University of Pretoria etd – Ejupu E C A 2001

CHAPTER 5

CHARACTERISATION OF THE FOOD INSECURE

5.1 INTRODUCTION

It is recalled from the conceptual framework, that the effects of commercialisation on food security can be direct or indirect and negative or positive. Directly, food sales affect food availability by reducing the quantity of food available for consumption. Indirectly, food sales affect food availability through income effects, i.e. the size of the food budget and the nature of foods bought. To examine the hypothesis that food sales negatively affect household food security, the analysis begins with the application of cluster analysis, an exploratory analytical tool, to the primary data. The objective is to group the households and examine the relationship between production, commercialisation, income and expenditure levels on the one hand and food availability on the other.

Comparative analyses of the demographic and socio-economic characteristics of households are done to establish the functional characteristics that distinguish between the groups created from the cluster analysis. The analyses examine the data, evaluating if such differences predispose households to belonging to one group or other. A combination of logit analysis and descriptive statistics is applied. Later in the chapter, indirect effects of commercialisation on food availability are analysed by descriptive statistics. While the same analysis may be done based on household income levels, in doing so, an association between commercialisation and income levels would be presumed.

5.2 DISTRICT VARIATIONS IN FOOD AVAILABILITY DURING THE SURVEY YEAR

Food availability has been equated to food output and purchases, less quantity sold and incremental stocks.

Household food availability = output + purchases - (sales + increases in stocks)

University of Pretoria etd – Ejupu E C A 2001

By this definition, it is expected that;

i) Production enhancing factors positively contribute to food availability

ii) Sales negatively contribute to food availability

iii) Food purchases contribute positively to food availability.

The following section is a descriptive analysis of observations made regarding food production, sales and purchases.

5.2.1 Production related variation

Agricultural performance is highly correlated to climatic fluctuations given that it is predominantly rain-fed. A prolonged drought period covered most of the country from 1996 to the season beginning 1997. In some places like Mbale District, it extended into the second season (Uganda-Mbale Department of Agriculture, 1998). Later in the year, much of Uganda experienced unusual and exceptionally heavy rains starting in September, the latter half of the second season of 1997, through to March 1998. This was a manifestation of the *El Nino* weather phenomenon (Uganda-Ministry of Finance Planning and Economic Development, 1998; Uganda - Ministry of Finance, Planning & Economic Development, 1999; USAID-FEWS, 1997). The effects of this were inflationary food price fluctuations; 10.4% in June 1997, 6% in October 1997, a rise to an average 10% through to February 1998, 4.9% in March and –2.3% in May 1998 (Uganda-Ministry of Finance, Planning & Economic Development, 1998).

A positive outcome of the prolonged *El Nino* rains was the planting of more cassava and sweet potatoes that would otherwise not have been done then (Group discussions, 1998; FEWS-Uganda, 1998). Some second season annuals like sorghum, in Soroti District (Uganda-Soroti Dept. of Agriculture, 1998) and the banana crop that is predominant in Mbale District (Uganda-Mbale Department of Agriculture, 1998) also benefited from these rains. On the negative side, in some places landslides, hailstorms and too much rain at the wrong time, were more destructive than beneficial. In general, the *El nino* rains adversely affected annual crops (Uganda-Ministry of Finance, Planning & Economic Development, 1998; FEWS-Uganda, 1998).

University of Pretoria etd – Ejupu E C A 2001

The study therefore started with the negative effects of the heavy rains in the short term and that of the prolonged drought in the long term. The average daily calories available per adult equivalent reflect this in the different districts, Table 5.1.

Table 5. 1: District inter-survey variation in food security (average daily calories available per adult equivalent)

SURVEY	1st SURVEY		2nd SURVEY		3rd SURVEY		SURVEY MEAN	
DISTRICT	Average	Food insecure* (Percent)	Average	Food Insecure (percent)	Average	Food Insecure (percent)	Average	Food Insecure (percent)
APAC	2267 (672)	24	2458 (866)	25	2759 (1364)	25	2495 (727)	23
SOROTI	2189 (669)	28	2434 (823)	24	2589 (1160)	30	2404 (739)	25
MBALE	1698 (708)	75	1544 (888)	74	1905 (941)	59	1698 (798)	72

Source: Primary Survey Data (standard deviations in parenthesis).
**NB Food insecurity refers to those households consuming less than 80% of the minimum requirements by FAO standards*

The short-term analysis of the food security situation, observations at different points during the year, is not sufficient for a break down of the problem into transitory or chronic components. Nonetheless, descriptive statistics of the districts at the different surveys suggests how perennial the problem may be. Estimates of food consumed (food not accounted for by sales in the inter-survey months and what is in-store), to which is added food purchases estimated from a five-day recall period, are used to assess a household's food security status. The family size and structure are assumed to remain unchanged.

The slight improvement in the percentages of households having less than 80% of their minimum needs[9] at the second survey it is believed could be due to the *El Nino* rains. The food security situation at this time in the agricultural cycle, the lean period, would otherwise be worse than at the first survey on average. This improvement matched the improved average calories consumed in Soroti and Apac districts but not so in Mbale District where on average, consumption levels deteriorated. However, these gains,

9 *A commonly used cut-off point for establishing a situation of chronic food insecurity is if consumption is less than 80% of the calorie requirements (Von Braun et al.,1992; Maxwell, 1996; Pacey & Payne, 1985).*

University of Pretoria etd – Ejupu E C A 2001

mainly from the perennial food crops cassava and matooke, were in some areas fast lost later in the year. Due to what farmers referred to as "the Nile flowing backwards", gardens were submerged under water, destroying the standing crops. Somewhere along its course in Uganda, a large floating island had obstructed the River Nile's flow. This caused floods upstream and relatively lower volumes of water downstream as far as Egypt.

Several villages in Apac, Soroti districts and other districts along the shores of Lake Kyoga, which feeds the Nile, were adversely affected. Sampled villages in Nambieso Sub-county in Apac District and Ochero and Kateta sub-counties in Soroti District were among the affected. In aggregate, this led to lower than expected improvement in consumption levels, on average, from the second to third survey. In Apac District, an improvement from an average of about 2,458 to 2,759 calories per adult equivalent, per day is realised. In Soroti District, a smaller improvement from 2,434 to 2,589 calories per adult equivalent per day is noted. An increase from 24% to 30%, rather than the expected decrease in the size of households consuming less than 80% of the minimum requirements in Soroti District, was realised. No change is noted for Apac District. In Mbale District in contrast, average consumption improved by about 450 calories per adult equivalent per day, i.e. from 1,544 calories to 1,905 calories. The percentages of households consuming less than 80% of their requirements also decreased from 74% to 59%, as reflected in Table 5.1.

It is estimated that on average 23% of households in Apac District consume less than 80% of their minimum food requirements throughout the year. In Soroti District the estimate is 25% and in Mbale District it is 72%. However, based on production-related factors, Bahiigwa (1999), estimated that 28.6% and 53.6% food insecure in Apac in the period July to December 1997 and January to June 1998, respectively. In Soroti District, he estimates that 34% and 50% respectively were food insecure in the same periods. Comparing his findings with the above discussion suggests that despite being faced with food shortfalls, many households in the two districts can meet their minimum food needs. Mbale District was not among his sampled districts.

University of Pretoria etd – Ejupu E C A 2001

5.2.2 Food purchases

While farm output is the more important source of food to the farming population, food is also acquired from the market to meet shortfalls or to diversify consumption. Bahiigwa (1999) found that food purchases are a common means by which production shortfalls are met. From the conceptual framework, of interest to this study are the size of the food budget and the nature of the food bought.

