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Farm Data Systems in Africa: a synthesis



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by

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1 INTRODUCTION

1.1 Role of farm data systems

Access to reliable and timely information is essential for development. Farm data is considered as an indispensable strategic resource in supporting decision-making at different levels of policy and management. Thus the contribution of statistical information and application in policy formulation, programme planning, monitoring and evaluation is normally well integrated in most developing countries. Access of reliable and timely farm data for farm level planning and decision-making, as well as a feedback mechanism to producers and local communities is a rather neglected aspect of farm data. Minimum efforts have been made to promote use of farm data to enhance farm planning and management within the mainstream support services system.

1.2 Objective of the study

The objective of the study was to review the status of farm data systems in respect to the support of farm management decision-making. By reviewing the current status pertaining to institutions that collect and use farm data, the actual type of farm data that is available, the format in which it is available and how it is disseminated, it was anticipated that the findings of the study would be used to identify opportunities for enhancing the establishment of a sustainable farm data information system. The results would also be used to determine the nature of technical backstopping and capacity building that might be required.

2 METHODOLOGY

2.1 Content of the study

The study examined the status of farm data information systems in selected member countries in Eastern, Western and Southern Africa, identifying the limitations of the data that were available and proposed options for improving farm data collection, analysis, dissemination and utilization. The review also assessed options and priorities for the Food and Agriculture Organization of the United Nations (FAO) support. Specific tasks and outputs of the review included:

2.1.1 Characterization and appraisal of the institutional setting:

The review assessed institutions that collect and/or use, or potentially collect or use, farm level data. These included government statistical and planning units as well as other departments, universities and research institutes, international organizations farmer associations and NGOs.

An overview of past and on-going activities/approaches in data collection were undertaken by identifying, describing and appraising periodic farm-level surveys and census (i.e. commodity specific, farm incomes, farm inputs including labour), that generate farm level data. The study also identified and appraised on-going or past recurrent farm management surveys, (e.g. weekly or monthly monitoring farm visits in order to collect input-output data). In both cases, these examined the types of data being generated, procedures and quality of data management and analysis, as well as computer software being

used and the constraints affecting quality and timeliness, as well as strengths and weaknesses of current approaches.

Another important component of the study was the appraisal of any on-going or past efforts on farmer record keeping systems. This examined attempts over the past two decades to introduce farmer record keeping, the procedures used including farmer selection, sample size, types of analyses carried out, and the use of data including any specific attempts to provide direct feedback to farmers. The strengths and weaknesses of these approaches were reviewed.

Innovative approaches to data generation that may have been used in various countries (e.g. focus-group reviews and monitoring and use of on-farm trials data) were identified, if they had been used. A description of where they had been used and who was responsible, what types of data were collected, types of analyses carried out, use of data, including any specific direct feedback to farmers was carried out.

2.1.2 Information dissemination

The second component of the study examined ways in which farm information from all of the above sources is being disseminated, accessed and shared among all the users and other stakeholders. These comprised:

- Identification of existing statistical monographs or publication series;
- Assessment of electronic dissemination facilities including Internet, and radio;
- Establishment of whether there is any inter-organization data exchange and networking;
- Assessment of whether farm data is being used by extension workers, private sector, farmer organizations or NGOs to enhance decision-making at the farm level.

2.1.3 Country system design

The third component of the review looked at the interests of the main stakeholders in improving the farm data system. These included all the relevant decision-makers at the farm, community and national level from both users and generators of farm data perspectives in terms of improved management and policy-making. Anticipated outputs comprised recommendations on ways to improve farm data system. Issues addressed included:

- what new data should be collected or different surveys required;
- how to minimize costs of data collection and analysis;
- how might information be presented to promote utilization by farmers and farmers groups/associations;
- how to take advantage of data already being generated;
- how to disseminate information better.

An assessment of the possibilities of introducing innovative approaches such as focus-group and informal approaches to data generation as well as use of modern information and communications technology and data networking and exchange including

integrated databases and use of data for participatory planning and farmer advisory services were examined.

