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USE OF INFORMATION SOURCES BY COMMERCIAL FARMERS IN THREE ZOBATAT OF ERITREA

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ABSTRACT

This study identifies the main sources of information used by commercial farmers in three Zobatat (regions) of Eritrea. A survey of 186 commercial farmers was conducted between November 2002 and February 2003. Results show that farmers' main sources of information vary according to enterprise type. For their production decisions, for example, poultry and dairy farmer respondents depend largely on information provided by veterinarians while horticulture and crop farmers rely mainly on the advice of extension agents. Policy recommendations include additional and appropriate record-keeping training for farmers, improving the road and communications infrastructure, promoting commercial information providers, and for the Ministry of Agriculture to periodically publish an agricultural magazine in a way that farmers can understand the information provided.

1. INTRODUCTION

Eritrea is a country of north-eastern Africa bordered on the east by the Red Sea, in the south by Djibouti and Ethiopia, and in the north and west by Sudan. The total area of the country is 121 320 square kilometres (CIA, 2004). Administratively, Eritrea is divided into six Zobatat (regions) with 54 sub-Zobatat and about 2685 villages (Ghebreyohanes, 2000). The population is estimated at about 4.45 million with a 2.57% growth rate

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per year. About 45% of the population is under 15 years of age, 52% between the ages of 15 and 64, and 3% is 65 years and older (CIA, 2004).

Agriculture is the mainstay of the Eritrean national economy, accounting for over 16% of the Gross Domestic Product (GDP) and employing over 78% of the national labour force (Rake, 2002). The current problems of Eritrean agriculture, as summarized by Bekuretsion (2002), include war, drought, various plant and animal diseases, lack of inputs, and lack of research and training programmes. Land is owned by the government and only the right to use it is granted to commercial farmers.

Farming is risky, and whether or not risk aversion matters, better decisions in a risky world can always be made if more information is available (Hardaker, Huirne & Anderson, 1997). The importance of information as a means to manage a risky environment, however, involves costs of obtaining and studying it.

Most information sources in Eritrean agriculture originate from government either at subsidized prices (newspaper, radio and television) or free of charge (extension and veterinary services). The development of infrastructure in facilitating information flow is vital. The long war for independence and the border war with Ethiopia, however, have negatively affected Eritrean infrastructure. In the current farming situation of Eritrea, the increasing demand for information by commercial farmers is not being met.

The objective of this paper is to identify the main sources of information used by commercial farmers in three Zibatat of Eritrea and to recommend policy measures that may promote the use of relevant information by farmers. The next section deals with the theories of information while section 3 presents the data sources for this study and some of the respondents' characteristics. Section 4 discusses the ratings and use of information sources by the sample of commercial farmers. A discriminant analysis of enterprise types according to information sources is presented in section 5. A final section presents some conclusions and policy implications of the results.

2. INFORMATION THEORY

Information is defined as the screening, editing and evaluation of data in the context of a particular decision-making process (Caspari, 1968, cited by Chavas & Pope, 1984). Information is an investment since the cost of obtaining it aims to achieve benefits, such as better decision-making. The probability of a farmer reducing the impact of risk is positively correlated with the quality of information he has.

2.1 The value of information

Information has become a critical input into the production, marketing and distribution process of farm and farm-related firms (businesses). Its critical role evolves from a need for more effective management strategies as agriculture copes with rising instability and change (Jones, Batte and Schnitkey, 1989). The link between information, decision and firm performance is well established and has been a major topic of research for several generations of economists (Ford and Babb, 1989). Barry, Hopkin and Baker (1988) reported that information reduces uncertainty at all stages of production by allowing a farmer to measure, evaluate and improve the performance of his business.

The value of information is measured in terms of its impact on the profitability of a business. The provision of information can be effective and productive only if it is aimed at the requirements of those who utilise the information for decision-making (Frick & Groenewald, 2001). The more appropriate the information a farmer has the better he can decide on his business strategy.

