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GHANA MINISTRY OF FOOD
AND AGRICULTURE

Ghana Agricultural Production Survey (GAPS)

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STRATEGIC OBJECTIVE

The Ghana Agricultural Production Survey (GAPS), a pilot project taking place in 20 districts during 2011–2012, aims to improve the quality of data produced by the national agricultural statistics system. GAPS will achieve this objective by broadening and deepening the Multi-Round Annual Crop and Livestock Surveys (MRACLS) that Ghana's Ministry of Food and Agriculture already assesses through its District Agricultural Development Units (DADUs). MRACLS currently covers agricultural production, giving estimates of field area and yields of important crops, among other topics. GAPS offers a chance to experiment with potential improvements to MRACLS before they are scaled up nationwide. GAPS has been spearheaded by Statistics, Research and Information Division (SRID) of the Ministry of Food and Agriculture (MoFA), with technical support from the Ghana Strategy Support Program (GSSP) of the International Food Policy Research Institute (IFPRI).

The potential improvements GAPS tests include:

- Larger sample sizes and adjusted sample designs to increase the reliability of district-level estimates.
- Broader coverage and greater depth of data. This means creating questionnaires that examine agricultural production activities—including vegetables, tree crops, livestock rearing, aquaculture, and processing—in more detail. In addition, data will be collected during the minor season on vital activities such as irrigated agriculture, processing, other farm and non-farm income-generating activities, and migration.
- Enhanced tools and strengthened methodologies. GPS devices will expedite the process of measuring field areas and allow DASAs to geographically reference the location of households and their fields.

Standardized data entry in each district, prompt computer assisted data checks, improved computer-based and personnel centered supervision procedures, and fast transmission of raw data to one central data processing point will assure good quality data.

The main objective of this strategy is to provide more accurate agricultural production estimates at the district, regional, and national levels.

GAPS PROCEDURES

Currently, data on agriculture in the districts is produced on the basis of information collected from 100 agricultural holders: 10 holders in 10 Enumeration Areas (EAs) per district. 100 observations per district are sufficient to provide regional and national level estimates providing that enough districts are included. However, in order to provide reliable district level estimates the GAPS will collect data from 400 randomly selected agricultural holders per district: 10 holders in 40 EAs per district. This means that the pilot will gather information from 800 holders in each region and from 8,000 in the country.

Collecting information from 10 holders in 40 EAs, instead of 10 EAs, increases the sample size to a point where the margin of error for key measures can be reduced considerably (given the size of districts). Quadrupling the district level sample size will provide district level agricultural data with a margin of error for important agricultural indicators to ± 5 percentage points. At the same time it prevents certain regions from disproportionately affecting the country's overall statistical picture by limiting the location-specific correlation between holders' responses in each district.

In addition, the margin of error may be less than ± 5 percentage points for field area measurements

because many holders will have more than one field (thus, the sample size of fields will be larger than 400 per district) and a greater spatial dispersion of fields (which will reduce location specific correlation). The number of plots where yield studies will take place for important crops (via crop cutting and weighing) will be increased from the current 100 plots to nearly 200 plots per district in order to improve the precision of yield estimates, though the exact number is yet to be determined.

Much like in the MRACLS design, holders will be visited several times to collect information throughout the agricultural seasons. GAPS calls for each holder to be visited twice during the major season—once during the land preparation and planting period and once after harvest and marketing—and twice during the minor season. Some holders will also participate in crop cutting studies.

Data will be collected by a team working exclusively on GAPS activities in each district. This team consists of one District Agricultural Statistics Officer (DASO) – in most cases the current MIS officer – acting as a supervisor and four District Agricultural Statistics Agents (DASAs) acting as fieldworkers. They have been selected from the pool of Agricultural Extension Agents (AEAs) who have received data collection training in the past.