2.1.4 FAO Potential Support

The review also identified the priority issues in farm data systems and made recommendations on potential FAO support in terms of facilitation and technical backstopping in development of training or preparation of field guides, workshops or consultations, project development or technical support.

2.2 Study Methodology

The review was commissioned by the FAO to national consultants who conducted country studies in Ethiopia, Namibia, Tanzania, Malawi, Uganda, Kenya, Mozambique, Swaziland, Zambia and Ghana. The consultants reviewed statistical documents and materials produced in the last decade, by different institutions in form of statistical reports and project documents. The review also conducted interviews and discussions with various stakeholders representing users and generators of farm data. The studies were carried out in the period between 1999 to 2001.

A workshop to review the country studies and to prioritise the main issues in farm data collection, management, dissemination and development in sub-Sahara Africa was organized in Harare, Zimbabwe, in September 2001. One of the major outputs of the workshop was to identify opportunities for developing a more effective data management system and identification of individual country briefs on follow-up action.

3 RESULTS AND DISCUSSION

3.1 Institutions involved in data collection

Each of the country studies identified several institutions that do collect, analyse, utilize and disseminate farm data. These include government ministries such as departments responsible for planning, monitoring/evaluation and extension services in the ministries of agriculture, which are more or less responsible for collating and disseminating information in agricultural production. Other institutions including research institutes, universities, farmer organizations, NGOs and statutory bodies, collect specialized agricultural information pertaining to their mandates, functions and activities. For instance most of the information on agricultural marketing is collected by parastatals responsible for commodity development and marketing. The main farm data collectors and users of farm data are different departments within government institutions. It was noted that there is limited coordination amongst those institutions, which generate farm data.

Though the National or Central Bureau of Statistics tend to have the overall mandate for the management of the national statistics, they do not seem to be considered as the lead organization in providing guidelines on the type of farm data to be collected. The National Statistics Bureau are nevertheless important in implementing and managing agricultural census comprising periodic surveys, while the Ministry of Agriculture tends to generate more regularised production statistics.

In most countries, resources allocated to farm data collection have been decreasing or are not adequate. Planning (and/or monitoring and evaluation) departments within Ministries of Agriculture do not have adequate resources to facilitate and support quality and effective farm data collection. There is heavy reliance on extension field staff for the collection of this data. Enumerators hired to monitor data, tend to be poorly qualified, with limited resources and poor supervision to ensure good coverage and quality data. There is an overall tendency to depend externally funded projects for quality data products.

3.2 *Current data status*

Substantial information on agricultural production is available. This is normally standard agricultural production information on the main sectors within agriculture, though the data sets might vary between countries depending on the importance attached to the commodity or enterprise. In general, crop production figures and area abound, though there is normally limited information on what is deemed as minor crops in terms of grain legumes and cereals, horticultural and root crops.

The more dynamic farm information on input-output performance, resource allocation including farm inputs, labour and employment, mechanization, use of farm equipment and capitalization, market volumes and prices, household incomes, are more difficult to access and are not updated regularly. Specialized information used in specific programmes such as Early Warning Units are implemented through special programmes with donor funding.

Synthesised information pertaining to farm management decision support and advisory services are scanty though they do occasionally exist for the major enterprises in some of the countries included in the study. In most countries, they are not updated regularly enough in response to price and other macro-economic changes.

From the literature reviewed, it is noted that in most countries, farm data is aggregated on regional basis, though household farm data groupings are sometimes also available. Regional coverage is not necessarily well distributed within the countries and high potential areas or commercial enterprises tend to have more comprehensive information, with emphasis on the production figures of the main commodities/ enterprises.

It was noted from the case studies that the quality of data that is available is highly questionable. Most countries do not invest adequate resources (in terms of human, technical skills and material resources) to ensure quality data is produced. In general the bulk of the data that is available is generated from routine work for administrative purposes.

