Gender-Specific Impacts of Road Improvement: What Can Be Done to Ensure That Better Roads Expand Economic Opportunities for All?

KEY FINDINGS

- Road improvements are associated with increased agricultural trade in both male- and female-headed households. However, an increase in agricultural production is only observed in male-headed households.

- Female-headed households may not be able to fully benefit from improved roads because they have less household labor and capital available. This is a result of having one less working age adult, and makes it more difficult for them to increase agricultural production.

- Coordinating road improvement programs with complementary interventions, such as access to credit programs, may help vulnerable households overcome constraints to making productive changes.

BACKGROUND

There is evidence that better transport infrastructure can achieve multiple development outcomes, from improving employment opportunities to reducing poverty. However, analysis of gender differences in these impacts has received less attention. We still don’t fully understand whether men and women benefit equally from improvements to transport infrastructure, and what barriers, if any, prevent either gender from reaping benefits on par with the other. With global spending on this particular development intervention estimated at US$1 trillion annually, it is imperative to make sure that both genders fully benefit.

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2 The estimates range from US$900 billion in studies by the Institute for Transportation and Development Policy (ITDP) and EMBARQ (Sakamoto et al. 2010; Mahendra et al. 2013), between US$1.4 and US$2.1 trillion in a World Resources Institute (WRI) study (Lefèvre et al. 2014), and US$2.6 trillion in a study by the International Energy Agency (IEA) (Dulac 2013).
WHAT DID WE DO?

We analyzed the impacts of a large World Bank Group-supported road improvement program, the Third Rural Transport Project in Vietnam (RTP3). The development objective of RTP3 was to improve year-round access to markets, economic opportunities, and social services for rural populations. Under the project, rehabilitation activities were carried out on approximately 3,100 km of rural roads and maintenance on over 19,000 km of rural roads spread across 33 provinces in Northern and Central Vietnam between 2008 and 2015.

Our analysis used a mixed methods approach. First, we carried out a rigorous ex post impact evaluation of RTP3 combining the Vietnam Access to Resources Household Survey (VARHS) with administrative data on the rollout of the project. Then, we carried out interviews and focus group discussions with beneficiaries in a subset of project sites in order to better understand the mechanisms behind the observed impacts in the ex post impact evaluation.

WHAT DID WE FIND?

**Crop trade increases in all households, but production only increases in male-headed households**

The results of the impact evaluation suggest that RTP3 road improvements triggered an increase in crop trade in all the households in our study sample (Figure 1). Interviews with project beneficiaries suggested that this was driven by the “access” channel: road improvements facilitated access to fields, transport of crops to markets, and access to and for traders. For example, one respondent said:

“When the road had not yet been upgraded, I drove a bike to carry 20 kg rice to a market. I couldn’t carry much more. It took 20 minutes… It might take a half of day to sell… Now I phone customers to come to buy rice. I don’t need to carry the product to the market.”

— Woman, Nghệ An Province

Figure 1 highlights two more important facts about the nature of this change, however. First, though crop trade increased across the study sample, the magnitude of the increase was substantially higher among male-headed households. And second, the production of crops increased only among male-headed households.

**Why do impacts differ for male- and female-headed households?**

We found two explanations for the difference between male- and female-headed households. First, our data show that female-headed households are households that are constrained in terms of household labor. They have one less working age adult compared to male-headed households (Figure 2). It appears that men are considered the head of household by default when both spouses are present. Female-headed households are households headed by widows or single women. This deficit of a working age adult makes it difficult to increase crop production directly since household labor is a key input into agricultural production.

Second, our qualitative interviews revealed that households increased production in two ways: they either increased their use of machinery as an input or started cultivating crops such as orange or acacia that brought greater revenue.

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3 We used a difference-in-difference framework for the non-experimental impact evaluation. For more details about econometric specification as well as qualitative data collection, please refer to the full paper, available at worldbank.org/eapgil.
In the words of the respondents:

“In the old days, we used buffaloes or oxen to plough. Getting up at 5 a.m., leading the buffaloes and ploughing tools to the rice fields, we would finish ploughing 1 sào at 8 a.m. Nowadays [with machines], 3 sáos takes 1.5 hours.”

— Woman, Phuc Thanh, Nghệ An Province

“I started planting acacia in 2012. First, I planted on 2 ha, and planted rubber on the remaining 1 ha. In 2016, I planted acacia on all 3 ha since rubber was not profitable.”

— Man, An Bac, Quảng Nam Province

Both types of changes have financial implications. Hiring machinery requires additional payments in the pre-harvest period. Cultivating crops such as orange and acacia requires liquidity over a longer period since the harvest cycles of these trees are much longer than the harvest cycles for crops like rice and maize. Poor households and households missing income from a household member, such as female-headed households, are less able to make these investments.

“Rich people have capital, so they can wait. We [are a household with] an average living standard… We cannot make long-term and large-scale investments like the rich.”

— Woman, Luong Son, Lào Cai Province

We find suggestive evidence that female-headed households may be selling assets such as land as a way of financing productive investments. Our quantitative data show that in these households RTP3 improvements are associated with an increase in income from selling assets and a decrease in income from agriculture (Figure 3). The decrease in agricultural income may be due to a transition to more profitable crops with longer growth cycles. Notably, for male-headed households we observe the opposite trend. RTP3 road improvements are associated with an increase in income from agricultural activities in male-headed households and decrease in income from the sale of assets.
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WHAT ARE THE POLICY IMPLICATIONS?

The results indicate that although road improvements under RTP3 create economic opportunities in agriculture, female-headed households face difficulties in taking advantage of these opportunities because of low access to household labor and capital.

This suggests the need for additional interventions to allow female-headed households and other vulnerable households facing similar credit or household labor constraints to fully reap the potential benefits of better roads. Programs facilitating access to credit or improving financial literacy would be examples of such interventions. Even if such programs are not explicitly targeted at female-headed or other vulnerable households, we expect their impacts to be greater for these households provided that the programs are accessible to them.

Our results also point to the value of complementarity in government investments. For example, coordinating the implementation of a rural roads program with an agricultural credit program could lead to greater impacts than the sum of the impacts of either the road improvement on its own or the credit program on its own, at least for more vulnerable households.

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