

FOOD SECURITY IN A COMMERCIALISING RURAL ECONOMY: INITIAL FINDINGS FROM A CASE STUDY OF TWO DISTRICTS IN UGANDA

E.C. Apili Ejupu, M.T. Makhura and J.F. Kirsten¹

The agricultural sector in Uganda has for long been characterised by a clear dichotomy between the rural cash economy (dominated by coffee, cotton and tobacco production) and the subsistence economy (production of staple foods such as millet, sweet potatoes, maize, bananas, cassava and beans). The on-going transformation of the rural economy to a cash economy has resulted in staple food crops, in addition to meeting the subsistence food needs, becoming important cash crops and sources of income for rural households. The growing use of food crops for cash has led to a concern that it is contributing to the increasing signs of food shortages in rural households. This paper uses cluster analysis to determine whether this is the case and how commercialisation relates with other food security determinants like production levels and non-farm income. The highly commercialised households are found to be comparatively less food secure.

1. INTRODUCTION

The Ugandan economy is predominantly agricultural and its population predominantly rural. At least 80% of its population derive their livelihood from agriculture to meet not only their food needs, but as the main source of cash income too. In the recent past, the agricultural sector was characterised by a clear dichotomy; the rural cash economy (dominated by coffee, cotton and tobacco) on the one hand and the subsistence economy (production of food crops like bananas, beans, potatoes, millet, cassava, ground nuts, simsim, vegetables etc.) on the other. Today this distinction is not as clear. Food crops have, increasingly, taken on the dual role of meeting subsistence needs and being major sources of cash income (MAAIF 1997, World Bank, 1995).

It is estimated that food production in Uganda has increased by about 70% since 1986 (MFPED, 1998). The implication is that the small farmer has in aggregate, increased production given that at least 94% of the food produced in the country by the same small farmers. Growth in supply has been matched by a growing demand for food both domestically and within the East African and Great Lakes region, and ultimately an increase in food sales by the

¹ Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, Pretoria 0002.

producer. Food sales have, in turn, been helped by the deregulation/decontrol of markets and prices under the economic reform programme.

Despite the increase in food production, the flip side of the coin depicts a growing problem of food insecure households disproportionately among the very same producers (MFEP, 1996, COOPIBO et al 1998, 1996; NFNC, 1996). This suggests that farmers sell their food either unmindful of their own needs or are under pressure to meet immediate cash needs e.g. health and education. Consequently, there exists a concern that the increased food sales are contributing to the growing food-shortages in rural households (NFNC, 1996; COOPIBO, 1996).

The concept of commercialisation is generally associated with increased production and improved welfare (Von Braun & Kennedy 1994 and Makhura *et al*, 1996). For a subsistent rural economy, it is both part of the development process and fundamental to economic growth. However, owing to market and policy failures, and intra-household factors, inefficiencies and inequities are created (Von Braun 1994).

In Uganda, the commercialisation of small-scale agriculture is at the heart of the poverty eradication programme (MFEP, 1996). Makhura *et al*, 1996, best defined the concept of commercialisation in the Ugandan context, i.e. the increased sales of farm produce to allow the purchase of other goods and services. In 1984, it was estimated that less than 10% of food produced was marketed (MAF, 1984). In 1995, it was estimated that 20% maize, 27% sorghum, 45% finger millet, and 60% each for cassava, sweet potatoes and bananas were the respective proportions consumed at farm level, (MFEP-EPAU 1995a). Secondly, the campaign to broaden the export base away from coffee is hinged onto the very staple foods of the producers who should thus balance between consumption and cash needs. More so because the food needs for most of the population are predominantly met from own production, equating food security largely to production levels (MFEP - EPAU, 1995a).

The growing use of food for cash rests on two assumptions with potential implications for food security thus:

- i) Increased production over and above the household needs allowing it to maintain or improve its food security status and generate cash income to consume other goods and services;

- ii) Production levels remain the same and the increased cash income allows the household to meet its food needs through increased food purchases.

Food needs are thus rendered dependent on how much food is left or bought back for household consumption and have to compete with non-food needs. Therefore, are producers selling a disproportionate amount of food compared to their own food needs, given that these needs are mainly met through own production? This paper explores the nature of this conflict in two districts of Uganda, namely Apac and Soroti, by means of cluster analysis. It examines the effect of commercialisation on household food security in rural areas.

