BUSINESS ORIENTATION AND THE FOOD SECURITY STATUS OF SMALL SCALE PRODUCERS IN THE VENDA REGION, SOUTH AFRICA

L.J.P. le Roy[1], C.J. van Rooyen[2], L. D'Haese[3] and A. de Winter[4]

Questions addressed in this paper are: How to determine the food status of rural households; and does an agribusiness orientation enhance the food security status of farm families. A study was conducted on two groups of small scale black farmers in the Venda region: one group, agribusiness directed and generally more progressive towards technology, produces mangos and other subtropical fruits (cash crop farmers); the other group concentrates on locally consumed and sold vegetables (food crop farmers). Their food status was quantitatively determined by means of household energy, protein and fat balances and food security determinants were identified. More than 80% of the households had a negative balance for energy, protein or fat. Business orientation and farming type in this particular case study does not influence the energy, protein and fat coverage significantly. The marginal nature of farming by these small holders could explain this finding. Significant predictors of food security status were rather factors such as the household size and the availability of outside sources of income and cash to spend on food.

1. INTRODUCTION

An analysis of the production and consumption of the most important agricultural commodities in the 1985-1993 national food balance sheets show clearly that South Africa is self-sufficient in all the important staples. (Van Rooyen, Sigwele, Ngqangweni, Van Schalkwyk, Kekana, Mabiletsa & Meyer, 1997).

However, a high national food self-sufficiency index does not necessarily imply household food security, because the index ignores dimensions sucy as individual access to and distribution of food. The majority of South Africans, especially in the rural areas, are food insecure in spite of the high levels of national food self-sufficiency. Currently more than 40% of the population

[1] *Department of Agricultural Economics, University of Gent, Belgium.*
[2] *Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, Pretoria 0002.*
[3] *Department of Agricultural Economics, University of Gent, Belgium and Extra-ordinary Professor, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, Pretoria 0002.*
[4] *Department of Agricultural Economics, University of Gent, Belium.*

lives below the poverty datum line (Cooper & van Zyl, 1994; Van Niewenhuizen, 1995 and Van Rooyen *et al*., 1997).

This article firstly focuses on the micro dimensions of the food security situation in South Africa. According to Maxwell and Smith (1992), food security has four important dimensions: access to food, food sufficiency, security of the access to food and finally the time dimension (i.e. secure access to sufficient food at all times).

Secondly the relationship between food security status and the agribusiness orientation of different farmer groups is analysed. Kirsten *et al*. (1998) found a positive correlation between farmer support programmes and household food and nutrition status in KwaZulu-Natal. They, however, argued that this relationship is complex and should be dealt with circumspection.

2. TYPOLOGY OF FARMER GROUPS

Two groups of small scale farmers in Venda, both receiving agricultural extension from the Agricultural and Rural Development Cooperation (ARDC) Northern Province, Northern Region are compared: their food security status is evaluated and its determinants are identified. Venda is situated in the northern part of the Northern Province, one of the poorest provinces in South Africa. Unemployment is high and the per capita income is by far the lowest in the country (Mekuria & Moletsane, 1996 and Provincial Statistics, 1996).

The first group of farmers is more business minded, and aware of technology and markets. They have been identified as "progressive" by a previous study by D'Haese *et al*. (1998). This group fruits (called Cash Crop farmers) concentrates mainly on the production of cash crops such as mangos, avocados and citrus. Most of these farmers apply a mixed cropping system, in which crops (e.g. maize) are grown between the mango trees. The other group is less focussed on agribusiness and produces food crops for home consumption and selling where surpluses are available. They grow crops such as maize, cabbages, spinach, tomatoes. They are called Food Crop farmers.

3. METHODOLOGY FOR FOOD SECURITY STATUS DETERMINATION

For sampling purposes, 150 farming households were stratified over farm size (0 to 5 ha, 6 to 10 ha and over 10 ha for the Cash Crop farmers and 0 to 5 ha, 6 to 9 ha and over 9 ha for the Food Crop farmers) and extension region (three regions). In both groups, a sample of 40 farming households was drawn using

randomized proportionate stratified sampling. Seventeen farmers (one cash crop and sixteen food crop) could not be interviewed (stopped farming, moved to another region or were not available).

