address the inadequacies in rural infrastructure.

Link between infrastructure and agricultural productivity

One of the factors behind the successful integration and rapid economic growth of East Asian economies into the global economy was the high quality of infrastructure in these East Asian countries. This has given them a competitive edge over other countries in Asia which have not invested in good infrastructure. While there is varying opinion and contrasting empirical findings among researchers about the link between

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infrastructure and growth, the preponderance of empirical evidence seems to show that inadequate supply of infrastructure or the unreliability of infrastructure services constrains investment and growth. Various studies have indicated that inadequate infrastructure can act as a significant constraint to growth and productivity.

Recent causality tests indicate that the direction of causation runs from infrastructure to economic growth and that regional imbalance in infrastructure availability has a negative impact on a region's economic growth prospects (Llanto 2007a, 2007b). Differences in availability of infrastructure have led to differences in regional growth in the Philippines (Basilio and Gundaya 1997; Manasan and Chatterjee 2003; Llanto 2007b). Llanto (2007a) and Cuenca (2004) find evidence that infrastructure could be a key variable in regional convergence.

Underinvestment in infrastructure

The Philippines has underinvested in infrastructure. In the recent past, the country's infrastructure investments averaged only at around 2 percent of gross domestic product (GDP) in contrast with the 5 percent norm for other ASEAN countries. This has resulted in the failure of the country's infrastructure to keep up with the growing needs of the economy and the population. With respect to key infrastructure, the Philippines thus compares unfavorably with its regional neighbors (ADB 2007), making it a relatively unattractive investment destination and leading to a higher cost of doing business in the country.

For the Philippines, an archipelagic country, transport efficiency is a critical development imperative. Shipping facilitates at least 80 percent of interisland movement of both passengers and

cargoes. However, inefficiencies in interisland ports and shipping, road transport, and telecommunication have had an adverse impact on the growth and competitiveness of domestic trade in the Philippines. A recent survey of the World Bank (Cross-Border Trading 2006) indicates that the Philippines has the highest cost of exporting a container among ASEAN countries (Basilio, Llanto, and Rodolfo 2007). According to the World Bank's Doing Business Indicators, it costs 60–300 percent more to export a 20-foot container from the Philippines than from China, Singapore, or Thailand.

Methodology and findings of the study

Notwithstanding severe data limitations, the study from which this *Notes* is culled used the standard production function approach with agricultural productivity as the dependent variable and rural infrastructure and other variables as independent variables.

The results show that:

- There is a significant link between rural infrastructure and agricultural productivity.
- Electricity and roads are significant determinants of agricultural productivity.
- Rural roads provide the important connectivity with growing markets adjacent to rural areas; they also lessen input costs and transaction costs of rural producers and consumers.
- Access to electricity creates various income-earning opportunities for rural households.
- Rural areas, which have good road infrastructure and accessibility to electricity, will experience higher rates of growth of agricultural productivity than those areas with inadequate roads and energy. Regions with high infrastructure investments tend to have higher economic growth while regions with low infrastructure investments tend to have lower economic growth.

The case for improving the energy sector is the need of firms and households for cheap, safe, and reliable supply of electricity. Access to cheap energy will provide rural households with an array of feasible options for production, processing, marketing, and distribution. This will help create the conditions for improved agricultural productivity. For electricity, a 1 percentage point increase in the number of households with electricity relative to the total number of households is associated with an increase of about 22 million pesos/agricultural worker in agriculture productivity.

Good quality or paved roads contribute to the physical integration of rural areas with urban areas, which result in access to faster-growing urban markets. Paved, all-weather roads provide the connectivity to markets that rural producers and consumers must have in order to satisfy their respective investment and consumption requirements. Good roads create economic opportunities to which enterprising rural households may positively respond. They open opportunities for sourcing relatively cheaper inputs and for marketing or trading rural produce at better prices from diverse markets, which would have been out of reach without good roads. For roads, a 1 percentage point increase in the length of paved roads as a ratio to total length of roads is associated with an increase of about 285 thousand pesos/agricultural worker in agriculture productivity.