2.2 Demand for information

Changing times also bring changes in the need for information. Ortman, Patrick, Musser and Doster (1993) stated that farmers' demand for information has increased in recent years with increased market instability, more complex production technologies and greater need for financial planning and control. Although it is true that information is vital for decision-making, the demand for it depends on the cost of acquiring and the benefits of using the information. What the farmer has to decide is whether the benefits of the additional information outweigh the costs of obtaining it. When farmers have alternatives to choose

among many information sources, they select those sources that yield the highest marginal benefit (Jones, Batte & Schnitkey, 1990). Since different types of enterprises face different types of risk, the demand for information also differs from enterprise to enterprise. Schnitkey, Batte, Jones and Botomogno (1992) found that farm type was an important variable in explaining the differences in information preferences.

2.3 Information sources

“Historically much of the needed information has come from extension and university outlets. However, in the new information age, commercial sources of information have developed to serve agriculture” (Ford & Babb, 1989:465). Information sources can be grouped into various ways. Some classify them as internal and external (Brown, 1989 and Joubert & Laubscher, 1989) or formal and informal (Hildebrand & Ortmann, 1994). A farm record system is the main internal source of information for a farm business (Brown, 1989), while external information can be obtained from public or private sectors (Joubert & Laubscher, 1989). Hildebrand and Ortmann (1994) indicated that formal information sources include, for instance, media, specialists and conferences, while informal sources include own farm records. Computerization has improved the quality and quantity of information available so that farmers with less time can access more sources of information.

3. DATA SOURCES AND RESPONDENTS’ CHARACTERISTICS

Data for this study were collected from three Zobatats of Eritrea, namely Ma’akel, Debub and Gash Barka, between November 2002 and February 2003. Farmers to be interviewed were randomly selected from a list of 1965 farmers that was provided by the Ministry of Agriculture. Interviews were conducted with 186 farmers, 42 from Zoba Ma’akel, and 72 from each of the Zobatats Debub and Gash Barka. Forty respondents are poultry farmers, 31 horticultural, 74 dairy, and 41 crop farmers.

Individual ownership² of the land accounts for over 74% of the sample farmers, followed by family ownership (22%), while the remaining 4% comprise association ownership. The average size of farms is 102, 1.5, 2.1,

² *Ownership implies the right only to use the land and not the right to hire, transfer or sell it.*

and 88 hectares for horticulture, poultry, dairy, and crop farms respectively. About 40% of the respondents had completed primary and junior school, 49% reached secondary school, and 7.5% had completed either technical school or college. Only 1.08% and 2.15% of the respondents were graduates with diplomas and first degrees, respectively.

About 65% of the commercial farmers surveyed had fewer than 15 years of farming experience. Only 12% had more than 20 years of farming experience. Poultry and horticultural farmers seemed to have less experience than dairy and crop farmers. About 75% of the sample farms had an annual gross income of less than 450 000 Nakfa³, 21% between NKF451 000 and NKF750 000, and only 4% had a turnover of more than NKF751 000. Thirty-eight percent of survey respondents, mainly crop farmers, had no farm liabilities. About 43% of respondents had debt-asset ratios of between 1% and 30% indicating that nearly half of the respondents were relatively solvent (Barry *et al.*, 1988). About 60% of the sample farmers were engaged in off-farm businesses (e.g., shops, trucks, buses, flour mills, import-export trade), 11% partnered their spouses in off-farm businesses, 3% of the farmers' spouses had off-farm income, while 26%, mainly dairy farmers, were not involved in any other activities. All farmers interviewed were male with the exception of two poultry and three dairy farmers. Moreover, all survey respondents were married.

4. RATINGS AND USE OF INFORMATION SOURCES

Farmers were asked to rate 13 sources of information for making production, marketing and financial decisions on a Likert-type scale ranging from 1 (not important) to 5 (very important). Farmers were also asked about their annual cash costs for each information source and the relative importance of additional information required for their businesses.

4.1 Ratings of information sources

Overall, own farm records were given the highest ratings for production (3.98), marketing (3.87) and financial (3.90) decisions. This supports the

³ The exchange rate at the time of the survey was 1USD=14.5 Nakfa.

results of the studies by Ortmann *et al.* (1993), Woodburn, Ortmann and Levin (1995), Hildebrand and Ortmann (1994) and Bullock, Ortmann and Levin (1994), which showed that farmers rely mostly on their own farm records for decision-making.