The questionnaire was tested in a group of 7 eligible farmers, who were excluded from the sampling population. From the total number of interviews, 52 could be used in this study (20 food crop farmers and 32 cash crop farmers). Questions were asked on household characteristics, household food consumption and purchase, farm characteristics, farm-production, business orientation, farm-income and non-farm income. Group discussions with farmers and extension officers were conducted. Based on the collected data, household food availability was calculated. By means of food composition tables, the energy, protein and fat availability were derived from the edible portions of available foods.

For every household, energy requirements were calculated by means of ENREQ2, a computer program developed by FAO in 1994 and based on James & Schofield (1990). The WHO Report on Diet, Nutrition and the Prevention of Chronic Diseases (1991) states that 10 to 15% of the dietary energy should be obtained from protein. In this study, 12% was used. Given that 1g of proteins equals 4 kcals, the protein requirements can be calculated with the following formula:

$$\text{protein requirement (g/day)} = \frac{\text{energy requirement (kcal/day)} \times 0.12}{4 \text{ (kcal/g protein)}}$$

According to the same report, fat should contribute 20 to 30% to the dietary energy; 20% is used here. With 1g of fat representing 9 kcal, the formula becomes:

$$\text{fat requirement (g/day)} = \frac{\text{energy requirement (kcal/day)} \times 0.20}{9 \text{ (kcal/g protein)}}$$

From the availability and requirements, energy, protein and fat balances were derived for every household. Statistical analyses (SPSS) were used to compare food balances and farm characteristics between the two types of farmers and between four energy-fat groups. Energy, protein and fat coverage are used as a proxy for food security (100% indicates food security).

4. RESULTS AND DISCUSSION

Energy, protein and fat balance: More than half of the households had a negative balance for energy, protein or fat. The distribution of the energy coverage indicates that 20% of the households had an energy coverage lower than 80%. The protein coverage is lower than 80% in 30% of the households and the fat coverage is even worse: in 25% of the households, fat coverage is lower than 60%.

Energy and protein coverage are strongly correlated: $r = 0.962$ ($p < 0.001$), the correlation between energy and fat is weaker ($r = 0.663$ with $p < 0.001$).

In order to find the determinants of household food security, the households were grouped according to the discussed coverages. Based on the energy fat coverage (EFC), four groups were formed, with the 100% energy and fat coverage as the cutoffs: group 1 (energy and fat coverage < 100%), group 2 (energy > 100%, fat < 100%), group 3 (energy < 100%, fat > 100%) and group 4 (energy and fat > 100%). Because of the strong correlation between energy and protein, the protein coverage is implicitly captured in this EFC grouping. The characteristics of the four EFC groups are summarized in Table 1.

Table 1: Average energy, protein and fat coverage (%) in the four EFC groups (52 households)

EFC group	Number of farms			Average coverage (%)		
	Cash crop	food crop	total	Energy	Protein	fat
1	10	12	22	78	73	58
2	10	4	14	117	107	83
3	4	2	6	91	90	135
4	8	2	10	144	143	158

Farm management factors: The two farm types (i.e. Cash Crop and Food Crop farmers) are not different in terms of average energy ($p = 0.11$), protein ($p = 0.13$) or fat coverage ($p = 0.13$). None of the production factors (management, capital, land and labor) were found to be significant determinants of household food security. Some important characteristics of these factors are discussed below.

Management and experience: On average, the farmers are 51 years old and have 12 years of farming experience. The majority of farmers (34 out of 52) are men. Sex, age, years of farming experience and the education level of the

farmer however did not influence the household energy, protein or fat coverage.

Capital: Most farmers only possess a hand hoe and a pick. Some farmers own a handspray and only 8 farmers have a tractor. The average agricultural, non-agricultural and total income however are not significantly different between tractor owners.

Land: The Venda region is characterized by a traditional land tenure system: private land ownership does not exist. Farmers only receive a 'permission to occupy' from the tribal chief. It is clear from Table 2 that Cash Crop farmers both 'own' and cultivated more land than food crop farmers do. Land size does however not determine the energy, protein or fat coverage in any significant way. Two reasons can be given for this (unexpected) finding: the income from non-agricultural activities represents on average 69% of the total income. Consequently, the importance of the agricultural income for food security is relatively small. Second, an increasing size of the land under cultivation is accompanied by a decreased income per ha ($r=-0.467$; $p<0.001$). Thus, a potential increase in agricultural income is undone by lower land productivity, possibly due to restricted inputs and increased exposure to crime and theft (D'Haese *et al*., 1998) and lack of management skills.