A dedicated data collection team is fundamental to meeting the increased workload of collecting district-level data. Currently, AEAs must undertake MRACLS surveying concurrently with their agricultural extension duties. A dedicated data collection team protects data integrity by eliminating possible bias and skewed data. Agricultural extension agents are not impartial observers of the agricultural production process, and holders being interviewed may receive more agricultural extension information, guidance, or visits than holders not included in the survey. A dedicated data collection team reduces the likelihood of biased responses and collecting skewed information while rendering the task of district-level data collection manageable.

It should be reiterated that as a pilot survey the GAPS will facilitate experimentation with certain data collection activities, such as those mentioned above, in order to learn whether they are effective before scaling them up to the national level. Therefore, this pilot is an opportunity to test the validity and of these

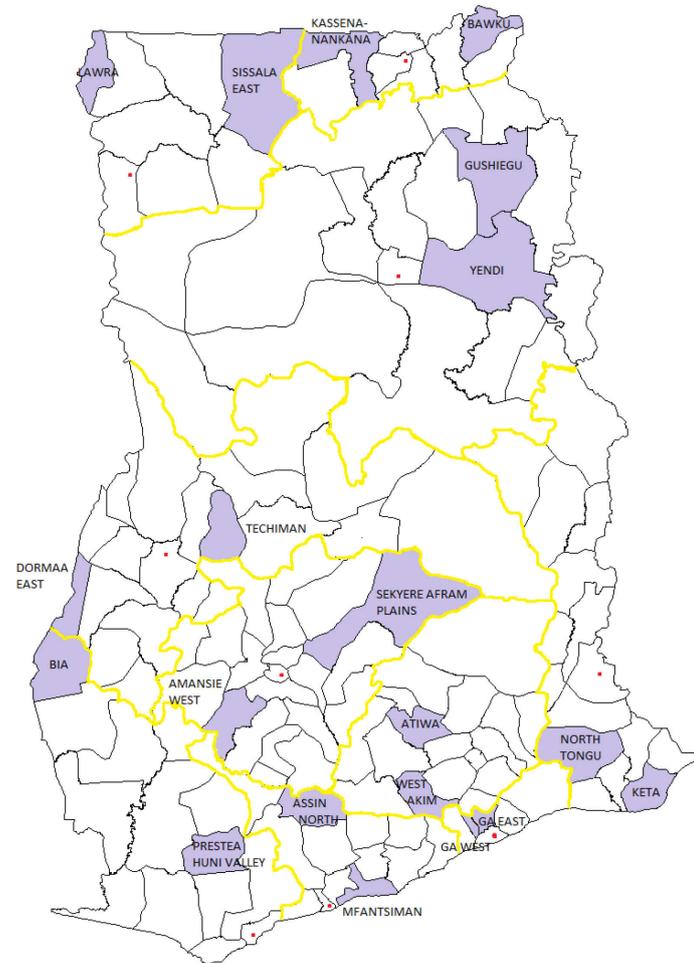
components, as well as the feasibility of incorporating them into a scaled up enhancement of the national agricultural statistics system.

WHERE GAPS IS BEING PILOTED

GAPS is currently being piloted in two randomly selected districts in each of Ghana’s 10 regions, equaling a total of 20 districts. These 20 districts, listed in the table below, were randomly selected with probability proportional to population after excluding predominantly urban districts.

Region	District
Ashanti	Amansie West
	Sekyere Afram Plains
Brong Ahafo	Dormaa East
	Techiman Municipal
Central	Assin North Municipal
	Mfantiman
Eastern	Atiwa
	West Akim
Greater Accra	Ga East
	Ga West
Northern	Gushiegu
	Yendi
Upper East	Bawku Municipal
	Kassena Nankana East
Upper West	Lawra
	Sissala East
Volta	Keta
	North Tongu
Western	Bia
	Prestea Huni Valley

The following map of Ghana illustrates the geographical distribution of these 20 districts:



As GAPS is a pilot project, it not only allows proposed improvements to be tested but provides an opportunity to assess the technical, human resource and cost implications of scaling them up to all districts. By November 2011, data collection for the major season will be complete and feedback from the stakeholders involved in this process will inform SRID how the national agricultural statistics system should be strengthened and in what proportion of districts this should take place in the short-term.

