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THE NEED FOR AGRICULTURAL INFORMATION IN THE NEW SOUTH AFRICA¹

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The necessary data on agriculture must be available for public and private decision-makers in the agricultural sector to use agricultural information for decision-making, solve problems or increase their knowledge. As a result of the deregulation of the agricultural marketing sector in South Africa, the supply of these data decreased. Also, the needs for data on agriculture of the various decision-makers, i.e. the policy-makers, researchers, agricultural service industries as well as the farmers and extension officers, changed. Since information systems are based on the needs of the decision-makers, the need for data on agriculture should be determined before either existing methodologies are improved or new methodologies are introduced to increase the supply of data on agriculture in South Africa.

DIE BEHOEFTE AAN LANDBOU-INLIGTING IN DIE NUWE SUID-AFRIKA

Die nodige data oor die landbou moet beskikbaar wees vir openbare en privaat besluitnemers in die landbousektor om landbou-inligting te gebruik vir besluitvorming, probleme op te los en hul kennis te vermeerder. Weens die deregulering van die landboubemarkingsektor in Suid-Afrika het die beskikbaarheid van die data afgeneem. Hierbenewens het die behoeftes aan landbou data van die verskillende besluitnemers d.i. die beleidsmakers, navorsers, landboudiensbedrywe sowel as die van boere en voorligters verander. Aangesien inligtingsisteme op die behoeftes van besluitnemers gebaseer word, behoort die behoeftes aan data oor die landbou bepaal word voordat bestaande metodologieë verbeter, of nuwe tegnologieë ingebruik geneem word ten einde die aanbod van data oor die landbou in Suid-Afrika te verhoog.

1. INTRODUCTION

Problems with the needs, or more naturally and accurately expressed, the demands for data, and with the alternatives available for meeting these demands in the face of inevitably limited resources, or the supply, are not new. A paper on data problems in agricultural economic research, presented to the Agricultural Economics Association of South Africa in 1972, mentioned

¹ This article forms part of the conference proceedings of the 36th Annual Conference of AEASA held in Swakopmund, Namibia September 1998 and published in *Agrekon*, Vol 37, Number 4, December 1998.

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problems with the collection and interpretation of data, the use of agricultural censuses, structural changes resulting in quality changes as well as the measuring and interpretation of economic data (Nieuwoudt, 1972). References to problems with data and information on agriculture were made by the Commission of Enquiry into the Marketing Act (1976), Groenewald (1989), Willemse (1996) and Van Schalkwyk & Swanepoel (1997). In the new millennium, especially with trends towards globalisation of trade, concentration of production, specialisation of products, introduction of new technology and expansion of agricultural related concerns, the demand for information on agriculture by various users is increasing. In South Africa, the demand for agricultural data and information increases at a much faster rate than the supply of agricultural information, resulting in a shortage of information that can have undesired consequences for the commercial and the small-scale farming sectors, and also for other economic sectors linked to agriculture. This paper is divided into three main parts: the agricultural information system, the supply of market and structural data and the need for agricultural market and structural data.

2. THE AGRICULTURAL INFORMATION SYSTEM

2.1 The terms data and information

The terms data and information are often used interchangeably but although they are closely related, they refer to two distinct concepts. One of the first problems encountered by agricultural economists and other social scientists, is the confused but common vocabulary which erroneously equates data with information and fails to distinguish the distinctive steps in the process by which data and information are produced (Bonnen, 1975). The terms data and information are discussed first.

Data are symbolic representations of concepts, quantities and are the direct product of measurement or counting (Bonnen, 1975). Larson & Narain (1998) defined data as given facts about a place, person or thing such as the production or price of a commodity. However, in real statistical terms, production, prices or inter-industry flows certainly are not independent of the statistical operations involved in its measurement. These data are constructed on statistical measures that are operationally meaningful through levels of aggregation, valuation, basic units of count and weighting schemes that are determined by some theoretical background and with some analytical aim in mind. Data on agriculture can be classified as market or structural data (Just, 1983). Market data consist of data on price, acreage, production, livestock

numbers, stock, consumption and exports while structural data include data on income, employment, productivity, nutrition and distribution of resources.