2. CHARACTERISTICS OF THE STUDY AREAS AND THE SAMPLED HOUSEHOLDS

Both districts are located in the centre of Uganda above the swampy basin of Lake Kyoga. Soroti is more easterly and in the Teso agro-ecological zone and Apac is in the Northern zone. Both zones receive biannual rainfall though the distribution is less pronounced in the latter. The Teso zone characteristically grows finger millet, sorghum, green-grammes, sweet potatoes, beans, groundnuts, simsim and cassava while the Northern zone grows cassava, simsim, beans, sorghum, finger millet, pigeon peas, groundnuts and maize with sunflower and tobacco as cash crops in a few areas (MFEP, 1995/96). Cotton used to be the main cash crop in both districts and efforts are being made to revive its growing.

Cattle are important for both socio-economic reasons and animal draught power especially cultivation, in both districts. Most were however, rustled in the late 80's. Apac, relying more on communal labour, was less affected than Soroti where ox-cultivation was the norm. The smaller stock, mainly goats, and poultry, are now the more common.

Table 1 shows some of the district specifics.

A household survey was carried out in the two districts during the first season of 1998. A sample of 160 households in each district was drawn from two counties. At the lowest level, the village, 10 households were randomly selected based on a residence list provided by the local leadership. The data used in this paper is drawn from this survey.

Table 1: District area, population densities, road distance and administrative units

District	Total area Km ²	Land area Km ²	¹ Population Density/km ² (1991)	² Total road distance (Km)	Percentage of road all weather	No. of Counties
Apac	6 488	5 887	77	862	4	4
Soroti	10 060	8 526	50	1 083	3.32	6

Source: ¹ (MFEP, 1994).

² (MFEP, 1997).

NB: The rail network is non-functional in both districts.

Table 2: Average characteristics of sampled households (standard deviations in parenthesis)

Food	Sample Size	Family Size	Family Depen Ratio	Land (acres)		Income (Uganda Shillings)			Expenditure (shs)	
				Own	In use	Non-farm	Crop	Livestock	Non-farm	
Apac	160	5.9 (2.67)	0.4 (0.21)	10.12 (16.1)	4.9 (7.4)	243 880 (288560)	96 686 (113773)	45 542 (115250)	116 143 (135563)	98 754 (75499)
Soroti	160	6.18 (2.79)	0.3 (0.22)	10.12 (13.88)	4.69 (7.43)	207 056 (237026)	24 948 (36085)	30 875 (91470)	113 708 (166465)	115 160 (94616)

At a poverty line of 11 500/= and 16 400/= for individuals and a monthly household average of 55 200/= and 78 700/= for food and total expenses respectively, 45.6% of Uganda's population were considered poor in 1995/96 fiscal year. Of these, 86% were in the rural areas and 14% in the urban areas. By head count, 53.3% of the population in the Eastern region, in which Soroti falls and 65.1% in the Northern Region in which Apac falls, were considered poor. By comparison, the Central and Western regions had 28% and 42.3% respectively (MFEP, 1998).

3. FOOD SECURITY STATUS OF THE HOUSEHOLDS

As a first step to investigate the hypothesis that increased food sales negatively affect household food security amongst the farming population, it is necessary to classify these households on the basis of the factors commonly known to render households food secure or insecure.

Food security has been defined in terms of the calories potentially available to the household compared to its requirements as in MFEP-EPAU, 1995a. The household obtains calories through production adjusted for sales, post harvest losses, quantities used in beer making and seed², and/or food purchases. This gives the net amount of calories potentially available since further losses may be incurred through the mode of preparation. Whether or not the household can meet its food requirements is determined by comparing the net available calories against the household requirements projected for 6 months (a season).

HHSTAT = (CALPROD + CALBUY - CALSOLD - post harvest losses) - (HH daily calorie requirements)*180.

$$\text{CALPROD} = \sum C_i X p_i$$

$$\text{CALSOLD} = \sum C_i X s_i$$

$$\text{CALBUY} = \sum C_i X b_i$$

where:

i = different foods, p = produced, s = sold, b = bought

X = Quantity in Kilograms

C = Calorie equivalent

² It is estimated that 25% of the food goes as seed, feed and to waste. In addition 10% correction is applied to compensate for loss of calories in brewing alcohol (MAF, 1984).