Table 2: Average land size by farm type

Farm type	Cash crop farmers	Food crop farmers	*p*
Total land size (ha)	6.7	13.1	*0.040*
Land under cultivation (ha)	2.7	9.5	*0.000*

Labor: Cash Crop farmers employ 3.5 laborers, food crop farmers less than 1. This difference is very significant ($p<0.001$). The average wage is R242 per month. The number of laborers and the agricultural income are not correlation but the non-agricultural income is significantly correlated with the number of laborers. This shows that the economic principle, in which the marginal product has to equal the cost of labor, may not be taken into account if only the farming business is considered. However, the increased number of laborers may allow increased time afforded to other non-farm income activities (or leisure time) for the farmers. A significant correlation between the number of laborers and the size of the cultivated area only holds for the food crop farmers.

Agricultural production systems: The only crop clearly associated with the energy, protein and fat coverage is groundnut. In the group of farmers with a positive fat balance (i.e. groups 3 and 4), a significantly (exact p-value 0.03) bigger proportion of the farmers grow groundnuts (11/16 vs. 13/36). Almost half of the farmers (48%) have chickens and 31% keep cattle on communal grounds. Goats (16% of the farmers) are kept as well. Chickens are slaughtered for household consumption on a regular basis, bigger livestock only for special occasions. No association could be found between the type or magnitude of animal production and the energy, protein or fat coverage.

Household size: The households in the sample had seven members on average; no differences in size were found between the cash crop farmers and food crop farmers. When energy, protein and fat coverage are regressed on household size, the latter proves to be a significant determinant of household food security. The regression models predicting energy and protein coverage are significant; the model predicting fat coverage is marginally significant. According to these models, the coverages decrease over 4% for every additional household member. (Table 3)

Table 3: Household size as a determinant of food security: regression models

Model		R^2_a	*p*
Energy coverage (%)	= 135.01 – 4.66 x household size	0.16	*0.002*
Protein coverage (%)	= 127.13 – 4.26 x household size	0.13	*0.005*
Fat coverage (%)	= 122.76 – 4.25 x household size	0.05	*0.062*

Household income: Twenty-eight farmers have regular employment or income besides farming (education, business, government, …). The agricultural income per ha (cultivated) is significantly bigger (p=0.026) for food crop farmers than for cash crop farmers: 1 ha of food crops generates an income of R213, whereas cash crop farmers only receive R49 per ha. If we adjust the agricultural income with the consumer value of the production consumed at home, the difference becomes more significant (p<0.001): the value of one ha of vegetables is R461, cash crop farmers make only R96 per ha. However, the total agricultural income is not different for both types of farmers, because of the difference in cultivated area. The average total household income amounts to R2949 per annum: 31% comes form agricultural and the rest from non-agricultural activities.

Only non-agricultural income determines household food security: farmers with both energy and fat coverage above 100% (group 4) have a significantly

(p=0.05) bigger non-agricultural income than the other farmers. Also, in this group the proportion of non-agricultural activities (80%) in the total income is significantly (p<0.05) bigger.

Expenditure: On average, households spend 38% of their R1540 monthly household budget on food. Expenditure patterns are not significantly different for both types of farmers. It is clear however that the total expenditure in households with positive balances for energy and fat (group 4) are significantly higher than in the other households (R2471 vs. R1310; p=0.023). The monthly expenditure on food in this particular group (R713) is also bigger than in households with negative fat or energy balances (R532). However, the proportion of the budget spent on food is negatively correlated with the energy (r=-0.278; p=0.046), protein (r=-0.274; p= 0.049) and fat coverage (r=-0.266; p=0.057): a higher proportion of the budget spent on food is significantly associated with decreased food security.