There is a relatively more marked difference between the size of the food budget at the third survey compared to the first or second. There is a drop of about 1,000 shs per week, in food expenditure in each district, at the third survey as reflected in Table 5.2.

Table 5. 2: Average weekly food expenditure (shillings) by district

District	Survey 1	Survey 2	Survey 3
APAC	2 689 (1 898)	2 184 (1 547)	1 241 (967)
SOROTI	3 187 (2 244)	2 703 (2 235)	1 029 (888)
MBALE	2 975 (2 242)	3 343 (2 344)	2 295 (1 797)

***Source**: Primary Survey Data (standard deviation in parenthesis)*

This is also reflected in the nature of food bought, i.e. there is little difference in calories bought per 100 shs spent at the first and second survey but a drop at the third survey, (Table 5.3). It therefore suggests a variation in food purchases to meet the existing needs shortfalls at the first and second survey and diversity at the third survey. Calorie purchases per 100 shs spent on food, is for example lowest at the third survey in all three districts, i.e. the period between the first season and second season harvests. This is the period when on average households are most food secure.

University of Pretoria etd – Ejupu E C A 2001

Table 5. 3: Food calories bought per 100 shilling spent

District	Survey 1	Survey 2	Survey 3
APAC	431 (372)	476 (653)	362 (422)
SOROTI	555 (388)	595 (861)	439 (648)
MBALE	485 (468)	424 (387)	397 (410)

Source: *Primary Survey Data*

Because food purchases make a small proportion of food consumed, making inferences about the degree to which it bridges household food shortfalls is difficult. In Mbale District for example, although more money is spent on food, there is a drop in calorie purchases per shilling spent. This would normally be taken for a substitution to the more expensive calories. The study responses however show that vegetables, which make low calorie contributions to a diet, are the common foods bought.

5.2.3 Food sales

On average, households in Soroti District are the more subsistence oriented, making the least food sales relative to food output. Mbale District, having the highest proportion of food sales to food output as evident in Table 5.4, is the more commercially oriented. From the conceptual framework and main hypothesis, the relatively high proportions of food sales should render more households in Mbale food insecure compared with households in Apac or Soroti districts.

Table 5. 4: Variations in district average commercialisation index (HCI) values surveys 1 and 3

DISTRICT	SURVEY 1	SURVEY 3*
APAC	17 (18.2)	11 (9.6)
SOROTI	9 (13.6	8 (9.3)
MBALE	44 (17.8)	38 (15.3)

Source: *Primary Survey Data (standard deviation in parenthesis)*
** The HCI values at the third survey reflect the proportion of the first season's harvest that had already been sold by then.*

University of Pretoria etd – Ejupu E C A 2001

Food sales reflect the transition that is gradually taking place in the rural communities from a predominantly non-monetary exchange economy to monetary exchange. A wide range of economic activities take place on market days with a variety of consumer goods and services exchanged on a monetary basis, indications of a growing cash economy. The demands the expanding cash economy places on households have contributed to the gradual decline of non-monetary exchanges that were the common mode of especially inter-household exchanges (Group discussions, 1998).

Cash payments are now a preferred mode of payment. Labour exchange between households coming together into groups used to be done on a rotational basis. Besides the shared labour, the recipient home offered the working group food and beer after the completion of a task. Cash payments are preferred because it allows individuals to satisfy their preferences that may include goods and services offered by the market whereas non-monetary rewards would limit them to short term consumption (Group Discussions, 1998).

This is also reflected in inter-household food exchanges. Many men thought that their wives were too generous with food, giving it away to relatives or neighbours. One elderly woman asked, "who can give away even the smallest bunch of matooke when they know it is money they are giving away". Cash income as the opportunity cost of non-monetary transactions involving food, may be causing the latter to shrink. However, segments of the community that have relied on the support often rendered in the non-monetary exchanges, e.g. the aged, may be increasingly marginalised. Table 5.5 shows the interaction between production, sales and purchases of food and food insecurity in the three districts (at the first survey).

University of Pretoria etd – Ejupu E C A 2001

Table 5. 5: Sample means for household food production, sales and purchases at the first survey

DISTRICT	Average calories in 000's (standard deviation in parenthesis)			% of Households Food Insecure* (first Survey)
	Produced	Sold	Bought	
APAC	6 670 (3 306)	1 335 (1 778)	396 (465)	24
SOROTI	6 925 (4 195)	510 (810)	411 (270)	28
MBALE	4 771 (6 038)	2 129 (2 190)	563 (421)	75

* *On average daily food available per adult equivalent is less than 80% of minimum calorie requirements per adult equivalent by FAO standards.*

The difference in output arises mainly from that due to the dominant crops cultivated.

- The average yields are higher for cassava than bananas, i.e. about 3 tons per acre compared with 2 tons respectively. The cereal grains do not differ much, 0.5 tons per acre for millet or sorghum compared with 0.6 tons per acre for maize (Uganda-Mbale Department of Agriculture, 1998; Uganda Bureau of Statistics, 1999).
- The cumulative effects of relatively better use of the second rains in Apac and Soroti districts contribute to high annual productivity.
- The dominance of the cassava crop in Apac and Soroti districts compared with Mbale District where little is cultivated partly because of the mosaic disease. Cassava gardens act as a standing food reserve.

Mbale District where more food is sold both in absolute terms and relative to output has the highest proportion of food insecure households. Before the statistical examination of the relationship between food security and commercialisation, this observation supports the main hypothesis. A negative relationship between food security and commercialisation of the food sub-sector is apparent.

University of Pretoria etd – Ejupu E C A 2001

5.3 EXPLORATORY GROUPING AND ANALYSIS

5.3.1 Cluster analysis defined

A cluster analysis is applied in an exploratory manner to examine the nature of the conflict between the sale of food and household food availability. This grouping of households, while not testing any hypothesis, will principally allow for the analysis of how consumption patterns (largely descriptive) relate with commercialisation.

Cluster analysis is an exploratory analytical tool (cannot make statistical inferences) which aggregate's individuals/objects into groups defined by the within group homogeneity and between group heterogeneity. It is a data reduction technique that enables a more easily discernible description. Secondly, it may be used to explore hypotheses that may apply to a data set. Clustering or grouping differs from classification methods like discriminant analysis in making no assumptions about the number of groups or group structure. Discriminant analysis pertains to a known number of groups. Cluster analysis is largely arbitrary; the investigator has to pass judgement on the best grouping according to their knowledge of the subject and expectations based on literature on the subject (Johnson and Wichern, 1998).

Clustering methods include the hierarchical and non-hierarchical. The former combine (agglomerative) or divide (divisive) the cases starting/ending with individual cases respectively. Each case is assigned to a cluster created in the process. Non-hierarchical methods, in contrast, assign objects based on a specified number of clusters and cluster seeds to generate the best cluster solution (Hair, Anderson, Tatham and Black, 1998; Johnson & Wichern, 1998). Its efficiency relative to the hierarchical methods derives from the fact that it does not compute the distances between all pairs of cases. By the nature of the investigation, the non-hierarchical method is considered the more appropriate and the "Quick Cluster" method of Statistical Program for Social Scientists (SPSS) is used. Similarly, Makhura, Coetzee and Goode (1998) grouped commercialising farmers using a non-hierarchical method, the Ward's minimum variance. Rauniyar (1990), too used non-hierarchical methods to group farmers according to the technological practices in use.

