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IMPROVING THE MEASUREMENT AND ANALYSIS OF AFRICAN AGRICULTURAL PRODUCTIVITY: PROMOTING COMPLEMENTARITIES BETWEEN MICRO AND MACRO DATA

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BACKGROUND: During the last 30 years, the physical, cultural, and socioeconomic environment in which cropping is carried out has changed in much of Africa. Population densities and population growth rates have increased; arable land per capita, soil quality, and tree cover have declined; input and credit markets have changed; and the relative importance of non-farm income has risen. African governments and donors have devoted much time, effort, and money to identify constraints, to develop new technologies, and to change the policy environment so that farmers can better cope with their evolving environment, thus raising farm output and productivity. As governments implement new agricultural policies and programs, it is imperative that they accurately monitor their effect on productivity. Poor agricultural data and inappropriate analyses can lead to misallocation of scarce resources and policy formulation that fails to resolve critical development and productivity problems.

OBJECTIVES: The goal of this research is to inform donors and policy makers about the relative strengths and weaknesses of the data and methods now used in African productivity analysis in view of encouraging better application of research results and design of research and monitoring programs. These objectives are accomplished using data from recent micro-level analyses of field surveys for Burkina Faso, Rwanda, Senegal, and Niger as well as a selective review of

farm productivity studies conducted in Africa during the last 30 years.

FINDINGS: The authors (1) identify numerous situations where poor data lead to incorrect estimates of African land and labor productivity and (2) argue that better coordination of macro (country-level), meso (district- and zone-level), and micro (farm-level) data collection, reporting, and analysis can lower costs and improve the ability to monitor trends and to quantify determinants of agricultural productivity. Seven key points are made in the discussion:

1. Missing or poorly measured variables are biasing productivity ratios.
2. In most cases, these errors underestimate levels of agricultural productivity and distort trends (not accounting for secondary crops in mixed cropping systems or ignoring household labor used in off-farm activities, for example).
3. Micro data are an important source of information for identifying the existence and magnitude of these errors in macro and meso data.
4. Information from micro data can improve estimates of productivity when macro data are not available and are too costly to collect.
5. Detailed micro data sets are the best source of information on the farm-level determinants of



agricultural productivity. This information contributes to the development of productivity-enhancing policies and technologies.

6. Micro data play an important role in identifying the appropriate variables to monitor in macro and meso series.

7. Only consistently-high-quality macro data in unbroken time series can provide adequate information about productivity trends and the contribution of policy and technological change to national agricultural productivity over time.

Improving the data used to monitor and analyze agricultural productivity requires much greater cross-fertilization of detailed micro studies and broad macro-data collection and reporting. As data collection and analysis costs are high, researchers and statistical services need to ensure the maximum complementarity possible among different types of surveys and data. This requires coordination among donors, government agencies, and research institutes that fund, collect, and analyze agricultural data.

RECOMMENDATIONS: Some of the key recommendations for improving agricultural productivity data and analyses are:

1. Countries should determine for which variables they can afford to collect data in their macro time-series and insure adequate funding so the data are of a consistently high quality and available in a timely fashion from year to year.

2. Once a country decides on a macro-survey design that it can competently handle, the institution responsible should ensure that ongoing micro surveys provide information on notable gaps in the macro-data -- particularly for labor-use and output of secondary crops.

3. Agricultural data bases should be seen as international public goods whose value goes far beyond the value to a single country. This implies that foreign assistance should be used to (a) improve uniformity of macro data-collection systems and methods across countries, (b) provide supplementary funding when necessary to avoid

breaks in time series due to temporary financial constraints, and (c) encourage the collection of the micro data needed to evaluate and supplement the macro series.

4. The extent to which macro surveys contain variables permitting data to be separated into different farm population groups greatly enhances the usefulness of the macro data base.

5. Efficiency of productivity analyses could be increased if a central clearing house for agricultural data bases were created in each country. This clearing house should publish an index of data and abstracts with key information such as variables and periods covered, sampling procedures, representativity, data format and software used, and names of people or institutions that know the data.

6. Countries should find ways of using computers, electronic mail, and global positioning technologies to improve data collection and access.

7. In the long run, the range of variables covered in macro data sets and the time dimension of micro data sets should be expanded. It would also be useful for countries to establish some type of ongoing but affordable survey that covers the entire country using a combination of single- and multi-visit components.

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This paper is a summary of a report entitled: "Improving the Measurement and Analysis of African Agricultural Productivity: Promoting Complementarities Between Micro and Macro Data." International Development Paper No. 16. It can be obtained by writing to:

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This paper is also forthcoming as an SD Publication Series technical paper. It can be obtained through USAID's development information system (CDIE) (catalogue number forthcoming).