Policy implications

Despite the measurable benefits of rural infrastructure investment, underspending in this area has persisted. Some of the important factors behind the underinvestment are the following:

- *The narrow fiscal space has constrained the national government from making critical infrastructure investments.*

The failure to raise substantial revenues and inefficient expenditures in the past coupled with years of neglect of the rural areas have resulted in ill-maintained irrigation systems, costly electricity, rural roads in extremely bad condition, and inadequate, inefficient, and accident-prone interisland shipping transport which have taken their toll in terms of lower productivity and lower level of welfare, especially in the rural areas.

- *Local government units (LGUs) have inadequate fiscal capacity and limited access to external financing.*

There is an imbalance in local fiscal capacity, which has an adverse impact on the availability and quality of infrastructure at the regional, provincial, municipal, and city levels. Richer and more advanced regions have better infrastructure while lagging regions are beset by inadequate infrastructure. The larger (richer) LGUs can raise substantial own-source local taxes and have a bigger share of the internal revenue allotment by virtue of their bigger population and relatively larger land areas. Local fiscal autonomy is constrained because the Local Government Code limits the power of LGUs to set local tax rates and preserves the more revenue-productive taxes in favor of the national government.

- *Many LGUs lack the administrative and technical capacity for better planning and programming of local resources and implementation of local infrastructure.*

LGUs are fragmented into small political but uneconomical units, with many of them incapable of raising the fiscal resources and maintaining technical capacity required for efficient local service delivery, including the provision of critical local and rural infrastructure. With a small local economy and tax base, many of them have remained dependent on fiscal transfers from the

national government whose own fiscal position is also challenged by low tax effort.

What must government do?

The government must improve its tax collection effort, reduce inefficient spending, and stamp out corruption, especially in the infrastructure agencies. It must also address the expected inadequate power supply in the future, which will constrain growth. The government should work with the private sector and donors in solving the threatening power supply situation.

Local governments must improve their local fiscal capacity to raise resources for local development. Facing policymakers are some outstanding policy issues on local finance: (a) the size and appropriate distribution formula of the internal revenue allotment, (b) the improvement of the equalization feature of the internal revenue allotment, (c) expansion of local fiscal capacity by assigning more revenue-productive taxes to LGUs, (d) development of capacity for better planning and programming of local resources and implementation of local infrastructure, and (e) expansion of local tax bases by resisting the tendency of politicians to cut up local governments into more unviable and smaller political units. 📄

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References

- Asian Development Bank. 2007. Philippines: critical development constraints. ERD Country Diagnostics Studies. Mandaluyong City: ADB.
- Basilio, L. and D. Gundaya. 1997. The impact of collective public infrastructure on regional income disparities. Unpublished thesis, University of the Philippines School of Economics.
- Cuenca, J. 2004. An empirical analysis of factors affecting regional economic growth and convergence in the Philippines. Master's thesis, De La Salle University, Manila.
- Llanto, G.M. 2007a. Identifying critical infrastructure-related constraints to economic growth and equitable development in the Philippines - Background report to Philippines: critical development constraints. <http://www.adb.org/Projects/Country-Diagnostic-Studies/default.asp>.
- _____. 2007b. Infrastructure and regional growth. In *The dynamics of regional development*, edited by A. Balisacan and H. Hill. Cheltenham: Edward Elgar.
- _____. 2008. A review of build-operate-transfer for infrastructure development: some lessons for policy reform. PIDS Discussion Paper No. 2008-25. Makati City: Philippine Institute for Development Studies.
- Manalili, R. and L. Gonzales. 2009. Impact of infrastructure on profitability and global competitiveness of rice production in the Philippines. <http://www.irri.org/publications/wrrc/wrrcPDF/session10-06.pdf> [accessed 12 January 2009].
- Manasan, R. and S. Chatterjee. 2003. Regional development. In *The Philippine economy: development, policies, and challenges*, edited by A. Balisacan and H. Hill. Quezon City: Ateneo de Manila University Press.