University of Pretoria etd – Ejupu E C A 2001

Though exploratory, two critical concerns in cluster analysis are multi-collinearity and how representative the sample is (Hair et al., 1998). The choice of variables included in the analysis has been guided to control for multi-collinearity, i.e. highly correlated variables are not used in the actual clustering. Validation of the results is done by comparison with variables that have not been used in the clustering process.

5.3.2 Cluster analysis applied

The cluster analysis is applied to data generated from the first survey and with a total of 443 households, it yielded 15 clusters. Because of the sensitivity of cluster analysis to outliers (Hair et al., 1998), they are omitted from the final analysis. Six variables were used to generate the clusters. The three that reflect household productive capacity include; total calories produced and adjusted for calories sold, income generated from livestock and poultry sales and non-farm income (wage labour, beer sales, shop, stall or "hotel" trade, fish trade, handicrafts, salaries/wages, rent oxen etc.). Reflecting the commercialisation tendency are; food sales, food purchases and non-food expenditure (the sum of non-farm expenses on education, health, clothing, fuel, transport, cigarettes and beer etc.).

The generated clusters are rearranged and grouped into two broad categories, the potentially food secure and food insecure. With a sample average family size of 5 adult equivalents, the average minimum calorie requirements would be about 4,400,000 (about 1,300 kg of maize meal) per household per year and about 3,700,000 calories for 10 months (the recall period for the first survey). This estimate is a guide to the cut-off point between the food secure and food insecure households. The clusters were rearranged and ranked by the variable CALAV_HH (calories residual to sales). Total food purchases (CALBUY_1) and residual calories per household, gives an estimate of how much has been consumed. This is then compared against the 3,700,000 estimated requirements for an average household. The level of production is relative to the sample and is deduced from the sum of residual calories available for consumption and that sold. It is verified by the actual average output.

University of Pretoria etd – Ejupu E C A 2001

Table 5. 6: Cluster results by food security status and degree of commercialisation (calories and shillings in '000' s)

GROUPINGS	FOOD SECURE GROUP						FOOD INSECURE GROUP								
VARIABLES	High Producers/ Low Sales (9%)		Average Producers/ Low Sales (67%)				High Producers/ High Sales (3%)			Average Producers/ High Sales (5%)			Low Producers / Low Sales(17%)		
Cluster No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
N	4	35	85	15	185	10	4	6	4	5	10	5	24	4	47
CALAV_HH	7782	4002	3856	3525	3309	3243	3242	3098	2865	2731	2251	2245	2237	2153	2151
CALBUY_1	378	362	506	573	422	494	221	623	842	662	584	584	482	220	435
CALSLD_1	1400	1781	1037	552	895	1615	3604	4698	5188	2558	2589	2594	1794	961	1529
CCRP_INC	41	8	7	5	3	3	168	62	472	410	307	272	210	82	92
AVLSINC	258	70	14	17	9	157	13	20	5	37	17	78	13	140	12
AVNFINC	53	32	36	117	16	32	95	70	28	34	18	18	15	31	19
AVNFEXP	114	38	23	47	10	67	43	46	12	25	14	34	12	61	13
CALPROD1	12726	7492	6759	5467	5821	6341	7517	8899	8667	5893	5270	5136	4447	3985	4276
HCI_1 (%)	9	25	18	13	16	26	49	43	48	42	47	46	41	26	35
CALORIAE	2141	2098	2097	2108	2128	2102	2059	2110	1958	1999	2049	2037	2072	2090	2080
%LESS80	0	6%	13%	0	6%	20%	0	17%	25%	40%	0	0	8%	25%	13%

***Source**: Primary Survey Data* *NB. n = 443 owing to exclusion of outliers*

CALAV_HH = residual calories after sales and losses
CALBUY_1 = quantity of food (calories) bought at first survey
CALSLD_1 = quantity of food (calories) sold at first survey
CCRP_INC = income from the traditional cash crops
AVLSINC = average livestock income
AVNFINC = average non-farm income
AVNFEXP = average non-food expenditure
CALPROD1 = quantity of food (calories) produced in recall period
HCI_1 = commercialisation index at first survey
CALORIAE = daily calories available per adult equivalent

University of Pretoria etd – Ejupu E C A 2001

Of the 15 clusters, 6 with a total of 335 households (75 %) are potentially food secure and 9 with a total of 108 households (25%) are food insecure at the first survey. Within the broad grouping (food secure and food insecure), further categorisation is by the level of production[10] as estimated by residual calories (CALAV_HH) and secondly, by the absolute value of calories sold. The 15 clusters are therefore reduced to five groups; High Production-Low Sales (HPLS), Average Production-Low Sales (APLS), High Production-High sales (HPHS), Average Production-High Sales (APHS) and Low Production-Low Sales (LPLS).

Five clusters fall under the broad category of high production and are 11% (53 households) of the sample. Two clusters grouped as high production-low sales (HPLS) are food secure; they make relatively low food sales, while three clusters making high sales are food insecure and are grouped as high production-high sales (HPHS). Six clusters making 71% of the sample, i.e. the majority with 315 households, are in the groups considered to have average production levels of which four clusters grouped as average production-low sales (APLS) make relatively low food sales and are potentially food secure. Three clusters grouped as average production-high sales (APHS) make relatively high food sales and are food insecure. Three clusters fall under the low production category with relatively low food sales, LPLS. They make up 17% of the sample (75 households) and are all food insecure.

5.3.3 Group descriptions:

5.3.3.1 High Production - Low Sales (HPLS)

With 9% of the sample (39 households), this group is considered a high production group as reflected by the high residual calories, 7,782,000 and 4,002,000 calories in the two clusters respectively, confirmed by their output (CALPROD1). Relative to what they produce, they make low sales; cluster No. 1 has the lowest commercialisation ratio of the sample, namely 9%, and cluster No. 2 has a ratio of 25%. In absolute terms, 1,400,000 and 1,781,000 respectively, they are however not the lowest of the sample. Food purchases are among the

[10] *Production refers to caloric output and not farm output in its widely used sense, i.e. weight of commodity produced.*

University of Pretoria etd – Ejupu E C A 2001

lowest in the sample, 378,000 and 362,000 calories respectively and the foods bought are likely to be for dietary diversification rather than meeting their basic food needs.

Besides food sales, they derive income from non-farm activities, cash crop and livestock sales. Income from the sales of livestock is 258,000 and 70,000 shs respectively for the two clusters, 1 and 2. The relatively high income (258,000 shs) from the livestock sub-sector in cluster no.1 is matched by the highest non-food expenditure (114,000 shs). This particular cluster no.1 with 4 households is considered a wealthy cluster. Its daily calorie availability per adult equivalent, 2,141,000 shows it as the most food secure cluster, with no household having less than 80% of its minimum requirements. Cluster no. 2, the larger of the two, with a daily calorie per adult equivalent of 2,098,000 is less food secure than lower production clusters and about 6% of its households consume less than 80% of their food needs. It may have fitted into the APLS group but for the difference in output.

5.3.3.2 Average production -low sales (APLS)

This is the largest group, 67% of the sample (295 households), reflecting the average situation observed during the survey. Though considered food secure, residual calories after sales and losses (CALAV_HH) is less than 3,700,000 calories. Food purchases are an important factor in bridging their food gap, ranging from about 50% to 100% of what is sold. In both absolute terms and relative to production, the group makes the lowest calorie sales of the sample, ranging from 552,000 to 1,615,000 calories and 13% to 26% respectively, i.e. a reflection of a strong subsistence orientation. Within the group, cluster, no. 6 making the higher sales of 1,615,000 calories, is rendered less food secure with on average 2,102,000 calories per adult equivalent and 20% of its households having less than 80% of their minimum requirements. This is despite that it is a higher producer than clusters no.4 and no. 5 with sales of 552,000 and 895,000 calories respectively. There are no households having less than 80% of the minimum requirements in cluster no. 4 but 6% in cluster no. 5 consume less than 80% of the minimum requirements.