Table 1: Typical data collected in Namibia

Organization and document Title	Type of information
Central Bureau of Statistics-National Planning Commission	<ul style="list-style-type: none"> - Types of implements used by communal farmers - Agronomic practice [ploughing of their fields, usage of fertilizer, compost/manure, improved cereal seeds] - Farm size and production, - Number of livestock owned [sheep, poultry, pigs, ostriches]
Directorate of Planning (MAWRD) <i>Farm-Household Economic Survey</i> <i>Crop Budget Bulletin for Selected Crops in the Northern Communal Areas</i> <i>Namibia Early Warning Food Information System</i> <i>Highlights monthly issues of the Early Warning</i>	<ul style="list-style-type: none"> -Village location -Household labour inputs [e.g. hand hoeing] - Land preparation - Hand hoeing, - Ploughing - Tractor/ animal draft power, - Weeding - Harvesting - Threshing; - Herding stock - Feeding stock <ul style="list-style-type: none"> -Crop [millet, sorghum, and maize] production - Commodity cash income and expenditure, - Labour - Commodity prices -Per ha inputs and rates [Information is used to produce Gross Margin Budgets] <ul style="list-style-type: none"> - Monthly rainfall data - Weather summary, - Seasonal forecast - Dam levels - Cropping season outlook, - Pasture <ul style="list-style-type: none"> - Livestock condition - Livestock diseases - Marketing and prices - Cereal supply and demand.
Directorate of Research and Training <i>Small Stock</i>	<ul style="list-style-type: none"> -Production and reproduction data
<i>Crop – On farm trials</i>	<ul style="list-style-type: none"> - Soil fertility, cotton cultivators name, - Germination percent flowering, plant height per plot, maturity dates, ---seed cotton weight per plot [kg/ha] - Fibre quality
Directorate of Extension and Engineering Services <i>(Southern region)</i>	<ul style="list-style-type: none"> - Information on crop livestock and horticulture; type of enterprise, yields, diseases, inputs
Directorate of Veterinary Services	<ul style="list-style-type: none"> -Animal disease statistics and marketing information
Ministry of Labour	<ul style="list-style-type: none"> Employment related data

3.3 Farm level data documentation and dissemination

Organizations disseminate farm data documentation in the form of pamphlets, reports (monthly, quarterly and annual), newsletters, bulletins, and other published documents such as workshop papers. The most widespread dissemination method used by governments is in the form of reports. The presentation of the data is normally in aggregated format that is more useful to management and decision-making at the policy formulation level and programme development, rather than in a format which would make sense to farmers and rural communities.

Information generated is disseminated to users either on request, distributed (monthly, quarterly, and annually). Some of the users can access this information through workshops, conferences and seminars. Where users have access to e-mails and faxes information can be disseminated electronically though this is very limited. Relatively adequate information flow is prevalent at organizational level where computers and faxes are accessible. However, where these facilities do not exist, dissemination of information is a problem.

Overall the coverage of the statistical information dissemination to farmers is poor, though there have been attempts to produce simple information bulletins and pamphlets that can be used by farmers and local communities. For example most countries under the study do provide information on local market prices of the main commodities through the radio (e.g. FOOD NET in Uganda).

There is no formal established networking system of data exchange, in most countries. There is however an informal networking system that allows for the exchange of information, mainly based on institutional working relationships. The coordination among data generators and users is therefore poorly developed. The same problem applies in terms of harmonising data production and management.

3.4 Farm data utilization

The purpose for farm data collecting and utilization vary from one organization to another. Information from the survey revealed, that apart from regularised statistical information, farm data is collated for planning and impact assessment of programmes and projects. For instance institutions of higher learning, collect and use farm data for teaching purposes, academic research and curriculum development. Statutory bodies on the other hand collect and use farm data on production, marketing and trade reflecting their functions. Commissioned studies are normally oriented towards specific programme development

Ministries of Agriculture depend on extension field staff to disseminate statistical information, though there are a few countries such as Uganda and Zambia, which have made attempts to establish agricultural information centres around the countryside. Contact farmers/farmer –extension linkages have also been utilized as mechanisms for information flow.