The technical evaluation of GAPS will include verifying the internal consistency of the data and identifying and studying any major gaps or differentials between information collected in different districts within a region or by different DASAs within a district. In addition, the quality of the statistics provided by the GAPS will be crosschecked with information from external sources, such as the Ghana Cocoa Board, fertilizer and other farm input suppliers, buyers of production, and so forth. If internal or external discrepancies cannot be reasonably explained by agricultural

or sociological reasons, they may indicate shortcomings in the data collection process in need of intensified supervision or redesign when the pilot is scaled up.

THE INFORMATION COLLECTED

In order to obtain better estimates of agricultural production and productivity and a better understanding of production practices and the environment faced by producers, GAPS is collecting information on the following topics (key enhancements underlined):

- Household demographic and housing characteristics including asset ownership
- Agricultural holding characteristics, farm tenure, farming practices, and planting intentions
- Livestock and poultry inventory and practices
- Tree inventory, practices, and production
- Aquaculture prevalence and practices
- Field area measurements using GPS technology, as well as field and soil characteristics
- Field level farming practices, input use (including irrigation, herbicide, seed, pesticide, fertilizer, labor, mechanization, and so forth), and expenses
- Crop level production levels, quantity and value of sales, and marketing details
- Credit, storage, and transportation use
- Yield estimation for key crops
- Gender differences in land tenure, field size, crop choice, agricultural practices (such as access to chemical inputs, technology, and labor), as well as intra-household dynamics
- Health and productivity of household farm labor
- Other farm and non-farm income generating activities and related migration patterns
- Processing of agricultural output
- Climatic shocks that impact agricultural practices
- Unit prices of standard inputs
- Community population, infrastructure, and agricultural characteristics
- Crop production, inputs, and farming practices of commercial farms

ANALYTICAL USES FOR GAPS

According to the National Development Planning Commission's (NDPC 2010) Ghana Shared Growth and Development Agenda (GSGDA), the overarching goal of Ghana's medium-term economic development policy is to accelerate economic growth in order to sustain economic stability and attain a per capita income level of at least USD\$3,000 by 2020, while also achieving the Millennium Development Goals (MDGs). The main focus of agricultural development will be modernization to ensure an effective link between agriculture

and industry, through the implementation of the Food and Agriculture Sector Development Policy (FASDEP-II) (MoFA 2007), and the allocation of at least 10 percent of government expenditures to the agricultural sector from 2011 to 2015, with the goal of attaining a six percent agricultural GDP growth rate, as called for in MoFA's Medium-Term Agricultural Sector Investment Plan (METASIP) (MoFA 2010).

METASIP indicates that this approach will require continued research on improvement of priority commodities, promotion of sustainable land and water management practices, integration of crop and small ruminant development, improved access to appropriate mechanization, improved access to extension services, increased adoption of Integrated Crop Pest Management (ICPM) measures, and linkage to markets.

Monitoring and evaluating the progress of these initiatives requires high-quality agricultural data for large-scale and household-based production that is collected frequently on a spatially disaggregated level. In addition, there is a need for an enhanced national agricultural statistics system that regularly produces precise agricultural statistics on an annual basis at the district level in order to facilitate effective, context specific planning and targeting at the district level.

Adequate information for monitoring and evaluation becomes all the more necessary as donors begin to align their support to the sector with the priorities of the government as articulated in the Comprehensive Africa Agriculture Development Program (CAADP).

GAPS is a necessary first stage, to be followed by many more steps, in strengthening the national agricultural statistics system. It will enable policymakers to comprehensively and thoroughly study agricultural development and the implementation of specific agricultural programs in Ghana. The following are examples of some planning-relevant features that will be feasible with the GAPS data and the future enhanced national agricultural statistics system:

- Reliable estimates of area of production for crops, such as maize, rice, millet, horticultural crops, and others by districts.
- Rate of adaptation of improved agricultural practices such as the use of organic and inorganic nutrients and certified seeds.