Non-farm income followed by that from the sales of livestock and poultry, are the more important sources of non-food income for this average production-low sales (APLS) group. Both, however, vary considerably across the group. Cash crop income is lowest and more

University of Pretoria etd – Ejupu E C A 2001

uniform across the group. Non-food expenses also vary considerably across this group, ranging from 10 shs in cluster no. 5, the lowest of the sample, to 67,000 shs in cluster no. 6, which has the highest non-farm income and shows the highest non-food expenditures of the group.

The largest cluster, no. 5, suggests that most households face constraints in meeting their needs. This cluster on average derives the lowest non-food income, 28,000 shs, this is matched by it's having on average, the lowest non-food expenses for the sample, i.e. 10,000 shs. It is considered to consist of the poor whose livelihoods revolve around meeting their food needs and therefore "food first" is a guiding principle. In spite of all the constraints, this is the second most food secure cluster of the sample according to the average daily calories per adult equivalent, 2,128,000. In cluster no. 5, 6% of the households have less than 80% of the minimum requirements, while 13% in cluster no.3 have less than 80% of the minimum requirements.

5.3.3.3 High Production - High Sales (HPHS)

This group, 3% of the sample (14 households), would according to output levels, be placed with the first group of high producers that are food secure. It stands out for making the highest calorie sales in absolute terms, higher than what is left for consumption and is food insecure as a result. They have to buy back food, the highest of the sample, i.e. 623,000 and 842,000 calories in clusters no. 8 and no.9 respectively, except cluster no.7 buying 221,000 calories, the lowest of the sample. However, calorie purchases are still not enough to bridge the food gap created by food sales. Daily calorie consumption per adult equivalent ranges from 1,958,000 in cluster no.9 to 2,110,000 in cluster no. 8. Those consuming less than 80% of their minimum food requirements are 17% in cluster no. 8 and 25% of the households in cluster no.9.

Not only do households in this group derive income from food sales, but from cash crops and livestock sales and non-farm activities as well. However, income from livestock sales are comparatively low. Despite the high aggregate income, non-food expenses are not any higher than the average range for clusters no. 7 and no.8, but very low at 12 shs in cluster no.9.

University of Pretoria etd – Ejupu E C A 2001

5.3.3.4: Average production - high sales (APHS)

With 5% of the sample (20 households), this group is different from the high production-high sales (HPHS) group in caloric output levels but similar to it in that sales match or exceed that left for consumption. Food sales are about 2,558,000; 2,589,000 and 2,594,000 calories against 2,731,000; 2,251,000 and 2,245,000 calories left for consumption in clusters 10, 11 and 12 respectively. Households in this group are thus rendered more food insecure than the average production-low sales (APLS) group to which they compare in production, consuming about 2,000,000 to 2,050,000 calories per adult equivalent per day, on average. Calorie purchases made, though relatively high, are not enough to make up for the shortages created by the sale of food. However, it is only in cluster no. 10 that 40% of the households have less than 80% of their minimum requirements.

Cash crop income is on average highest in this group and is well complemented by livestock and non-farm income. However, like the previous group, non-food expenses are not any higher than the average range, in the order of 25,000, 14,000 and 34,000 shs for clusters 10, 11 and 12, respectively.

5.3.3.5 Low production - low sales (LPLS)

This group is the second largest (17% - 75 households) of the sample. Its production levels are the lowest of the sample. Despite this, the group makes relatively high food sales, higher than the sales made by the high production-low sales (HPLS) group in absolute terms. Relative to what they produce, sales are still higher than the more productive average production-low sales (APLS) group. Despite their needing more food to bridge their production shortfalls, food purchases are within the same range as the more productive groups.

Unlike the high production-high sales (HPHS) and average production-high sales (APHS) groups where high sales rather than low productivity renders them food insecure, both low productivity and food sales constrain this group's food security. In relative terms, the daily calorie available per adult equivalent is, however, better than the earlier HPHS and APHS, ranging from about 2,070,000 to 2,090,000 calories. Those having less than 80% of the

University of Pretoria etd – Ejupu E C A 2001

minimum requirements are about 8% in cluster no.13, about 25% in cluster no.14 and 13% of the households in cluster no.15.

Income from cash crops and livestock sales vary considerably within the group but that from non-farm activities is more uniform. Non-food expenses are at the lower end except cluster no. 14,000 at 61,000 shs. Based on these findings, it can be argued that this group is a relatively poor group, the poorest of the sample.

5.3.4 Discussion

Overall, all the groups are on average consuming less than their minimum daily calorie requirements. This could be because of the prolonged drought followed by the heavy rains discussed earlier. However, on average, the relatively low percentages in many groups suggest that most of the households nonetheless meet at least 80% of their minimum requirements.

A high correlation between production levels and food availability is evident. The high producers are relatively more food secure than the relatively lower producer clusters. Assuming a condition of purely subsistence production, the production variable suggests that most households, except those in the low production-low sales (LPLS) group, produce enough to meet the food needs of 5 adult equivalents per household, on average. However, a correlation is also apparent between food sales and food insecurity. By production levels, groups similarly ranked differ significantly depending on how much food is sold. Those groups where a relatively high proportion of food is sold are seen to be the more food insecure.

Food purchases should reflect the shortages created by either low production or food sales. The variation however, does not necessarily reflect the shortages realised by a group or cluster. It is recalled that the income effects on food availability depend on the proportion of expenses that go into meeting the costs of buying food versus non-food expenses and the nature of foods that are bought. Food purchases in households with on average sufficient food may therefore be one of diversifying their diets, but one of meeting shortages in the other clusters. The nature of purchased food would therefore be of interest. It is not necessarily a

University of Pretoria etd – Ejupu E C A 2001

case of lack of money to buy food because besides food sales, there is a general diversification in sources of income across all groups and there is no marked correlation between these incomes and levels of food purchased or non-food expenses either.

The high variability in livestock income could suggest different coping strategies not just to food shortages but to household needs in general, e.g. health, education, marriages etc. that would require the sale of livestock. A cluster average would be sensitive to the sale of 1 cow at about 150,000 to 250,000 shs. The wide variation in cash crop income is indicative of the variation in recovery of the different crops as discussed in a previous chapter. Coffee is the best performing traditional cash crop to date. However, even in a district like Mbale that is one of the leading coffee producing districts in the country, some areas grow almost no coffee.

5.4 GROUP COMPARISONS

A pair wise comparison of three selected groups from the cluster analysis of the previous section is done to establish those variables that are significantly different between them. The larger groups, more representative of the majority of the sample, are chosen for the analysis. The group size relative to the number of explanatory variables also limited the groups chosen for the analyses. A comparative analysis is done between:

i) The high production-low sales and average production-low sales groups (HPLS and APLS)

ii) The average production-low sales and the average production-high sales groups (APLS and APHS)

iii) The average production-low sales and low production-low sales groups (APLS and LPLS).