4.1.1 Information sources for production decisions

The result of mean ratings by respondents of the various sources of information for production decisions is shown in Table 1. Overall, own farm records (3.98), own farm workers (3.75), local veterinarian (3.44), radio and television (3.28), and extension agents (3.17) were the most important sources of information for production decisions.

Table 1: Mean ratings of information sources for production decisions, sample of commercial farmers, Eritrea, 2002/03

Sources of information*	Mean ratings**				
	Overall	Poultry	Dairy	Horticulture	Crop
	(n=186)	(n=40)	(n=74)	(n=31)	(n=41)
Own farm records	3.98 (1)***	3.70 (4)	3.68 (3)	4.23 (2)	3.61 (3)
Own farm workers	3.75 (2)	4.50 (2)	4.30 (2)	4.10 (3)	1.78
Local veterinarian	3.44 (3)	4.88 (1)	4.85 (1)	1.29	1.10
Radio and television	3.28 (4)	4.08 (3)	3.18 (4)	2.94	2.95
Extension agents	3.17 (5)	1.70	2.80	4.29 (1)	4.61 (1)
Salesmen	2.96	2.93	2.92	3.77 (4)	2.46
Other farmers	2.75	2.93	2.49	2.10	4.44 (2)
Consultants	2.24	1.83	2.58	3.19 (5)	1.32
Lenders (Banks)	2.23	2.18	2.80	2.29	1.22
Newspapers	2.22	2.35	2.50	1.87	1.85
Local government	1.80	2.18	2.16	1.26	1.20
University specialities	1.76	1.18	2.28	2.00	1.22
Non-governmental organizations	1.70	1.20	1.12	2.16	2.88

* The sources of information are listed in order of their importance in the overall ratings

** The mean ratings (1= not important and 5 = very important) should be roughly interpreted to give an overall view of the importance of information sources since the data are ordinal.

*** Figures in parentheses indicate the rankings of information sources with ratings greater than 3.0.

Generally, poultry and dairy farmer respondents rated information from government veterinarians highly followed by own farm workers. These farmers also rated own farm records, and radio and television as important sources of information. Since these farmers deal with animals, relevant and up-to-date information concerning the health of their animals is obtained primarily from veterinarians in the Ministry of Agriculture.

Horticulture farmer respondents gave government extension agents, own farm records, own farm workers, salesmen and private consultants high ratings for production information. Crop farmer respondents rely on information from government extension agents, other farmers and own farm records for their production decisions. The Ministry of Agriculture extension agents focus on providing information to farmers on how they can protect their crops against plant diseases and weeds. Other information, which is vital for production decisions, includes fertilizer application rates, weather forecasts, seed selection, soil fertility and new production techniques. The fact that respondents in Zibat Ma'akel and Debub (mainly poultry and dairy farmers), which have relatively better infrastructure, have more access to television than horticulture and crop farmers implies that these farmers benefit more from the weekly agricultural programmes.

4.1.2 Information sources for marketing decisions

Overall, only two sources of information for marketing decisions had ratings greater than 3.0, namely own farm records (3.87) and salesmen (3.50). Except for crop farmers, own farm records were rated highly by poultry (4.45), dairy (4.05) and horticulture (4.16) farmer respondents for marketing decisions. The fact that the majority of horticulture farmers own market outlets implies that these farmers give more value to the information provided by salesmen (4.29) for their marketing decisions. Information from salesmen includes information from wholesalers, processing plants and grain boards. Crop farmer respondents rely more on information from salesmen (grain board) and other farmers for their marketing decisions. The few information sources for marketing decisions could be due to the unavailability of commercial information sources on prices of inputs and outputs, limited marketing alternatives and government market intervention (semi-regulated market). Ortman *et al.* (1993), Woodburn *et al.* (1994) and Bullock *et al.* (1995) also found

that respondents rated relatively few information sources (not more than three) for marketing decisions.

