**PAPER NUMBR #262**

**Understanding resilience profiles in the context of a high-frequency data collection in Ethiopia**

**Presenting Authors**

Alessandra Garbero

**Affiliation**

International Fund for Agricultural Development (IFAD)

**Country of residence**

Italy

**Objectives/aims**

As part of an ex-post impact assessment of an IFAD-supported project, the Participatory Small-scale Irrigation Development Programme (PASIDP), an agricultural project aimed at improving food security and increasing income of beneficiaries by providing access to small-scale irrigation infrastructure systems in four regions of Ethiopia, we ran a lab-in-the-field experiment and collected a high-frequency dataset to investigate the relationship between farmers' resilience profiles, risk preferences and agricultural productivity and well-being outcomes. The novel high-frequency dataset consists of a baseline survey collected in November 2016, and three follow-up surveys conducted every three months until November 2017.

The goal of this study is therefore to address three main research questions. First, we explore the relationship among the prevalence of resilience estimated using a number of mainstream methodologies that have recently gained momentum in the literature in the context of an impact assessment. Specifically, do we see robust and ubiquitous evidence of resilience prevalence as displayed by the various resilience indices when using the different approaches? While answering this research question, we also discuss the implications of setting specific resilience thresholds, defined as the critical level at which the household is considered to fall into a non-resilient “trap” which can coincide or not with a poverty trap or a food insecure trap. Hence the ancillary question is to test whether different resilience estimation methods generate consistent findings on the relationship between resilience and poverty traps among the households in the sample. Thirdly, by answering these research questions, our study aims to develop a list of the most relevant indicators for measuring resilience, which would help streamline the data requirement for the empirical approach to measure resilience.

Last, our study contributes to the existing literature by also studying the relationship between risk and time preferences, resilience profiles and well-being outcomes by measuring impact using quasi-experimental methodologies.

**Methods**

Resilience, similar to other well-being indicators, is a multidimensional concept. To date, scholars have developed several approaches to estimate resilience. One common approach to measure resilience is to use the stochastic frontier analysis, which combines the multidimensional ordering and the stochastic dominance approaches to measure resilience. A second approach, developed by a working group at the Food and Agriculture Organization of the United Nations (FAO), employs a multidimensional poverty analysis approach by a multivariate statistical technique, is referred to as the Resilience Index Measurement and Analysis (RIMA) model. A third approach, which is an updated version of the RIMA model, is the Resilience Index Measurement and Analysis – II (RIMA II) model. The fourth approach is to use a principle component analysis (PCA) to combine different sub-indices to form a single resilience index developed from a household survey conducted in Ethiopia from the Pastoralist Areas Resilience Improvement and Market Expansion (PRIME) project. The fifth approach is to use a conditional moment-based econometric approach to compute household-level resilience index. And finally, the sixth methodology uses a simulation-based model to measure resilience by building the counterfactual scenario of shock incidents.

These wide ranging methodologies allow researchers and practitioners to choose from a greater set of relevant indicators that measure resilience by reducing them into a single variable; either as a predictor variable or as a dependent variable. However, an important empirical challenge to be explored is whether the various methods all lead to a robust resilience impact measure. Developing a streamlined methodology to measure resilience is important for generating lessons learned to improve the design, targeting, and implementation strategies of projects aimed at building resilience capacity of beneficiaries. Being able to correctly identify the potential beneficiaries who are most likely to benefit from a resilience-building project would allow the project to help them strengthen their resilience capacity, and hopefully lift them out of poverty. Hence, the motivation to revisit and compare the existing methodologies that estimate resilience, to guide researchers and practitioners using the various existing methodologies.

However, it is also important to assess the exogeneity of a resilience measure in the context of an ex-post impact assessment framework. The potential endogeneity, in terms of joint determination of the resilience measure along with the interventions delivered on the ground, plagues in fact existing metrics and is thoroughly assessed in this paper. Hence this study uses a range of methods – from structural equation models, data reduction methods such as factor analysis, and difference in difference, along with sensitivity analyses to derive an impact measure that is exogenous to the intervention.

**Main findings**

The findings from this study offer greater insights into measurement of resilience in the context of ex-post impact assessments with quasi-experimental designs, using high-frequency data. Specifically the robustness of resilience measurement results from different methodologies is explored extensively, especially when these results are contingent on the methodology used, as the analysis of resilience, and subsequent lessons learned from the analysis to inform future project design and implementation could differ greatly. Therefore this study aims to fill this gap in the literature, notably by measuring resilience impact reliably using a novel dataset, and second, by characterizing resilience profiles according to risk and time preferences.