Household calorie requirements were determined on the basis of adult equivalents per household. This takes into consideration the age and gender of each member of the household³. Calorie requirements per adult equivalent is defined as 2 419, a Sub-Saharan standard used by MFEP-EPAU, 1995. FAO conversion tables for use in Africa (FAO 1968, MFEP-EPAU, 1995 b) were used to determine calorie levels for the different foods. For purposes of this paper, potentially food insecure households are those with a negative HHSTAT, i.e. requirements exceed calories available to the household. In Apac, 29 cases are below 0 while in Soroti, 54 cases are below 0.

Cassava, a drought resistant perennial that can stay in the ground for up to three years is a very important food security crop in both districts. The mean acreage under cassava is 1.36 in Apac and 1.4 in Soroti. Too, cassava calorie contributions on average are 65.6% and 72.1% respectively.

Table 3: Sample means for food security indicators per household

District	Calories				Percentage of Households	
	Produced	Sold	Bought	Available	Food Insecure	Food Secure
Apac	6 641 211	1 468 797	530 183	3 479 183	18	82
Soroti	6 718 292	922 099	162 887	3 812 080	27	73

¹⁾ According to minimum calorie requirements per adult equivalent

4. CLUSTER ANALYSIS

Cluster analysis is an exploratory tool which aggregates individuals/objects into groups defined by the within group homogeneity and between group heterogeneity. It reduces large data sets to enable a more easily discernible description and, secondly, it may be used to explore hypothesis that may apply to a data set. Clustering methods include the hierarchical and non-hierarchical. The former combine (agglomerative) or divide (divisive) the cases starting/ending with individual cases and assigning each to clusters created in the process. Non-hierarchical methods, in contrast, assign objects on the basis of a specified number of clusters and cluster seeds (Hair et al, 1995 and Wichern, 1998) to generate the best cluster solution. Makhura et al (1998)

³ Adult equivalent is based on FAO consumption requirements for "normal" activities levels and is defined as: males 10 or older = 1, females 20 or older = 0.72, females 10-19 = 0.84, children <10 = 0.60.

grouped commercialising farmers using the Wards minimum Variance non-hierarchical method. This paper applies the non-hierarchical "Quick Cluster" method to explore the relationships between commercialisation and food security and in so doing examine the hypothesis that commercialisation of the subsistence economy negatively affects food security.

Six variables were used to generate the clusters. The three that reflected household productive capacity included; total calories produced and adjusted for calories sold, income generated from livestock and poultry sales, and non farm income (the sum of labour sales, beer sales, shop, stall, "hotel" trade, fish trade, handicraft, salaries/wages, rent oxen etc). Those reflecting the commercialisation tendency are calories sold, calories purchased and non-food expenditure (the sum of non-farm expenses on education, health, clothing, fuel, transport, cigarettes and beer etc).

The averages of household surpluses (consumption having been taken care of), calories produced, and an index indicating the proportion of production that is sold, were determined for each class and compared against the results. The larger the consumption surpluses, the potentially more food secure the cluster.

4.1 Results

The results here discussed are an aggregation of households into twelve clusters. In general, they indicate levels of commercialisation against levels of potential food security. These twelve clusters were rearranged and merged into seven groups whose variable means are presented in Table 4 below. They have been presented according to the level of calories in excess of production and calorie sales compared against the averages as presented in Table 3.

High Production-High Commercial (HPHC): This cluster with 27 households has the highest residual calories available for consumption, makes the highest earnings from livestock sales and earns relatively high non-farm income. Despite having the second highest non-farm expenditure because the bulk of food is a certainty, households in this group make rather low food purchases most likely to be the more expensive animal proteins. In magnitude, this group makes the third highest calorie sales, but in proportion to what is produced, the sales are low with a commercialisation ration (HCI) of 5.7%. This group is food secure and this is confirmed by a high value of calories in excess of consumption.