4.1.3 Information sources for financial decisions

Overall, own farm records (3.90), radio and television (3.49) and lenders (3.07) were the most important sources of information for financial decisions. Own farm records and daily foreign exchange rate information via radio and television are considered to be important information sources by poultry, dairy and horticulture farmers. Information from banks (about the availability of medium and short-term loans, collateral and interest rates) and private consultants are also important for poultry and horticulture farmers for financial decisions. Most poultry and horticulture farmers stated that they acquire information on financial record keeping from private consultants since no government officials support them in this matter. Crop farmers did not rate any of the information sources very highly.

4.2 Cost of information

An attempt was made to estimate the mean annual cash costs of various sources of information. Many sample farmers could not exactly specify the actual costs incurred for obtaining information. It was also not possible to ascertain the opportunity cost of time spent to study the information. Information that is obtained from extension agents, veterinarians, lenders, local government, non-government organizations, salesmen, other farmers, own farm workers and university specialists involves no cash costs. On average, the respondents spent NKF1365 per year, of which 41% was spent on private consultants, 54% on own farm records and the remainder on newspapers, radio and television. Ortman *et al.* (1993) reported that large US Cornbelt farmers spent, on average, \$2578 per year on information sources, while Woodburn *et al.* (1994) estimated that the average amount spent on information by commercial farmer respondents in KwaZulu-Natal was R3504 per year. Bullock *et al.* (1995) reported that a sample of vegetable farmers in KwaZulu-Natal spent an average of R2745 per year on information sources.

4.3 Additional information requirement

Farmers were also asked to rate the relative importance of more information for farm production, product marketing, farm finance and overall farm management on a Likert-type scale ranging from 1 (low importance) to 5 (highly important). Over the whole sample, farm production (4.34) and farm finance (3.90) were the two management areas where farmers need more information for their decisions. On average, poultry and horticulture farmers indicated a higher need for more information in all management areas as compared to dairy and crop farmers. While poultry and crop farmers focus on more information on farm production, dairy and horticulture farmers demand more information on farm finance and product marketing respectively.

The fact that poultry and horticulture farmers make more use of loans and are involved in fierce competition with government-subsidized projects, may lead these farmers to seek more information than other farmers. The less importance given to additional information on product marketing and overall farm management by dairy and crop farmers could be due to the relatively greater farming experience of these farmers, which may have made them to believe that they had accumulated sufficient management skills.

Farmers were also asked to specify the type of additional information they need for production, marketing and financial decisions. Most poultry farmers indicated the need for more information on chicken health issues and breeds for production decisions. Additional information for marketing decisions include information about alternative feed (input) and output markets, while tax rate calculations and appropriate record keeping were considered essential for financial decisions. While horticulture farmers find the usefulness of information on the technical side of production (plant disease control, seed selection, machinery selection and rotation type), crop farmers seek more information on weather forecasts and effective and appropriate weed control systems. Dairy farmers focussed on the importance of additional information on genetic selection and ration mix for production decisions. Generally, all sample farmers regarded additional information on appropriate record keeping systems as important.

5. DISCRIMINANT ANALYSIS OF ENTERPRISE TYPES

An attempt was made to discriminate between groups of farmers on the basis of their ratings of information sources for production, marketing and financial decisions. Farmers were grouped by enterprise, namely poultry, dairy, horticulture and crop farming. The number of components in each of these analyses was three (number of groups (four) minus one) (Manly, 1994). The first discriminant function estimated for production, marketing and financial decisions accounted, respectively, for 85.7%, 76.6% and 47.1% of the differences between enterprise types. The first and most important discriminant function estimated for each decision area is presented in Table 2.

The null hypothesis that the group means of the discriminant scores are equal is rejected because the value of Wilks' Lambda and its associated chi-square for all three decision areas are significant.

For production decisions, the positive mean discriminant scores for poultry (5.578) and dairy farmers (4.419) indicate that these farmers favour the information sources with positive loadings. Horticulture and crop farmers, on the other hand, favour the information sources with negative loadings. Similar interpretations can be made for the relative importance of various information sources for marketing and financial decisions.