There is low utilization of farm data by small- scale farmers. Part of the reason for this is caused by the fact that most of the data that is generated is not synthesised into simplified formats and languages that are user friendly to farmers and local communities.

Though there is an increasing demand for timely and relevant statistical information among the emerging and commercial farmers who utilize the data in farm planning, farm data is not normally incorporated in the mainstream extension services. The same issue applies on data related to agribusiness and market information.

3.5 Farmer record keeping

There is hardly any regularised farmer record keeping in all the countries included in the study. Attempts to introduce farmer record keeping have been isolated and have tended to focus on cash-oriented production (e.g. dairy production), with the aim of conducting simple financial analysis on the specific enterprise. Thus a more systematic farmer record keeping, that would reflect farm dynamics with regards to resource allocation and complex farming structures, such as intercropping and resource flows between enterprises are hardly captured. Some of the reasons for lack of farm record keeping for small-scale farmers include:

- record keeping is cumbersome,
- complex farming systems,
- subsistence nature of agricultural production,
- lack of sensitisation on its importance,
- lack of business acumen,
- illiteracy.

3.6 Innovative farmer record keeping strategies

Good examples of innovative farmer record keeping strategies are scanty and are based on isolated efforts mostly under specialized projects, with low area coverage and limited potential for scaling-up. Some of the documented strategies include:

- Study-groups initiative introduced by the Directorate of Extension and Engineering (DEES) and farmers' organizations in the case of Namibia. This facilitated data collation through groups.
- Use of simple data notebooks and data sheets for farm record keeping have been used in some countries. These have tended to be introduced by specific projects and usually focus on keeping farm records for particular enterprises rather comprehensive farm activities. Use of data sheets is based on the household having a literate member.
- Farmer focus groups as a mechanism for facilitating farm record keeping have been used under projects especially through NGOs in some of the countries for example Zambia, Uganda and Kenya.
- Use of contact farmers in farm record keeping have been promoted through farmer associations
- Farmer managed farm data information system and Farmer Field Schools.
- Some on-farm research trials managed by the farmer.

The systems either assist individual farmers to maintain their own farm records, though the majority treat the group of farmers as within the same typology and hence maintain one set of data. In the case of Farmer Field School they have a communal plot on which they maintain records.

3.7 Constraints in data management and dissemination

The regularised data available in most countries is to a large extent is not demand driven, but depends on those who generate data to decide what data and in what format it is presented. This is compounded by the absence of a central data bank or referral point for farm information that provides some harmonization in data collection methodologies and analysis. Data collected by different institutions is thus hardly compatible. For instance, units of data collection, data sets, scope and coverage as well as the degree of data disaggregation depend on the institutions involved, while the computer packages used in the analysis are not harmonized. There is limited collaboration in data management and where inter-organization data exchange and networking exist. It is usually based on informal arrangements.

Most institutions do not have channels for feedback to farmers particularly the resource poor. Lack of feedback after the studies/surveys have been completed, may result in lack of appreciation of the outcomes especially by farmers. Thus in most cases farmers are not aware of the need for quality data, which may result in the provision of fictitious, incomplete and inconsistent farm data.

3.7.1 Constraints in data collection

The lack of necessary skills and computer software in data collection and analysis as well as limited financial resources for data production and reproduction hampers the efficiency of the farm data system, compounding further the low usefulness of the data. Coupled to this is the poor access to appropriate packages for synthesising data into simple user- friendly formats.

Inadequate logistical support for enumerators and supervisors to facilitate accurate and timely completion of data forms and monitoring activities is a serious problem. This is compounded by the distances from farmers, especially in vast countries such as Namibia and Zambia, that making data collection very costly and cumbersome, hence resulting in delays in data collection and analysis.

Where record keeping by farmers has been used, dropouts are common. This could in part, be caused by the fact that record keeping is cumbersome, as well as that the fact that some of the formats used in data collection are not designed to reflect small-scale farmer production systems and are even more irrelevant for communal farmers.