Information involves more than data. It usually combines data from different collection processes and subject matters, always within some analytical interpretation (Bonnen, 1975); it is the result of modelling, formatting, organising or converting data in a way that increases the level of knowledge for the user (Burch *et al.*, 1974 cited in De Waal & Van Zyl, 1991). Information is knowledge used especially for the purpose to reduce uncertainty and to support decision-making and problem solving (Bonnen, 1975). "Information is data endowed with relevance and purpose. Converting data into information requires knowledge" (Drucker, 1989). Information can be technical, commercial (including marketing information), social and cultural and also legal information (Aina, 1995).

2.2 The agricultural information system

An agricultural information system is a logical configuration of significant information for problem solving and decision-making in agriculture (Eisgruber, 1967). The system is a product of some basic process of enquiry (Figure 1) which imposes form and gives meaning to data (Barnard, 1975); data only become information after the required analysis and interpretation are made by the decision-makers (Riemenschneider & Bonnen, 1979).

An appropriately designed information system should therefore reduce uncertainty and manage undesired consequences (Bonnen, 1975 and FAO, 1986) as well as the interpretation of the complexity of agriculture (FAO, 1986). Berry (1973) cited in Vlasin *et al.* (1975) specifies three data and information system purposes, namely (1) reacting to past problems and planning for present concerns, (2) responding to predicted futures and planning toward the future and (3) planning for and creating the future desired. The information system (Figure 1) contains three obvious components, namely (1) a data system, (2) an information system which includes the analytical capability necessary to transform data into information (3) and the decision-makers.

2.2.1 The data system

Every data system involves an attempt to represent reality by describing empirical phenomena in some system of categories usually in quantified form (Bonnen, 1975 and Riemenschneider & Bonnen, 1979). Since reality appears infinitely complex and is not readily grasped by the human mind, it is

necessary first to break down phenomena into a set of categories or classes that can be counted or measured. Data are the result of measurement or

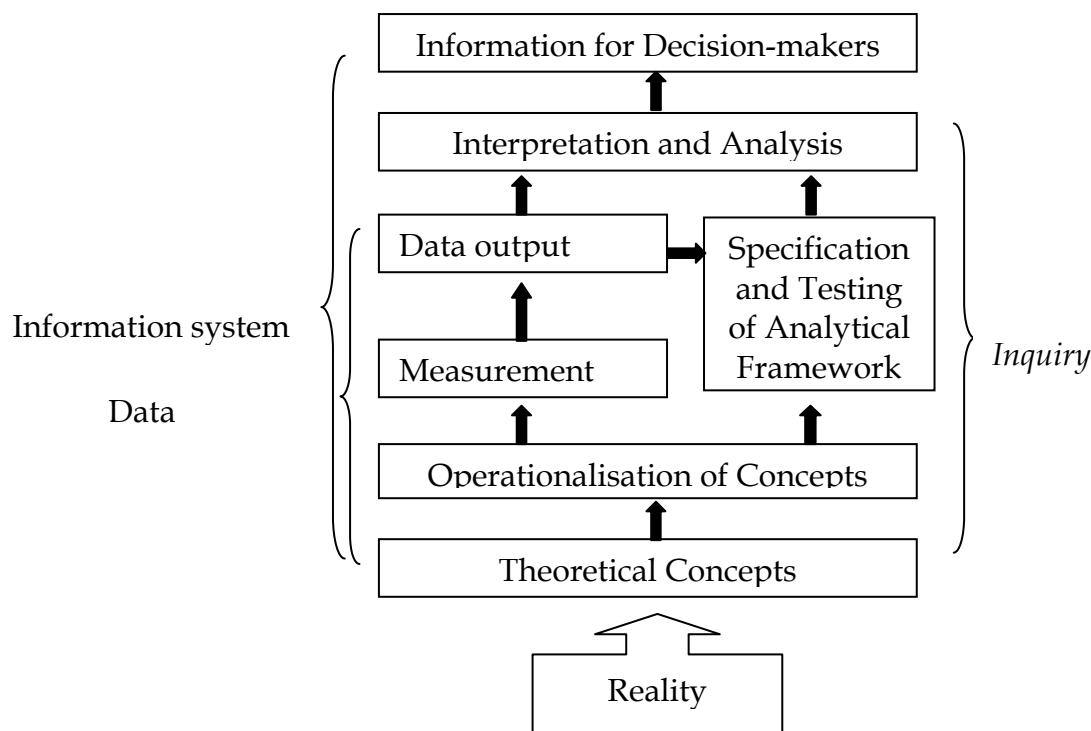


Figure 1: An agricultural information system

Source: Bonnen (1975)