The first function, which explains 85.7% of differences in enterprise type for production decisions, discriminates poultry and dairy farmers from horticulture and crop farmers. For their production decisions, poultry and dairy farmers rate information mainly from veterinarians highest, followed by own farm records, while horticulture and crop farmers regarded extension agents as a relatively important source of information for their production decisions.

Poultry and crop farmer respondents considered other farmers and radio and television as relatively important sources for their marketing decisions. Horticulture farmers in particular (higher mean) regarded salesmen as the most important source of information for their marketing decisions. Crop farmers were distinguished from other farmers by the last function that explains 47.1% of differences between enterprise types for financial decisions. None of the listed information sources were rated

Table 2: Discriminant analysis of enterprise types for production, marketing and financial decisions, Eritrea, 2002/03

Sources of information	Production	Marketing	Finance
Veterinarians	0.897	0.172	0.118
Non-government organizations	-0.170	0.121	0.036
Own farm workers	-0.117	0.250	0.274
Private consultants	0.030	0.007	0.216
Other farmers	-0.048	-0.258	0.306
Lenders (Banks)	0.112	-0.079	0.306
Newspapers	0.055	-0.154	0.628
Local government	0.006	0.153	0.118
Own farm records	0.261	0.181	0.636
University specialists	0.069	0.012	0.084
Extension agents	-0.241	-0.005	0.078
Radio and television	0.075	-0.370	0.343
Salesmen	0.001	0.567	0.141
Percentage variation	85.7	76.6	47.1
Chi-square for Wilks' Lambda	1049.87***	712.083***	430.492***
Means Poultry	5.578	-2.187	0.026
Dairy	4.419	0.356	0.781
Horticulture	-4.304	2.102	0.794
Crop	-7.863	-4.000	-2.502
Correct allocation (%)	98.9	97.3	83.9
Correct allocation (%)			
Poultry	95	97.5	72.5
Dairy	100	95.9	89.2
Horticulture	100	96.8	71.0
Crop	100	100	95.1

*** Significant at the 1% level of probability

as important by crop farmers for their financial decisions. However, other farmers, lenders (banks), newspapers, own farm records, and radio and television were relatively important information sources for dairy and horticulture farmers in their financial decisions.

Since the overall percentage of cases classified correctly is the sum of the number cases classified correctly in each group divided by the number of

cases, 184 respondents (98.9%) were correctly allocated for production decisions, 181 respondents (97.3%) for marketing decisions and 156 respondents (83.9%) for financial decisions.

6. CONCLUSIONS AND POLICY IMPLICATIONS

In this study, commercial farmer respondents highly rated their own farm records for production decisions (3.98), followed by financial (3.90) and marketing (3.87) decisions. Excluding cost of time, respondents spent on average an estimated NKF1365 on information, of which 41% was spent on consultants (particularly by poultry and horticulture farmers). Overall, sample farmers highly rated the importance of additional information for farm production decisions (4.34) and farm finance (3.90). Results of a discriminant analysis of enterprise show that, for their production decisions, poultry and dairy farmer respondents depend largely on information provided by veterinarians (followed by own farm records), while horticulture and crop farmers rely mainly on the advice of extension agents. As for marketing, horticulture farmers rely mainly on salesmen, while poultry and crop farmers depend mainly on radio and television and other farmers for their marketing decisions. For their financial decisions, dairy and horticulture farmers rely mainly on own farm records, newspapers, radio and television, lenders (banks) and other farmers.

The results of this information study have some policy implications. The first is that since own farm records are one of the most important sources of information for respondents for making business decisions, it is recommended that the Ministry of Agriculture and local government should provide additional and appropriate record-keeping training for farmers. The extension service could play a crucial role in this regard. The study also shows that government participation in providing information to commercial farmers in Zoba Gash Barka in particular is low. As this could be due to the poor road and communication infrastructure, improving the infrastructure in this Zoba is expected to improve information flows and promote the effectiveness of the extension service.