University of Pretoria etd – Ejupu E C A 2001

5.4.1 Socio-economic characteristics of selected groups

Table 5. 7: Socio-economic and demographic variables of selected groups (means and proportions)

Variable	HPLS n = 39	APLS N = 295	APHS N = 20	LPLS n = 75
Age of the household head	47.2 (12.3)	42.5 (14.2)	55.1 (12.0)	47.4 (14.0)
Education of household head (post-primary =1)	36%	26%	25%	21%
Gender of household head (male =1)	87%	88%	95%	92%
Occupation of household head (Farming = 1)	82%	84%	85%	93%
Number of children six years old or less	1.7 (1.4)	1.7 (1.6)	2.2 (2.0)	1.6 (1.2)
Number of children in primary school	2.6 (1.9)	2 (1.7)	3.1 (1.6)	2 (1.8)
At least one child in post primary school	23%	16%	30%	25%
Monthly non-food expenses ('000)	45.8 (25.6)	17.3 (15.2)	21.6 (13.9)	14.8 (14.3)
Percent of average non-food expenditure spent on education	26.5 (32.3)	14.8 (25.3)	30.3 (29.3)	19.1 (28.3)
Percent of average non-food expenditure spent on health care	14.6 (15.5)	20.9 (18.2)	12.3 (14.2)	16.0 (14.8)
Percent of average non-food expenditure spent on alcohol/cigarettes	31.0 (26.5)	30.5 (28.2)	33.3 (29.1)	37.0 (31.5)
Monthly non-farm income ('000)	33.4 (18.6)	27.3 (17.3)	21.6 (17.9)	18.0 (12.6)
Household with cattle	77%	53%	90%	71%
Number of goats	5.1 (4.4)	3.0 (2.7)	2.6 (3.2)	2.4 (3.0)
Cultivated area (acres)	4.8 (2.9)	3.0 (2.0)	4.5 (2.2)	3.7 (2.2)
Pre-dominant crops grown				
Cassava & cereals	80%	83%	5%	24%
Banana & maize	3%	7%	95%	61%
Maize & beans	17%	10%	0%	15%

***Source**: Primary Survey Data (standard deviations in parenthesis)* NB. Appendix 6 shows the variables by cluster.

The cultivated farmland area is an important factor in determining production levels. On average it is highest in the high production-low sales group with 4.8 acres and lowest in the average production-low sales group with 3.0 acres.

The high production-low sales (HPLS) group on average has the highest non-food expenditure, about 46,000 shs per month (it is recalled this group is considered a relatively wealthy group). It is followed by the average production-high sales (APHS) group with an average non-food expenditure of about 22,000 shs per month. The low production-low sales (LPLS) group, considered relatively poor, has the lowest monthly non-food expenditure, about 15,000 shs.

A similar trend is observed with the average monthly non-farm income except that the average production-low sales (APLS) group generates the second highest income from

University of Pretoria etd – Ejupu E C A 2001

non-farm activities. The high production-low sales (HPLS) group generates the highest non-farm income. The more food secure groups therefore generate more income from non-farm related activities, suggesting that it is more diversified.

Between health and education, on average, most of the non-food expenditure is spent on education. Only in the average production-low sales (APLS) group are costs on health care, about 21% of non-food expenditure, higher. On average, the proportion of non-food expenditure on education ranges from about 15% to 30% while that on health ranges from about 12% to 21%. However, the proportion of non-food expenditure spent on alcohol and cigarette consumption warrants much concern. Participants in the group discussions shared this concern, as did the local leadership. Non-food expenditure on alcohol and/or cigarettes ranges from about 31% in the average production-low sales (APLS), to 37% in the low production-low sales (LPLS) group.

The seeming indifference in the number of school children would imply a heavier burden on the poorer households to meet similar costs of education. On average, the lowest number of children in primary school across the groups ranges from 2 in the low production-low sales group to 3.1 in the average production-high sales group. The average number of children attending post-primary education is generally lower than that in primary school. The variable is thus recorded as a dummy variable.

Households in the groups where food sales are high (HPHS and APHS) are predominantly drawn from Mbale District. The average production-low sales (APLS) group draws from all the three districts. The low production-low sales group (LPLS) mainly has households from Apac and Mbale districts.

5.4.2 Logit analyses

Logistic regression (logit analysis) is an analytical technique that is pertinent when the dependent variable is a categorical variable. The cases can therefore be sub-divided into two groups. Described in greater detail by Gujarati (1995), Hair et al.(1998), Mukherjee, White and Wuyts (1998), it is similar to ordinary least squares regression (OLS) except that it predicts the probability of an event occurring (the dependent variable) given explanatory variables. While it applies the maximum likelihood method to estimate the

University of Pretoria etd – Ejupu E C A 2001

model, OLS analysis as the name suggests, estimates the value of the dependent variable by means of the least squares method. Like OLS, its appeal lies in the simplicity of interpretation of the results. It is robust even with the violation of the classical condition of homoscedasticity that renders OLS results biased. Like OLS, logistic analysis handles both continuous and categorical variables. The implicit log transformation of the variables also reduces the effects of correlations.

The model is generally expressed as:

$$\text{Log}\left(\frac{P(y=1)}{1-P(y=1)}\right) = \beta_0 + \sum_{i=1}^{n} \beta_i x_1 \text{ or as } \frac{P(y=1)}{1-P(y=1)} = e^{(\beta_0 + \sum_{i=1}^{n} \beta_i x_i)}$$

Following (Hair et al., 1998), to evaluate overall model fit as the coefficient of determination does in OLS, an R^2_{logit} can be calculated as:

$$R^2_{\text{log it}} = \frac{-2LL_{null} - (-2LL_{model})}{-2LL_{null}}$$

The logit analysis is appropriate to examine the membership of the different groups and determine the functional characteristics that may be used to identify vulnerable segments of the population. By recoding, a categorical dependent variable is generated with one group taking on the value 1 and the other the value 0. The socio-economic variables compared are: land as a basic factor of production, cropping patterns, household characteristics, wealth (reflected by ownership of livestock and expenditure on non-food goods and services), and diversification of income (reflected by non-farm income).

5.4.2.1 HPLS and APLS Compared

The high production-low sales (HPLS) group was recoded to take the value 1 and the average production-low sales (APLS) the value 0, in the analysis. It is recalled that clusters in both these groups are considered the most food secure of the sample.

University of Pretoria etd – Ejupu E C A 2001

Table 5. 8: Socio-economic differences between HPLS & APLS - logit results

Variable	Definition	B	Wald	Exp (B)
AGE_HHH	age head of household head	0.0092	0.2651	1.0092
EDPP_HHD (1)	attained post primary education	-0.0971	0.0320	0.9075
GEN_HHH (1)	gender of household head - male	-0.6796	1.0506	0.5068
OCC_FARM (1)	main occupation is farming	0.5429	0.5394	1.7209
CHI_SIX	number of children six or less	-0.2232	1.5434	0.8000
CHI_PS	number of children in primary school	0.0176	0.0171	1.0178
CHISES_D (1)	has children in post primary school	-1.0009	1.6017	0.3675
AV_NFEXP	average non-food expenditure	0.0082	33.6509*	1.0001
AVTO_INC	average non-farm income	-0.0003	6.2743*	1.0000
AVCATT_D (1)	household has cattle	1.0305	3.8540*	2.8025
AVGOATS	average number of goats	0.2232	6.8312*	1.2501
LND_USED	area of land cultivated	-0.0061	0.0033	0.9939
CAS_CERD (1)	cassava/cereal cropping pattern	-1.5767	4.9849*	0.2067
BAN_MZD (1)	banana/maize cropping pattern	-1.4399	1.2960	0.2370
CONSTANT		-3.1918	4.7796*	

χ^2 14 df 90.43
R^2_{logit} 0.38
N 334
*Note: * = significant at 5% level, Values in Parenthesis indicate variable is categorical.*

The model makes an overall average correct prediction of the group membership of 89%. Between the two groups it makes a relatively poor prediction, 33%, of the membership of the high production-low sales (HPLS) group, but 97% of the membership of the average production-low sales (APLS) group. The variables that are significantly different between the two groups are; average monthly non-food expenditure (AV_NFEXP), average monthly non-farm income (AVTO_INC), ownership of cattle (AVCATT_D), number of goats owned (AVGOATS), and cassava/cereals (CAS_CERD) as the dominant crops cultivated. The characteristics that define the household head, i.e. age, gender, education level and their main occupation, are insignificant in determining group membership. The cultivated area as a factor of production is also insignificant.