Table 4: Cluster results ranked by calories in excess of sales and available for consumption (Cluster means are in '000's)

Cluster	HPHC	HPLC	HIFPMC	HPVHC	LPLC	LPHC	VLPIC
No. of households	27	62	10	21	102	41	51
No. of Hholds in percentage	8.4	19.3	3.1	6.6	31.9	12.8	15.9
Excess of Cal. Sold (CALHHAV)	8 994	5 096	4 070	3 986	3 033	2 256	1 294
Calories bought (CALBUY)	<u>159</u>	202	2 922	268	225	<u>123</u>	<u>255</u>
Calories sold (CAL SOLD)	1 502	785	969	4 504	556	2 037	496
Livestock income (LSINC)	106	48	49	34	29	24	18
Non-farm income (NFINC)	235	244	311	280	205	195	180
Non-farm expense (NFEXP)	151	130	176	118	95	107	82
Excess of Cal Consumed (HHSTAT)	6 527	3 240	4 674	2 095	1 249	326	- 111
Calories produced (CALPROD)	15 036	8 465	7 096	10 466	5 118	5 372	2 420
Commercialisation ratio (HC1 %)	5.7	3.8	12.1	43.7	5.2	27.9	15.7

NB. **Bold**, **bold-underline** and **bold-italics** are the highest three values respectively. Underlined values are the lowest two values for every variable.

High Production-Low Commercial (HPLC): It is the second largest group with 62 households. Calories available for consumption in this cluster are also above average. It stands out for its relatively high livestock and non-farm income in which it is ranked second and third highest respectively. Like the first group, households in this group rely on own production for their food needs and make relatively low calorie purchases. Their HCI value is the lowest (3.8%) and in magnitude they still make below average calorie sales.

High Food Purchases-Moderately Commercial (HFPMC): This is the smallest group with 10 households. They make the highest food purchases, higher than what they sell, as reflected by calorie purchases. This is matched by it having the highest and second highest non-farm and livestock earnings respectively. Calorie availability is greatly increased by calorie purchases, about 75% of what is available for consumption. Despite having the highest non-farm expenditure, the high non-farm income allows the households to make food purchases. This group is considered food secure, relying on both production and non-farm income to ensure food availability. Calories in excess of consumption rank it as the second most food secure group.

High Production-Very High Commercial (HPVHC): This group with 21 households stands out for selling slightly more calories than it retains for consumption. Despite the high non-farm income, the calorie purchases are not markedly different from the other groups though second to the group (HFPMC) above. Their non-farm expenses too are not markedly different either. These two factors fail to explain the high calorie sales. The bulk of the calories should therefore be the cheap, but high calorie foods like cassava.

Low Production-High Commercial (LPHC): With 41 households, this is a lower than average producer. Its calorie sales are slightly lower than what is left for consumption making it very similar to the above group. It too stands out for its high calorie sales but in contrast, it derives comparatively low non-farm and livestock income, which are constrained to contribute to calorie purchases by non-farm expenditure.

Low Production-Low Commercial (LPLC): This is the largest group with 102 households. It is an average group, which does not stand out in any of the variables except the comparatively low food sales which together with food available for consumption, indicates low production. Its calorie purchases, which would otherwise make up for the low production, are the lowest.

Very Low Production-Low Commercial (VLPLC): With 51 households, this group stands out with low production as reflected by low calorie availability.

All the variables indicate it as one characterising the poor. Despite low production, they still sell off some of its food, only to buy back about 50% of the quantity sold. Low (the lowest) non-farm and livestock income, further constrain food purchases as does non-farm expenditure, also the lowest compared to the earnings, The value of calories in excess of consumption is negative, implying they are not meeting their food needs.

4.2 Discussion of results

Comparing the production and calories in excess of consumption reaffirms the importance of production in the food security web. Generally, the less food secure clusters produce less food. The majority of households fall below average production levels i.e. 194 (60.6%) households found in the groups LPLC, LPHC & VLPLC. However, commercialisation interrupts the trend created by production by ranking the HPVHC group less food secure than it would otherwise be, and so too the LPHC group.

Food security in the HPVHC & LPHC groups, is determined by their respective levels of production. The low production group (LPHC) will be rendered vulnerable to food insecure while the high producer (HPVHC) is more food secure because of its above average production, but is still less food secure than it should otherwise be. The two groups best illustrate the likely effects of commercialisation on food security. Indeed, comparatively, calories in excess of consumption (HHSTAT) place each cluster as less food secure in comparison to their production levels.