counting and presuppose a concept (a concept is an abstract idea). Concepts cannot be measured directly; we rather operationalise the concepts by establishing categories of empirical phenomena that are as highly correlated as possible with the reality of the object of inquiry. Data collection is normally perceived in terms of measuring or counting using sampling or complete enumeration of a specific population depending on the decision to be made. The three distinct steps before one can produce data are therefore, conceptualisation, operationalisation and measurement of concepts (see Fig. 1). In this sense, operational definitions are used as measurement units of the theoretical or more abstract theoretical concepts (Zetterberg, 1954).

2.2.2 The information system

Data are, as already explained, not information and are rarely used directly by decision-makers (Bonnen, 1975; Eisgruber, 1967 and Drucker, 1989). Data must be transformed into information before it has much utility; information processing systems are therefore an absolute necessity (Riemenschneider &

Bonnen, 1979). The system includes not only the production of data but also the analysis and interpretation of these data in some purposeful decision or problem solving context. Data are transformed by intervening acts of interpretation, i.e. through statistical and economic analysis, policy and political evaluation, etc., to place them in a specific problem context and thus give the data meaning for a particular decision-maker (see Fig. 1). An information system should include not only a data system but also the analytical and other capabilities necessary to interpret data (Bonnen, 1975). Any theory of information must have a multidisciplinary perspective to be useful in understanding information systems (Eisgruber, 1967).

2.2.3 *The decision-makers*

Information systems in agriculture are designed to help public and private decision-makers make decisions to solve problems that arise at the farm, firm, industry or the national economy level (Riemenschneider & Bonnen, 1979). The goals and values of the decision-makers must impact on the design of the information system since these goals and values provide insight into the nature of the problem on which the system focuses. Therefore, the objectives for an information system should be viewed in the context of decision-making (Barnard, 1979), problem solution (Eisgruber, 1967; Barnard, 1979) and knowledge (Gardner, 1975 and Juster, 1973). In order to achieve these objectives, the system needs to consider the entire range of economic and non-economic information at the household, firm, local, regional, national and even international level (Eisgruber, 1967). However, an information system designed for farm policy decisions by government policy-makers would consequently differ from an information system used by a farmer in the day-to-day operation of a farm business because of the difference in decision making (Riemenschneider & Bonnen, 1979). Similar differences can be expected to exist between information needs of traders, governments and farmers.

- *The supply of agricultural data*

Primary data (also called raw, basic or unprocessed data) have three main sources: experimental sources, farms and a miscellany of other organisations within the agricultural industries, such as government departments, markets, marketing boards and commercial firms (Barnard, 1975). Data are obtained either by experimental or non-experimental means (Barnard, 1975). The former rely heavily on testing relationships between phenomena by eliminating or controlling as many extraneous variables as possible and apply mainly to natural science. By contrast, the latter depend largely on various

forms of censuses and surveys (Barnard, 1975; USDA, 1987 and FAO, 1986) and farm account projects (Plaunt, 1967).

- *Agricultural data in South Africa*

This paper will focus only on non-experimental means of data collection. The collection of market data on South African agriculture began in 1915 with a system of monthly crop and livestock reports by the Department of Agriculture. Structural and market data on agriculture were included in the population census of 1904 and the agricultural and population census of 1911. At first the data sources were samples of evenly distributed farmers in the districts and reports of livestock inspectors and other officials of the Department. Later in the early 1920's, the districts were divided as far as practically possible into small areas of four farms, with one farmer being appointed as a crop respondent (Department of Agriculture, 1922). The crop respondent had to complete a monthly report, which normally included livestock and crop conditions. This report was forwarded to the Magistrate of that District where it was processed, scrutinised, weighted and averaged before being transmitted to Pretoria. Since the system depended on the farmers as a source of data, the Government in return had to keep the farmers well informed with related information that was estimated from the data the farmers supplied. The estimates were thereafter validated with the agricultural censuses and surveys, conducted by the Department of Census hereafter (Department of Agriculture, 1907-1927).