It is recalled that the high production-low sales group is considered a relatively wealthy group. Wealth as reflected by ownership of cattle and the average number of goats, increases the odds that a household belongs to this group. The odds ratio for number of goats owned is 1.25 while that for ownership of at least a head of cattle is 2.80. Non-food expenditure also an indicator of wealth is significant and increases the odds ratio, 1.00, of a household belonging to the high production-low sales group. Non-farm income however, reduces the odds of a household belonging to this group. The implication is that

University of Pretoria etd – Ejupu E C A 2001

the high production-low sales group generates less income from non-farm activities, on average.

The difference in output between the two groups is not from a difference in area of land under cultivation as this variable is insignificant. The choice of crops cultivated better explains the difference. The odds, 0.21, of a household belonging to the high production-low sales group are reduced by the variable indicative of the predominance cassava/cereal cultivation. This implies that most households in this group cultivate crops other than cassava and cereals, compared with the average production-low sales group.

The variables indicative of the pressures that come to bear due to costs of social services, pre-school and school going children are insignificant. This is interpreted as an indication that the cost implications may affect some segments of the population more than others.

5.4.2.2 APLS and APHS compared

Table 5. 9: Socio-economic differences between APLS & APHS - logit results

Variable	Definition	B	Wald	Exp (B)
AGE_HHH	age of household head	-0.0166	0.1045	0.9835
EDPP_HHD (1)	attained post primary education	5.1604	1.4143	174.2345
GEN_HHH (1)	gender of household head – male	-5.6983	1.1294	0.0034
OCC_FARM (1)	occupation mainly farming	21.1967	0.2081	1.61E+09
CHI_SIX	number of children six years or less	-1.3865	1.2467	0.2500
CHI_PS	number of children in primary school	-1.0329	2.7860*	0.3560
CHISES_D (1)	children attending post primary school	2.7153	0.4635	15.1093
AV_NFEXP	average non-food expenditure	-0.0001	1.9357	0.9999
AVTO_INC	average non-farm income	0.0004	3.4830*	1.0004
AVCATT_D (1)	household owns cattle	-4.7979	1.5849	0.0082
AVGOATS	average number or goats	-0.1111	0.0259	0.8948
LND_USED	area of land cultivated	-2.1553	3.7767*	0.1159
CAS_CERD (1)	cassava/cereal cropping pattern	38.2122	0.1526	3.94E+16
BAN_MZD (1)	banana/maize cropping pattern	-22.7673	0.2376	0.0000
CONSTANT		17.2103	2.4604*	

χ^2 14 df 131.638
R^2_{logit} 0.88
N 315
Note: * *= significant at 5% level, Values in Parenthesis indicate variable is categorical*

The average production-low sales (APLS) group takes on the value 1 and the average production-high sales (APHS) group takes on the value 0. While the APLS group is considered food secure, the latter group is considered food insecure.

University of Pretoria etd – Ejupu E C A 2001

The model makes an overall average correct group prediction of 98.41%. Between the groups, it correctly predicts 85% of the membership of the average production-high sales (APHS) group and 99.32% of the average production-low sales (APLS) group. The characteristics that define the head of the household are insignificant. The significant variables are the number of children in primary school (CHI_PS), area under cultivation (LND_USED), and average total non-farm income (AVTO_INC). Average non-food expenditure (AV_NFEXP) is marginally insignificant. Cropping patterns are significant in comparing these two groups.

The number of children in primary school reduces the odds, 0.36, of a household belonging to the average production-low sales group. On average, this group has two primary school going children per household while the average production-high sales group has three. The area of cultivated farmland increases the odds, 0.39 that a household is a member of the average production-high sales (APHS). On average, the cultivated area is 4.5 acres in this group and 3 acres in the average production-low sales group.

The livestock variables, indicative of wealth, are both insignificant. Non-food expenditure is marginally insignificant, and reduces the odds of a household belonging to the average production-low sales group. Non-farm income is significant, and increases the odds of a household belonging to the average production-low sales (APLS) group.

5.4.2.3 APLS and LPLS compared

The average production-low sales (APLS) group took on the value 1 and low production-low sales (LPLS) group the value 0 for this analysis. The latter is considered a food insecure group and relatively poor.

University of Pretoria etd – Ejupu E C A 2001

Table 5. 10: Socio-economic differences between APLS & LPLS - logit results

Variable	Definition	B	Wald	Exp (B)
AGE_HHH	age of household head	0.0111	0.5378	1.0112
EDPP_HHD (1)	attained post primary education	-0.0411	0.0088	0.9597
GEN_HHH (1)	gender of household head – male	0.0575	0.0085	1.0592
OCC_FARM (1)	occupation mainly farming	0.1847	0.0906	1.2029
CHI_SIX	number of children six years or less	0.1369	1.0190	1.1467
CHI_PS	number of children in primary school	-0.0926	0.6917	0.9115
CHISES_D (1)	has children attending post primary school	0.8210	2.5539*	2.2728
AV_NFEXP	average non-food expenditure	-0.0147	1.1196	1.0000
AVTO_INC	average non-farm income	0.0383	7.4683*	1.0000
AVCATT_D (1)	household owns cattle	-0.9241	5.4838*	0.3969
AVGOATS	average number of goats	-0.1510	3.6510*	0.8599
LND_USED	land area cultivated	-0.1459	2.4586*	0.8642
CAS_CERD (1)	cassava/cereal cropping pattern	2.1939	15.9557*	8.9700
BAN_MZD (1)	banana/maize cropping pattern	-1.8408	7.4683*	1.0000
CONSTANT	0.6561	0.3000		

χ^2 14df 143.775
R^2_{logit} 0.39
N 370

*Note, *= Significant at 5% level, Value in parenthesis indicates variable is categorical*

The model makes an average correct group membership prediction of 88%. It correctly predicts 93% of the average production-low sales group and 65% of the low production-low sales group. The significant variables are: post-primary school going members, (CHISES_D), earnings from non-farm activities, (AVTO_INC), ownership of cattle, (AVCATT_D), number of goats owned, (AVGOATS), area under cultivation, (LND_USED) and the dominant crops, (CAS_CERD and BAN_MZD). Like the previous analyses, the variables that define the household head namely age, gender, education level and main occupation are all insignificant.

The area of farmland under production is significant but contrary to expectations, it reduces the odds ratio, 0.86, of a household belonging to the average production-low sales (APLS) group. On average, the acreage in the average production-low sales group is 3 acres and that in the low production-low sales group (LPLS) is 3.7 acres. The odds ratio of a household belonging to the average production-low sales group (APLS) is increased by the variable indicative of the dominance of cassava and cereals. The odds of membership of the average production-low sales group (APLS) are however reduced, if bananas and maize are the dominant crops.