5. CONCLUSIONS

Food security status: It is clear from the analysis that the households of EFC groups 1, 2 and 3 (i.e. 81% of the sample) are not food secure: they do not have access to sufficient food since the energy, protein or fat coverage is below 100%. A possible better coverage in different time periods, does not change this conclusion, since the definition of food security states that there must be access to sufficient food at all times. Households in EFC group 4 do have access to sufficient food. Any "clear cut" conclusion on food security is impossible however. First, no information was collected on intra-household distribution of food. Second, this survey is a snapshot, not taking into account any seasonal effects.

Business orientation: The business orientation and farming type does not directly influence the energy, protein and fat coverage in this particular study and hence the food security position of families. The differences in energy, protein and fat coverage are rather determined by factors independent from business orientation and farm characteristics. The number of people in the household is negatively associated with food security: the bigger the household, the lower the coverages. The income from non-farm activities is an important determinant as well. The higher this income the higher food security. Total expenditure and food expenditure are associated similarly. For these variables, group 4 clearly stands out from the other three groups. Group 1, 2 and 3 do not seem to be really different, except for the high fat coverage in group 3 explained by the cultivation of groundnuts.

Improving food security through agricultural production: Increased efficiency and farm management could increase yields and consequently food security. A much more coherent farmer support programme approach will however be required. The study by D'Haese *et al* (1998) argued this point in more detail. This would be achieved by improving business knowledge and management techniques, improve labor management and in record keeping, better access to technology and markets, etc (as was also argued by Kirsten, et al 1998). Extension services will have to be more adapted to the needs of these farmers.

Knowledge about nutrition: A better acquaintance with the nutritional value of the various crops could improve food security as well. This study showed the important role of groundnuts in the fat coverage. Avocados – also grown by some farmers - are also rich in fat, but they do not last as long as groundnuts do. Here again, the extension service should set itself this task.

Finally, for rural small-scale farmers, operating at the margin, access to resources, knowledge and opportunities are vital. The loose classification of such groups as "more" and "less" business orientated as used in this paper seems somewhat "academic". Conclusions on the relationship between business orientation, farm type and food security is not clear – rather complex. This finding is supported by Kirsten *et al.* (1998.)

REFERENCES

COOPER, D.H. & VAN ZYL, J. (1994). The influence of land reform on food security and food self-sufficiency in South Africa. FSSA Journal, 17-31.

D'HAESE, M., VAN ROOYEN, C.J., VAN HUYLENBROECK, G. & D'HAESE, L. (1998). Problem-solving strategies for small-scale emerging commercial mango farmers in Venda. *Development Southern Africa,* 15(3).

JAMES, W.P.T. & SCHOFIELD, E.C. (1990*). Human energy requirements, a manual for planners and nutritionists*. Oxford, Oxford University Press.

KIRSTEN, J., TOWNSEND, R. & GIBSON, A. (1998) Determining the contribution of agricultural production to household nutritional status in KwaZulu-Natal, South Africa. *Development Southern Africa*, 15(4).

MAXWELL, S. & SMITH, M. (1992). Household food security: a conceptual review. In: Maxwell, S & Frankenberger, TR (Eds.) *Household food security: concepts, indicators, measurements*. New York, UNICEF & IFAD.

MEKURIA, M. & MOLETSANE, N.P. (1996). Initial findings of rural household food security in selected districts of the Northern Province. *Agrekon,* 35:309-313.

PROVINCIAL STATISTICS. (1995) – Part 9, Northern Province, 1996. Pretoria, Central Statistical Service. CSS Report No 00-90-09.

VAN NIEUWENHUIZEN, P.J. (1995). An assessment of options to achieve food security in South Africa. *FSSA Journal*, 61-70.

VAN ROOYEN, C.J., SIGWELE, H.K., NGQANGWENI, S., VAN SCHALKWYK, H., KEKANA, D., MABILETSA, P. & MEYER, N. (1997). *Towards a food security policy: macro aspects of food availability in South Africa*. Research paper prepared for the Food Security Policy Working Group, Minister of Agriculture and Land Affairs, Government of South Africa.

WORLD HEALTH ORGANIZATION (WHO) (1991). Diet, nutrition and the prevention of chronic diseases – a report of the WHO study group on diet, nutrition and prevention of non-communicable diseases, 1991. *Nutrition Reviews*, 49:291-301.