

# Soil testing, organic farming and digitalization: Supporting Indonesian smallholders to farm more sustainably



UNIVERSITAS  
GADJAH MADA

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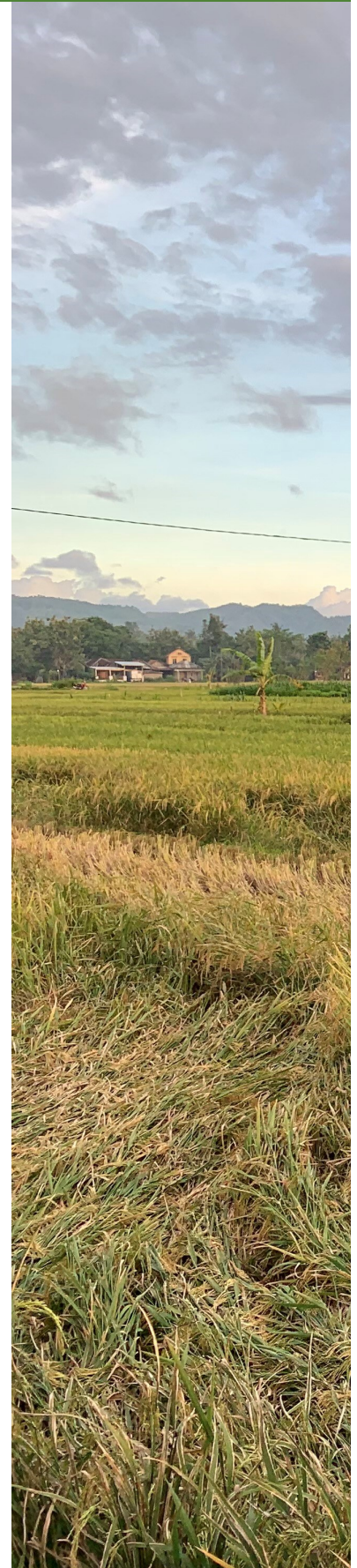
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## Introduction

The intensive use of chemical fertilizers and pesticides has contributed to a significant decrease in poverty rates; however, it is also associated with negative impacts on soils, water resources and biodiversity. Presently, only a small fraction of agricultural land worldwide is cultivated sustainably prioritizing soil health. The intensive use of fertilizers and pesticides has contributed to an unprecedented reduction in poverty, however, it is also associated with negative impacts on soils, water resources, and biodiversity. In Indonesia alone, an estimated 107 million hectares of land are currently experiencing acidification, partly due to decades of excessive fertilization. The intensive and often unbalanced use of chemical fertilizers has also greatly reduced soil organic matter.

How can smallholders be supported to transition towards more sustainable agricultural practices? What motivates farmers to use organic practices in the long-term? How can soil tests and digital extension resources be introduced to farmers to protect the environment and increase farm productivity? A team of researchers from the University of Passau and the University Gadjah Mada has explored these questions in two projects funded by the German Research Foundation (DFG) and the German Federal Environmental Foundation (DBU).

### **Learning about the sustainable adoption of green agricultural technologies: Experimental evidence from training on organic farming**

In Indonesia, numerous initiatives promote organic farming. This includes NGOs that have been active since the 1980s, governmental programs emerging in the early 2000s, and increasingly also private businesses. Despite these collective efforts, organic farming remains a marginal activity in Indonesia. Increasing the uptake of organic farming requires a better understanding of how to motivate farmers to use organic farming practices in the longer-term. This project uses an experimental design with more than 1,000 farmers to evaluate the longer-term impact of repeated organic farming training in Tasikmalaya and Yogyakarta.

### **A large-scale pilot experiment on low-cost soil-test kits to enhance sustainable farming among smallholders in Indonesia**

Farming technologies must be adapted for use in developing and emerging countries, where farming occurs mostly on small, low-tech farms with little financial resources and little training. One promising technology in this regard is the use of simple and low cost soil tests. This project investigates how such soil tests can be introduced among smallholders to improve the health of their soils. The research is located in the province of Yogyakarta.

Extension workers play a key role in promoting sustainable soil health management. Yet, Indonesia, like many other countries, faces a shortage of extension workers. Increasing online agricultural extension is one solution to address this shortage. This project explores the potential of blended learning by evaluating a training that combines conventional face-to-face extension with digital platforms to promote sustainable farming practices.

The research findings from these two projects, their key messages and policy recommendations are presented in a series of policy briefs.