Excluding the HFPMC group, the low range in calorie purchases is explained by the tendency to buy the more expensive animal proteins, mainly fish, for dietary variety. Likewise, non-farm expenditure would seemingly put more pressure on the less food secure groups, which are also low producers with the lowest non-farm and livestock earnings. The lower range in non-farm expenses, about 90 000/= compared to the non-farm and livestock earnings whose sums have a range of about 160 000/= reflects that the less food secure households are further constrained to meet their food needs by purchases.

5. CONCLUSIONS

That own production is the predominant factor in ensuring food availability is evident by high producers having higher values of calories in excess of consumption than the lower producers. Food purchases make a small contribution to food availability making food retention the better means of guaranteeing food availability rather than income diversification.

This analysis justifies the concerns that food insecurity among the farming population is being created or aggravated by the sales of food. It would be expected that the high producers sell off more of what is produced if sales were mainly profit motivated. The more food secure clusters generally sell fewer calories compared to production levels. The hypothesis that commercialisation negatively affects food security may therefore be tested.

Further analysis needs to be undertaken to establish the inter-play between production, calorie availability and sales of individual crops. It is also necessary to examine the contributions non-farm income makes to food purchases as opposed to meeting non-farm expenditure to establish the pressures pushing food sales.

REFERENCES

- COOPIBO. (1996). Support to Food Security Initiatives in Uganda, Workshop Proceedings COOPIBO, SNV (U) and OXFAM (U), (1998): The Impact of Agricultural Price and Market Liberalisation on Food Security in Uganda - Workshop Proceedings.
- FAO. (1968). Food composition table for use in Africa, FAO/U.S. Department of Health, Education and Welfare.
- HAIR, J.F, ANDERSON R.E, TATHAM, R.L, & BLACK, W.C. (1995). *Multivariate data analysis*. Fourth Edition.
- JOHNSON R.A & WICHERN D.W. (1998). *Applied multivariate statistical analysis*. Fourth Edition.
- MINISTRY OF AGRICULTURE, ANIMAL INDUSTRIES AND FISHERIES. (1997). Socio-economic conditions baseline survey for the household agricultural support programme. Districts Report on Bundibugyo, Kabarole, Masaka, Pallisa and Tororo.
- MINISTRY OF AGRICULTURE AND FORESTRY. (1984). *Towards a national food strategy*. Vol. II - Supporting Technical Reports
- MINISTRY OF FINANCE AND ECONOMIC PLANNING. (1997). *Statistical Abstract*.
- MINISTRY OF FINANCE AND ECONOMIC PLANNING (1996). *Background to the Budget 1996/97 and National Development Strategy 1996/97 - 1998/99*.

MINISTRY OF FINANCE AND ECONOMIC PLANNING. (1995). *Export Policy Analysis Unit (1995a): Food Security and Exports – A Technical Report.*

MINISTRY OF FINANCE AND ECONOMIC PLANNING. (1995). *Export Policy Analysis Unit (1995b): Food Security and Exports – A Statistical Report*

MINISTRY OF FINANCE AND ECONOMIC PLANNING. (1994). *The 1991 Population & Housing Census, National Summary.*

MINISTRY OF FINANCE, ECONOMIC PLANNING AND DEVELOPMENT (1998). *Background to the Budget 1998/99 (Budgeting for Poverty Eradication).*

MAKHURA M.T, GOODE F.M & COETZEE G.K. (1998). A cluster analysis of commercialisation of farmers in developing rural areas of South Africa. *Development Southern Africa*, 15(3).

MAKHURA M.T, COETZEE G.K & GOODE F.M. (1996): Commercialisation as a strategy for reconstruction in agriculture. *Agrekon*, 35(1).

UGANDA NATIONAL FOOD AND NUTRITION COUNCIL (1996): *National food and nutrition policy*

VON BRAUN, J. (1994). Introduction and overview: In Von Braun J & Kennedy E. (Eds.). *Agricultural Commercialisation, Economic Development, and Nutrition*. Johns Hopkins University Press.

WORLD BANK (1996): *Uganda - the challenge of growth and poverty reduction.*

WYCKOFF J.B AND RUKUNI M. (eds.). (1992). *Food security research in Southern Africa: Policy implications.* *