The odds ratio, 2.27, of a household belonging to the average production-low sales group is reduced by the variable, children attending post-primary school. Given that the low

University of Pretoria etd – Ejupu E C A 2001

production-low sales group is considered a relatively poor group, this finding is indicative of the high regard with which investing in education is held. However, contrary to this finding, a related variable, the average non-food expenditure, is insignificant. The wealth related variables are supportive of the earlier finding that average production-low sales (APLS) are less likely to own cattle or many goats, i.e. ownership of cattle and the number of goats both reduce the odds that a household belongs to the average production-low sales group. Non-farm income increases the odds of a household belonging to the average production-low sales group.

5.4.3 Discussion of the group differences

Land as a basic factor of production is important in determining production levels. The finding that the low production-low sales group on average has more land under production than the average production-low sales group may seem contrary to expectations. However, coupled with it is the finding that the low production-low sales group is more likely to be cultivating bananas and maize. The average production-low sales group is more likely to be cultivating cassava and cereals. This is partly explained by the differences in yields which is relatively higher for cassava (3 tons per acre) compared with bananas (2 tons per acre). Between the high production-low sales group and average production-low sales group, the latter group is still more likely to be cultivating cassava and cereals. It is therefore surmised that the cropping patterns coupled with cultivated acreage determine production levels. Indications also are that the more commercial households have more farmland under cultivation. The more commercial average production-high sales (APHS) group has more land under production, than the less commercial average production-low sales (APLS) group.

Wealth indicators, the livestock variables and average non-food expenditure, suggest several relationships. From the analysis of the high production-low sales (HPLS) and average production-low sales (APLS) groups, and the latter (APLS) with the low production-low sales (LPLS) group, it is surmised that ownership of livestock may cushion the household from the negative effects of high non-food expenditure. This then reduces the pressure to sell food. The high production-low sales (HPLS) and low production-low sales (LPLS) groups are both considered as low commercial groups. From the principal hypothesis of the thesis, high non-food expenditure, or school going

University of Pretoria etd – Ejupu E C A 2001

children (an indicator of the cost implications of education), would otherwise have rendered them high commercial groups. The hypothesis is borne out in the finding that the average production-high sales group (APHS) is more likely to have more children attending primary school than the average production-low sales (APLS) group.

Non-farm income as an indicator of income diversification is supportive of the above argument. The average production-low sales group where the livestock variables are not in favour seems to meet its income needs from off-farm activities, so too reducing the pressure to sell food. In comparison, the average production-high sales (APHS) group to which the wealth indicators and non-farm incomes are not in favour, rely more on food sales and is considered a high commercial group. In summary, the demand for cash income is variously met across the groups. If met from activities other than food sales, the pressure to sell food may be reduced.

5.5. DIETARY HABITS IN UGANDA

In the development paradigm proposed by Timmer (1997), commercialisation entail's specialisation in production of fewer crops, and an increased diversity in the foods consumed. However, it was argued that consumption habits are influenced by other factors besides income, notably the dietary culture. Within the context of this argument, this section starts by reviewing the general dietary habits in the country and the study area in particular. By means of descriptive statistics, the effects of commercialisation on the nature of foods eaten and purchased are then examined.

Dietary habits vary by agro-ecological, ethnic and socio-economic dispositions in the country. Nonetheless, a meal generally consists of a starchy staple (e.g. matooke, millet, cassava, osho, sorghum, potatoes), that forms the bulk and is the main source of energy. These are complemented by a "sauce", which mainly provides the proteins and minerals (Uganda-Ministry of Agriculture & Forestry, 1984b; Goode, 1989). The sauce may be a legume (e.g. beans, peas, groundnuts), a vegetable (e.g. cabbage, various greens, tomatoes), or animal protein (e.g. fish, poultry, beef, goats and pork). The average food basket is protein deficient, reflected in shortages realised in beans, milk and beef, but surpluses for most crops, as evident in Table 5.11. Income elasticity's of staple foods in Uganda, as seen in the same Table 5.11, is less than 0 except for animal protein where

University of Pretoria etd – Ejupu E C A 2001

the income elasticity is greater than 1 (Uganda-Ministry of Finance & Economic Planning, 1995c). The implication is that consumption is still predominantly to meet basic needs.

Table 5. 11: National per capita food availability and consumption for selected commodities

Commodity	Per capita availability (kg/yr) (a)	Per capita consumption (kg/yr) (b)	(b) as % of (a)	Income elasticities
Beans	19	20	105	0.18
Maize	45	23	51	0.20
Finger Millet	39	15	38	0.10
Cassava	218	131	60	0.13
S. Potatoes	128	81	63	0.20
G. Nuts	10	5	50	0.18
Banana	286	217	76	0.165
Milk (lts)	20	25	125	0.58
Beef	5	6	120	1.01

Source: *Adapted from Uganda–Ministry of Finance & Economic Planning, 1995b*

No single food can be called a national staple. As earlier noted, consumption habits have a strong ethnographic bias. Matooke, for example, was predominantly eaten in the central, south and montane regions where rainfall is relatively well distributed throughout the year. Millet, sorghum and cassava were predominantly eaten in the relatively more arid east, north and parts of the south of the country. The situation is however gradually changing and ethnographic dietary boundaries are breaking down.

Notable is posho (maize meal) which was not a staple food in Uganda; maize was mainly grown to be eaten green on the cob (Uganda-Department of Lands & Surveys, 1966; Goode, 1989). Where consumed, posho was considered food for the poor. It has since become a widely eaten food, especially in urban areas (Bibagamba, 1996; Goode, 1989) and is the main food in institutions like schools and prisons. Millet was the preferred grain in the millet/sorghum eating areas in the eastern region while sorghum was reserved for the lean season (Group discussions, 1998). Sorghum is now more commonly eaten while millet is reserved for sale as grain or brewed beer.

University of Pretoria etd – Ejupu E C A 2001

With rising incomes, the share of food expenses in the household budget should decrease and the nature of foods consumed shifts towards the more expensive foods and to ensuring a wide variety (Timmer, 1997). Whether an increase or improvement in nutrition accompanies such shifts is not clear. In a study in Rwanda, the composition of the food basket changed considerably from the poorer to the better off segments of the community (Von Braun et al., 1991). However, despite the changes in consumption, the overall level of the food budget share remained stable across income levels. They attributed this to the wide variance in income elasticities, e.g. 4.73 for sorghum, 2.96 for new cereals like wheat and rice, 4.29 for animal products and 0.48 for maize.

Von Braun (1994), discussing findings from studies done in several countries, suggests that given the level of elasticities of nutritional improvement (ranging from 1 to 4.9% for a 10% increase in income), major increases in income levels would be necessary for a major nutritional improvement effect. Schiff and Valdes (1990), citing Behrman & Deolalikar (1988), suggest that as income increases, more of the expenditure on food is spent on non-nutrient attributes such as diversity, freshness, taste and convenience. These attributes however, may not improve nutrition.

From the income elasticities shown in the previous table, dietary variation across income groups in Uganda should come from the consumption of animal protein. Cognisance is taken of areas where they are widely consumed, e.g. fish in villages where fishing is an important economic activity. To examine how commercialisation translates into the nature of foods bought and consumed, and the size of the food budget, this section uses the cluster groupings rather than income levels for analysis.