- Marketing practices of farmers, prices received and their relation to various infrastructure and information access.
- The extent of production for consumption and patterns of participation in markets.
- Contribution of tree crops, livestock, and aquaculture to farm income.
- Incidence of and household benefits from implementation of special projects such as block farming or establishment of mechanization centers.
- Comparison of farming practices and access to inputs and resources of male- and female-headed holdings.
- Participation in non-farm activities, including migration.

CATALYZING DATA USE AND DEMANDS

Data must be useful to those who collect it. If data do not meet the needs of those collecting it, the incentive to collect good data will be absent. In addition, for a national agricultural statistics system to be sustainable, the data must be useful to stakeholders at district, regional, and national levels. Taking this into account, GAPS will enable district-level staff to use data for monitoring and evaluation, analysis, and planning. GAPS can lead to the production of district-level reports and statistical handbooks to facilitate planning. This will ensure that information is shared and used at the local level and a systemic feedback loop is established between the district, region, and national levels.

Data must also be preserved and disseminated in a raw format to maximize its value. Raw data -- data that is not processed and aggregated -- has a rich potential for addressing complicated policy and research questions. GAPS has been designed to meet the data needs of District Directors of MoFA, District Chief Executives, Coordinators, and Planning Officers, Regional Directors, MoFA national directorates, and donors as well as researchers and academics in and outside of Ghana. For example, data on the prevalence of agricultural holders who grow rice may be useful to District Directors, Executives, Coordinators, and Planning Officers in areas where irrigation has been introduced to boost rice production and who need to monitor and evaluate the implementation of the irrigation initiative. GAPS data can also be used by Regional Directors and MoFA officials in Accra to monitor and evaluate the effectiveness of agricultural extension efforts by tracking the adoption of row-planting and zero-tillage techniques, or checking whether these extension

efforts can be associated with changes in crop productivity. Similarly, GAPS data on changes in animal husbandry practices and population sizes can help officials assess the impact of livestock vaccination initiatives, and Ministry Officers, other government officials, and researchers may be able to use GAPS data to evaluate the impact of block farming on food security, assess the cost effectiveness of the program, or identify technical improvements to the project.

If stakeholders (including those collecting the information) see value in the data being collected and put it to good use, their demand for quality data will intensify. This heightened demand for regularly available, good quality, raw data starting from the district level will support an enhanced national agricultural statistics system over time.

PANEL DATA

The current statistical system provides a fresh cross-section of data each year for a new set of (randomly selected) agricultural holders. This format is very good, however, it does not enable policymakers to empirically assess the effectiveness of agricultural interventions over time or investigate medium- to long-term agricultural dynamics. For this, they need a subsample of agricultural holders to be surveyed repeatedly over a number of years.

As such, GAPS proposes to observe some of the same households over time, integrating a panel component, or repeated cross-section, into the enhanced national agricultural statistics system. GAPS will examine the feasibility and cost implication of incorporating paneling into the enhanced national agricultural statistics system.

Panel data is valuable because it increases the precision of statistical estimates and analytical results. First of all, by following individual holders over time, paneling can indicate causality because it controls for unobserved characteristics. Cross-sectional surveys can establish correlations between fertilizer use and yield, but such a correlation can be due to some

unobserved soil characteristics; however, panel data control unobserved such characteristics and can subsequently provide more accurate estimates of the impact of fertilizer on yields. Secondly, panel surveys can measure changes much more precisely than a series of cross-sectional surveys.

One of the most practical and feasible ways to do this is to implement a system of panel rotation, – regularly refreshing a part of the sample, so that each holder stays in the panel for a limited time (generally two or three rounds). For instance, two-thirds of the selected sample of agricultural holders interviewed in 2011 could be refreshed in 2012; in other words, one-third of the selected sample of holders would be revisited in 2012 and 2013, before being replaced with new agricultural holders.

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