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**Impact of an integrated rural development project on income and poverty: Evidence from Guangxi, China**

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**Objectives/aims**

Improving market access of smallholder farmers in the developing world is considered an important approach to moving them out of poverty and increasing their economic mobility. In China, rural poverty has declined at a phenomenal speed within just two decades, and much of this success story is attributable to rapid income growth in rural areas. Thus, having a good understanding of how development efforts in rural China may help alleviate poverty and improving economic mobility is of particular interest for policy, as they are instrumental in informing future project design and scaling-up of success stories to other regions in China as well as to other countries.

The Guangxi Integrated Agricultural Development Project (GIADP) is an example of a development effort aimed at increasing rural household income in China through three project components: community infrastructure development, agricultural production and marketing support, and rural environmental improvement. The project was approved by the Executive Board of the International Fund for Agricultural Development (IFAD) in December 2011, entered into effect in January 2012, and ran until March 2017. Interventions delivered covered three main components: community infrastructure improvements, agricultural production and marketing support, and interventions aimed at preserving the rural environment.

The overall goal of the impact assessment of GIADP is to attempt to measure the impact of the GIADP on four core dimensions: agricultural production, economic mobility, food security and resilience. Because these outcomes cannot always be measured directly, we use a set of proxy variables for each of these core outcomes. Moreover, since the GIADP included different subcomponents, we attempt to measure the average effects of the project on the classes of outcomes listed above, along with trying to measure the impact of some specific components.

**Methods**

In order to measure the impact of GIADP primary data was collected from a representative pool of beneficiaries (treatment group) and non-beneficiaries (control group). The impact assessment methodology employs a non-experimental design. Because the impact assessment is conducted in an ex post manner, there are two primary estimation challenges: (1) to properly construct treatment and the counterfactual or control groups, and (2) to attempt to limit bias in impact estimates due to nonrandom placement of the program. To address these challenges, the identification strategy relies on a three stage matching approach, where the counterfactual is first determined at administrative village (AV) level where AVs are matched within counties (AVs); then at natural village level (NVs); and last, at household level where households are consequently matched within such AVs and NVs. In addition, the AVs and NVs sample selection was further validated through a consultation with key informants and experts, who confirmed the validity of the counterfactual.

In terms of impact estimation strategy, a number of estimators, namely the inverse probability weighting estimator with regression adjustment (IPWRA), the inverse probability weighting estimator (IPW), covariate matching (NN), propensity score matching (PSM), and the regression adjustment (RA) estimators were compared and employed to verify the robustness of results.

Impact estimates are computed for the whole sample, and for specific sub-samples, namely poor and vulnerable counties (the relatively better off ones) and samples of counties receiving different sets of interventions within the poverty category (specifically, AVs receiving (1) agricultural production and marketing support only, (2) infrastructural development only, (3) agricultural production and marketing support along with infrastructural development, and (4) agricultural production and marketing support along with rural environmental improvement). The sub-group analyses are essential to understand the heterogeneity of project impact, given that different treatment intensity occurred, i.e. the distribution of interventions was not homogeneous across all AVs.

**Main findings**

The quantitative findings indicate that beneficiary households have higher yields and value from production of their crops, in particular fruit crops, and this finding is particularly strong for the vulnerable counties sample among those receiving agricultural support and infrastructure interventions. We also find higher yields and value from production of vegetable crops among those receiving agricultural support and environmental improvement interventions, an innovative intervention approach introduced by GIADP for potential scaling-up to other areas in the future. In terms of economic mobility and income returns, we do not observe a significant impact on the income aggregate, except for vulnerable counties (albeit marginally significant) while we also find a positive and significant impact on household savings for the same counties, highlighting the result that savings accumulation can only happen in context where there is sufficient income growth. On the other hand, given the strong pro-poor focus of the project, we find that households in poorer counties, exhibit positive and significant changes in assets ownership, specifically durable assets, and this finding is particularly strong for the sub-sample of households who receive the agricultural and marketing components, and even larger for those receiving infrastructure and agricultural interventions combined (albeit marginally significant in the latter case, given the small sample size). In addition, we find an impressive impact on poverty dynamics, where treated households are more likely to move out of poverty. These findings are consistent across almost all asset-based relative poverty lines, and across all sub-samples, and are particularly strong when using the durable assets index distribution to define the poverty lines.

While our results show lower dietary diversity for treated households in a number of instances, compared to households in the control group, such findings are particularly unstable across the different specifications and the sub-samples, warranting further research. Relative to the resilience dimension, proxied by both the coping strategy and the ability to recover indicators, we did not find any positive and significant impact except for households residing in poor counties and receiving the infrastructural component.

These results point out to at least two implications for future research and more generally for policy design of rural development efforts. First, the findings confirm that agricultural, marketing related and infrastructure interventions tailored to context-specific conditions can generate positive and significant impacts. However, further research, possibly with ex ante impact assessments, is still needed to understand the mechanisms and channels through which improvements in agricultural production and market access may help beneficiary farmers improve their welfare. For instance, additional investigation is required to understand farmers’ decisions vis a vis marketing opportunities and the relevant constraints that might prevent farmers from taking full advantage of such opportunities. Second, the strong impacts on assets and particularly the ones on durable and productive assets for the less-well off households receiving both agricultural and infrastructural-related interventions combined, raise a point of consideration for future design of rural development projects. Particularly, it motivates the need to investigate the possibility of implementing integrated approaches covering two key aspects of rural development, namely the provision of agricultural and marketing support, along with infrastructural development geared towards the improvement of market access, price transmission and the reduction of transaction costs, particularly for those at the bottom end of the income distribution. This would maximise the benefits of individual interventions and would allow smallholders to fully benefit from the outcomes that can be brought about by production-oriented interventions, and thus permitting them to permanently move out of poverty and improve economic mobility.