Poor information flow between farmers and those who design farm data systems may lead to lack of appreciation on the importance of quality data and hence the importance of accurate information. This may culminate in the provision of irrelevant, inaccurate, incomplete or factious data, especially where agricultural production is taxed.

Data collection coverage tends to be biased on specific regions making it difficult to infer or generalize the findings. The use of different sample frames and scope by different institutions make data aggregation and synthesis from different sources, almost impossible. There are limited efforts to harmonise data collection designs or collaboration in terms of coverage creating unnecessary duplications. At the same time formats in which data is presented often make it very difficult to identify areas with specific characteristics.

Most of the data collection systems format are passive and do not allow documentation of the dynamic structures within agricultural activities or responses to

underlying factors and the changing economic environment. For instance intra-resource flows are hardly captured. Localized systems of perceiving data are not integrated in data systems, neither are data that may be of interest to farmers included in most data collection formats.

In most countries under review, sustainable data management systems are lacking. In cases like Uganda where the extension services have been reformed, the traditional data collection systems no longer exist. Thus data systems that are based on local resources are essential.

3.7.2 *Constraint in farm information dissemination*

Production, reproduction and dissemination costs of reports and pamphlets were stated as very high by the majority of respondents, resulting in limited reproduction and dissemination of information to end-users.

With regards to the farm data systems analysis, it was felt that the present data collection formats and ‘analytical software packages’ were more suitable for large-scale production systems making it difficult to adapt to small-scale, in particular the communal farmers.

Most of the information that is generated and disseminated is in English. Illiteracy and poor numeracy in most African countries is a major constraint to communication. Hence only a minority population can access statistical information. Translation of information into simple pamphlets or in vernacular to facilitate utilization by end-users especially small-scale farmers is not widely practised.

4. CONCLUSION and RECOMMENDATIONS

4.1 *Potential in improving farm data systems*

Based on the findings, a number of recommendations were made from the country studies and the workshop deliberations. These include:

- National conferences involving all the relevant stakeholder i.e. the existing and potential agricultural data collectors and users should be convened, possibly by the Ministries of Agriculture planning units. The aim would be to deliberate on the issues impinging on effective and efficient farm data collection, management and dissemination in individual member countries. The forum would be used to appraise farm data systems and to prioritise with respect to the type of farm data that should be collected and disseminated, as well as broach the issue of networking among data users and the establishment of a central data bank. A decision to identify a coordinating body and measures required allowing it to take up leadership in data harmonization and coordination would be agreed on. Networking among data users is to be encouraged and strengthened. Participants could also elaborate on the training requirements during the same conference.
- There is an urgent need for training staff involved in data collection and analysis, so as to enhance their capacities. A need’s assessment on data management training needs, will be established. Tentative areas identified as critical include; training in questionnaire design, data collection methods and interviewing skills.

Attention will be paid to designs of information formats for farmers who have got illiteracy and non-numerical skills. Some organizations require training on data analysis, software packages, and research methodologies.

- Production of farm management handbooks, which can be used by farmers for their production operations, should be considered including production of simple versions translated in vernacular languages.
- The current form of information dissemination should be strengthened in order to reach a wider audience. Translation and simplification of the information generated into main vernacular languages could be considered.
- It is noted that innovative monitoring and information networking through farmer extension development and study groups, farmer associations, learning groups, used by different member countries such as Namibia, Uganda, Zambia, Kenya, could be replicated and scaled-up.

4.2 Priority for FAO's Support

The review recognized that there are many needs and weaknesses in the farm data system, which require improvement. However, based on the synthesis, priority was proposed that FAO in consultation with the Ministries of Agriculture should consider;

- Facilitating the national stakeholders' conference to discuss the findings of the study and for the way forward.
- Consider capacity building and training needs.
- Investigate the potential to support production of farm management handbooks and field guides on enterprise production and marketing, which can be used by extension technicians and farmers.
- Support in the development production of simple data collection manuals that could be used in farmer record keeping especially through groups.

There was a general consensus that as a follow-up, organizing national stakeholder workshops and development of guidelines for community-based data collection strategies should be considered as priority issues.