The late 1930's and 1940's were characterised by the establishment of control boards, which regulated the marketing of the most important agricultural products in South Africa. Statutory measures (Article 52 of the Marketing Act) enabled marketing boards to collect data by means of compulsory returns. These data supplied by marketing boards became reliable data sources for decision-makers. As a result, the system of crop and livestock reports was reduced to include only forecasts and final estimates of summer and winter field crops as well as livestock numbers estimates. Agricultural censuses and surveys were valuable sources of structural data as well as benchmark data for crop forecasts and livestock number estimates. However, problems were encountered with the inconsistency of definitions (Nieuwoudt, 1972), the discrepancies between census data and other official data sources (Groenewald, 1989) as well as delayed publishing dates.

The deregulation of marketing in the 1990's was characterised by the disbandment of marketing boards, resulting in a decrease and in some cases, the discontinuation of the supply of administrative data (Willemse, 1996). For

some products like grain and oilseeds, cotton, deciduous, citrus, dried and canned fruit, lucerne, wool, mohair, milk and meat, alternative organisations were established under to the Marketing of Agricultural Products Act of 1996 to continue the collection of agricultural data (National Agricultural Marketing Council, 1998). However, these organisations still rely on compulsory or in some cases on voluntarily returns for the collection of data. Also, as a result of budgetary constrains, the Central Statistical Service indicated that the agricultural census that was planned for 1998 was postponed. A dearth of data availability relative to needs can be expected in future. Therefore, the design of new systems should in future be based on needs.

- *The need for data on agriculture*

The success of a information system in agriculture depends on how well it meets the information needs of the users of its service, i.e. public and private decision-makers with interest in and responsibility for food and agriculture (FAO, 1986; USDA, 1987). Therefore, the design and implementation of such a system must be based on an understanding and appreciation of those needs in the context of the information system of which it is part (FAO, 1986). The need for data on agriculture will be discussed according to the users of the data and factors influencing needs.

- *The users of agricultural data*

If you are in business and your objective is make a profit - and no business is sustainable without it - one of the first things to do is to identify the potential market, find out what the market wants and what is it willing to pay. Even though agricultural information is subsidised and provided to the user free of charge, the same principle applies (Metcalf, 1989). Information systems are often criticised for a lack of attention to the intended users and uses of the data collected and managed, although information specialists emphasise the importance of their clients or users in the design of their services and products (Eele, 1989; Gustafson & Thesin, 1981). Just (1983) classified the users of agricultural data as commercial decision-makers, speculators and information producers. However, the agricultural data users can be more meaningfully delineated as policy-makers, researchers, agricultural service industries, farmers and extension officers (Aina, 1995; Plaunt, 1967; Russell, 1983 and USDA, 1987).

- *Data needs of policy-makers*

Policy makers require data on levels of production, uses of resources, market outlooks, and similar data about the agricultural sector on a regional, national and international perspective (Russell, 1983). Policy makers of developing countries especially need data on utilisation, irrigation, fertiliser usage, employment in agriculture, agriculture power and machinery, agricultural credit, market intelligence and farm costs (Idaikkadar, 1979). There is also a need for improved environmental quality data together with social indicators (The AAEA Committee on Economic Statistics, 1972). The globalisation of economic life, including agriculture also renders it increasingly important to obtain data on international market and capital movements. These data must be pertinent, reliable, accurate, impartial and up to date to be used in today's policy context (Lindner, 1998).

2.2.4 *Data needs of researchers*

In a research environment, assessment of users' needs usually focuses on the requirements of researchers and scientists. Trends in the policy environment can influence researchers' information requirements (Ballantyne, 1994). However, policy trends do not directly influence use or non-use of information by scientists; shifts in policies on information and research largely determine the kinds of information that researchers demand, and the ability of information units to respond to their demands. To some extent, all the needs by other users get reflected in researchers' data requirements; researchers have to convert data into useful information. The satisfactory analysis of the agricultural sector requires data that are pertinent, reliable, impartial, accurate and timely (Lindner, 1998).

