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## Small Farmers’ Climate Change Adaptation Can Be Accelerated by Citizen Science

JONATHAN STEINKE<sup>1,2</sup>, JACOB VAN ETTEN<sup>1</sup>, THOMAS AENIS<sup>2</sup>

<sup>1</sup>*Bioversity International, Adaptation to Climate Change,*

<sup>2</sup>*Humboldt-Universität zu Berlin, Albrecht Daniel Thaer-Institute of Agricultural and Horticultural Sciences, Germany*

### Abstract

Small-scale farmers in the global south are among the most vulnerable population to the effects of climate change. As effective adaptation will be key to preserving livelihoods, many farmers are adapting their production system to new pressures or options by making choices among locally available agrobiodiversity. Cultivar adjustment is a highly effective adaptation strategy, so facilitating farmers’ access to crop varietal diversity can accelerate climate adaptation by strengthening local adaptive capacity.

Traditional plant breeding has had limited impact in marginal environments, in part because it often failed to address farmers’ highly specific selection criteria. Efforts of participatory variety selection (PVS) have tackled this issue, but are bound to focus on a limited geographical coverage. In practice, inconsistent attendance to PVS activities often leads to distorted results, non-adoption of selected varieties and thus does not lead to climate change adaptation.

Citizen science may offer a solution. It involves recruiting large numbers of volunteers to help in scientific tasks, including data collection, analysis and interpretation. Citizen science differs from the participatory methods used until now in the agricultural sciences in that it requires less group organisation and involves more information and communication technologies (crowdsourcing).

Using a citizen science approach, small seed packages of promising crop varieties can be disseminated to large numbers of farmers and tested under local conditions. This may lead to a higher *in situ* agrobiodiversity, dynamic adaptation of farming households, and strengthened climate change resilience of rural communities.

We show that “triadic” comparisons between different varieties is a simple and effective way to evaluate the adaptation options and feed information into local seed networks. Farmers are incentivised to participate via planting an individual mini-trial by the access to new varieties and the capacity building involved. Farmers make accurate observations on the varieties’ local suitability, which can be used as inputs to variety recommendations in other regions. Women are empowered by the easy participation. Up-scaling of the approach is feasible by building on mobile phone technology and local seed distribution points.

**Keywords:** Citizen science, climate adaptation, cultivar adjustment, participatory variety selection