The fact that some important information sources are provided by the government implies the lower availability of private commercial information sources in Eritrea. Commercial information providers could

play a role in supplementing government (extension) sources and thus provide farmers with access to more information. Furthermore, the low rating of university specialists as sources of information to farmers may indicate that there are few research programmes being conducted at the university to equip farmers with appropriate information. More research by professionals and university specialists aimed at helping farmers to assess more and relevant information is, therefore, recommended. The extension service could play an important role in disseminating this information. Lastly, the Ministry of Agriculture should periodically publish an agricultural magazine (currently no publications exist) in a way that farmers can understand the information provided.

REFERENCES

BARRY, P.J., HOPKIN, J.A. & BAKER, C.B., 1988. *Financial Management in Agriculture*, 4th edition. Danville, Illinois: The Interstate Printers and Publishers, Inc.

BEKURETSION, H., 2002. *The coexistence of commercial and traditional farming in Eritrea*. Paper presented at the Ministry of Agriculture Annual Conference, Asmara, Eritrea.

BROWN, T., 1989. Where and how farmers get useful information. In *Farm Management Yearbook*. Edited by Smith, D.T. US Government Printing Office, Washington, DC: 233-235.

BULLOCK, W.I., ORTMANN, G.F. & LEVIN, J.B., 1994. Farmer characteristics, risk sources, and managerial responses to risk in vegetable farming: Evidence from large- and small-scale commercial vegetable farmers in KwaZulu-Natal. *Agrekon*, 33 (3):103-112.

CHAVAS, J.P. & POPE, R.D., 1984. Information: Its measurement and valuation. *American Journal of Agricultural Economics*, 66:705-710.

CIA (Central Intelligence Agency), 2004. *The World Fact Book*. Website: <http://www.cia.gov/cia/publications/factbook/> (accessed on 14 September 2004).

FORD, S.A. & BABB, E.M., 1989. Farmers' sources and uses of information. *Agribusiness*, 5:465-476.

FRICK, A., & GROENEWALD, J.A., 2001. The need for agricultural information and data: Researchers and policy makers. *Agrekon*, 40(1):104-117.

GHEBREYOHANES, F., 2000. *The interface between local and macro-perspectives: An analysis of the impact of the SG 2000 Program in Eritrea*. Unpublished MSc thesis, Department of Economics and Marketing, Wageningen University, The Netherlands.

HARDAKER, J.B., HUIRNE, R.B.M. & ANDERSON, J.R., 1997. *Coping with Risk in Agriculture*. CAB International, Wallingford, Oxon, UK.

HILDEBRAND, Q. & ORTMANN, G.F., 1994. Use of information and computers by Eastern Cape dairy farmers. *Agrekon*, 33(2):68-73.

JONES, E., BATTE, M.T. & SCHNITKEY, G.D., 1989. The impact of economic and socioeconomic factors on the demand for information: A case study of Ohio commercial farmers. *Agribusiness*, 5:557-571.

JONES, E., BATTE, M.T. & SCHNITKEY, G.D., 1990. A socioeconomic analysis of marketing information usage among Ohio fruit producers. *Southern Journal of Agricultural Economics*, 22:99-107.

JOUBERT, G.J. & LAUBSCHER, J., 1989. Aspects regarding the information requirements of farmers and the role of extension systems in this regard. *South African Journal of Agricultural Extension*, 18:8-12.

MANLY, B.F.J., 1994. *Multivariate Statistical Methods*. Chapman and Hall, London, UK.

ORTMANN, G.F., PATRICK, G.F., MUSSER W.M. & DOSTER, D.H., 1993. Use of private consultants and other sources of information by large Cornbelt farmers. *Agribusiness*, 9:391-402.

RAKE, A., 2002. *Africa South of the Sahara: Regional Surveys of the World*. Taylor and Francis Groups, The Gresham Press, London, UK: 344-361.

SCHNITKEY, G.D., BATTE, M.T., JONES, E. & BOTOMOGNO, J., 1992. Information preferences of Ohio commercial farmers: Implication for extension. *American Journal of Agricultural Economics*, 74:486-497.

WOODBURN, M.R., ORTMANN, G.F. & LEVIN, J.B., 1995. Sources and management of risk: Evidence from commercial farmers in KwaZulu-Natal. *South African Journal of Economic and Management Sciences*, 17:46-63 (Summer).