2.2.5 *Data needs of agricultural service industries*

In the present highly competitive market, agricultural service industries must have rapid access to data on market trends, production estimates and prospects concerning agricultural industries (Just, 1983). Their data needs are often met through highly specialised services. With international trade liberalisation, these industries are very interested in data on costs of production, marketing and transport in competing countries (Allen, 1998) and certainly also consumption and capital movements in both competing and customer countries.

2.2.6 *Farmers and extension officers*

Farmers represent the beginning and the end of the data and information chain (Russell, 1983). Farmers need technical and marketing data to make decisions on production and marketing. However, the ability of the producer to successfully meet the dynamic changes in the market place hinges on the interpretation of the data received on market prices, production trends and cycles (Riemenschneider & Bonnen, 1979). The need for data and information on production aspects and marketing exits for commercial and emerging farmers in South Africa. South African commercial farmers appear to have had considerable technical information over a long time, but very little marketing information. In a regulated agriculture, with marketing decisions removed from farmers (e.g. in single channel schemes) marketing information obviously had rather limited value. The scene did, however, change with deregulation. Among emerging farmers, the need for marketing information is perhaps larger than anticipated. In a survey in Eastern Cape, particularly younger farmers indicated an intense shortage of marketing information (Madikizela & Groenewald, 1998). Both marketing and technical production information are needed to level the playing field in South Africa and between South Africa and her competitors.

2.3 *Factors influencing the need for data on agriculture*

The following reasons increase either the need for data, or the data supply, or the productivity efficiency of transforming data into information:

- Technological changes, i.e. changes in technologies of farming practises and to a lesser extent in statistical methods (Trelogan, 1963);
- access to computer technology at a decision-making level that reduces the cost of evaluation and analysis of data (Just, 1983; Barnard, 1979; Allen, 1998);
- the volatility of agricultural markets resulting from the relationships of domestic agricultural markets to other markets (Just, 1983);
- the development and growth of non-commercial markets that can be used to turn commodity information into quick, large-scale and highly leveraged profits without developing commercial interests (Just, 1983);
- the development and perfection of remote sensing technology and related production of data by satellite (Just, 1983);

- the changes in the organisation and nature of the agricultural sector, i.e. industrialisation and development (Bonnen, 1975; Lindner, 1998);
- changes in agriculture policies (Bonnen, 1975; Hauser, 1973), decreased government intervention (Amstutz, 1998) and reduction in government budgets for agricultural data collection (Gardner, 1983); and
- economic and political integration towards market globalisation as well as political and trade integration (Oresnik, 1998).

4. CONCLUSION

Information becomes an economically valuable commodity only in the context of decision-making; its value depends on the types of decisions for which it is used and the value of those decisions (Riemenschneider & Bonnen, 1979). However, decision-makers do not know the exact value of the information until it is required and used, but to determine precisely its value prior to buying it, the user must in effect obtain it without cost. It seems that in South Africa, the official suppliers of agricultural data, namely the National Department of Agriculture, Provincial Departments of Agriculture, Central Statistical Service and the National Crop Estimates Committee are not providing the necessary data that the decision-makers, both public and private need. As a first step to address these problems, the identification of the data needs vis-à-vis existing availability is necessary (Kabat, *et al.*, 1998). The following methods can be used to determine the data needs: correspondence with possible data users, asking them to outline their needs, field travel, i.e. personal contact with potential data users and national and regional data users conferences. (USDA, 1987). As a second step, actions must be undertaken by the Government to improve existing, or establish new data collection methodologies that satisfy the needs of users. With the establishment with Provincial Departments of Agriculture, standardised definitions and methods should be introduced to ensure interprovincial comparability. For the agricultural sector in South Africa to contribute to the GEAR objectives, pertinent, reliable, accurate, impartial and up to date data on agriculture must be available for private and public decision-makers. To paraphrase Aristotle: without this knowledge, we are dead.

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