5.5.1 Dietary habits in the study area

Indirectly, the income effects of commercialisation depend on the proportion of income spent on food compared with that on non-food goods and services, i.e. the size of the food budget. Within the food budget, they depend on the nature of foods purchased (Von Braun, Bouis & Kennedy, 1994), which in turn partly depends on the dietary habits within a cultural setting. To explicate the effects of commercialisation on dietary culture, the group discussions (complemented by consumption data from the surveys) were used to evaluate the changes in eating habits over time. The group respondents ranked the

University of Pretoria etd – Ejupu E C A 2001

crops grown in relation to how they featured in their diet during Amin's regime, Obote's regime and to date. These regimes were used to represent the progression from high subsistence to commercialisation. While all the group discussions cannot be presented, the general trend by district is presented in the next section (minor differences exist across micro-ecological dispositions).

In Apac District, the diet has changed from a finger millet/cassava mix complemented by pigeon peas, simsim, vegetables, groundnuts, and sweet potatoes to one mainly made of cassava and beans, simsim and vegetables. They now eat sweet potatoes, millet, groundnuts and pigeon peas to lesser extents while posho often features in the diets of many. In fishing villages close to the shores of Lake Kyoga, fish frequently replaces beans.

In Soroti District, the diet used to be a finger millet/cassava mix, complemented by cow peas, pigeon peas and groundnuts. They mainly ate sweet potatoes and sorghum in the lean season. The diet is now mainly a sorghum/cassava or sorghum/sweet potato mix complemented by beans, vegetables and cowpeas to a lesser extent. Millet, sweet potatoes, simsim and groundnuts now rank lower. Like Apac, fish replaces beans in villages along the lakeshores. Millet though still widely grown, has become an important source of cash through direct sales or is used in making local alcohol for sale. Groundnuts, has been replaced by simsim in some places but both are now highly traded.

Mbale District in general shows the least dietary diversity, i.e. matooke, posho, beans, sweet potatoes and vegetables. Millet and cassava (partly because of the cassava mosaic disease) are no longer as common across the district. Where millet is grown, it is more important for the making of locally brewed beers. Sweet potatoes are no longer as prominent as they used to be (Group discussions 1998). Farmers' note that the loss in production diversity, discussed earlier, also contributes to a loss in dietary variety.

It is also noteworthy that:

i) The nature of the staple food, e.g. matooke compared with millet and sorghum predisposes the consumers to low protein diets and high possibilities of malnutrition (World Bank 1993a). Matooke for example has less than 1.5 gm of

University of Pretoria etd – Ejupu E C A 2001

protein per 100 gm compared with either millet or sorghum, each of which has about 8-9 gm of protein per 100gm (Goode, 1989).

ii) Important in Apac and Soroti districts is the role of simsim and groundnuts in the diet. It is a common practice for them to be introduced as a paste into cooked vegetables thus adding qualitative value to the meal (Goode, 1989; Group discussions 1998). On the contrary, many households in Mbale commonly eat plain vegetables that make comparatively negligible calorie contributions, (FAO/US Department of Health, Education and Welfare, 1968; Goode, 1989), aggravating the dietary protein deficiency.

iii) For Apac and Soroti districts, because of the proximity of Lake Kyoga basin, fish a relatively cheap source of animal protein, is widely consumed. Mbale District is not as endowed with fishery resources.

iv) Matooke and posho are generally more highly priced sources of energy than cassava, millet, sorghum, or sweet potatoes, per unit weight.

5.5.2 Dietary differences between the clusters

The application of strategies for dealing with various insufficiencies at the household level can be used as indicators of their food security status (Maxwell, 1996; Teklu et al., 1991; Von Braun et al., 1991). Some of these strategies are; short-term dietary changes, reduced or rationed consumption, altering household consumption or intra-household distribution of food, depletion of stores, use of credit for consumption, increased reliance on wild food, etc.

Maxwell (1996) used short-term food sufficiency indicators as part of a study to quantify the determinants of a long-term adaptive strategy, semi-subsistence farming in a major urban centre, Kampala. The respondents identified the different coping strategies and focus group discussions were then used to rank them in order of application and depending on the severity of food shortages. The least severe coping strategy was reportedly eating foods that are less preferred followed by limiting the portion size. Skipping meals or not eating at all on anyone day are strategies indicating severity of food shortages.

University of Pretoria etd – Ejupu E C A 2001

Similarly, a study done in Malawi found that most households produced enough food for 5 to 8 months after which they applied various coping strategies. These included eating less preferred food (mgaiwa) and inferior foods (madeya, pumpkins, green maize, roast cassava etc.) and/or reducing the frequency of meals (Kandoole and Msukwa, 1992). As households run out of maize stocks, the proportion of "nsima" mostly made from maize flour, declined from 72% in June, to 62.4% in December and 47.1% in March. Concurrently, the proportion of meals prepared from "mgaiwa" flour (less preferred in comparison to "nsima") increased from 9% in June to 27.4% in March. The hunger months are January to March. Vegetables, beans and pulses as a complement to the main food accounted for 82% in May, 71.3% in January and 78% in March. Animal proteins were taken with 16.4% of the meals in May and 25.4% of the meals in November.

From the first section of this chapter, the grouping by cluster analysis suggested that purchased food might contribute to bridging household food deficits. This observation is further analysed by examining variations in the size of the average weekly food budget and the nature of foods that are bought. Implicitly, the effects of commercialisation on consumption habits are examined. It is expected that the more commercial or relatively better off households would show a tendency to consume more expensive calories.

Without getting into the details of individual consumption and intra-household food distributions, the nature and the quantities of food consumed was collected for a 5-day recall period. Findings are that most households have a minimum of two meals a day. Where they skipped meals, it was either due to lack of food or lack of time (they left for their gardens early in the morning and returned late in the day). The use of this as a variable indicating food stress is rendered impotent.

The nature of foods consumed however varied across the clusters and the frequency in the recall period of five days is compared. Supported by the literature, (Uganda-Ministry of Finance & Economic Planning. 1995a; Goode, 1989; Maxwell, 1996), group discussions and respondent responses, it is assumed plain vegetables, as the complement to the carbohydrate base of a meal, is an indication of some food constraint. It is a strategy that tides households through the lean season when they have run out of beans, peas, etc. Reference was often made to meat or fish as "good" or "tasty" food while vegetables were a reflection of poverty (Group discussions, 1998). Basic food

University of Pretoria etd – Ejupu E C A 2001

Table 5. 12: Dietary habits across the different clusters and groups (5-day recall period)

Cluster Grouping	HPLS		APLS				HPHS			APHS			LPLS		
Variables\ Cluster number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
No. meals at 2nd Survey	10	10	9.6	10	9.7	9.9	9.3	9.8	9.7	10	10	10	9.8	10	9.6
No. meals at 3rd Survey	10	10	9.7	10	9.7	9.6	9.7	9	10	10	9.9	10	9.9	10	9.7
Vegetable 2 (no. of meals)	1	3	3	4	3	4	6	4	4	3	5	4	4	3	4
Vegetable 3 (no. of meals)	2	2	2	3	3	3	4	4	6	4	5	5	4	5	4
Ave. expenditure/week- shs	2942	2272	2567	3375	2079	2666	3238	3517	3017	4117	2917	2900	2582	2225	2298
Calories per 100 shs spent	368	427	534	451	568	486	137	431	435	427	507	457	435	226	451
% calories protein nature 1	81	66	67	68	68	60	61	40	10	48	26	41	31	68	41
% calories protein nature 2	55	74	77	64	74	73	50	19	21	67	45	44	62	83	53
% calories protein nature 3	75	47	61	63	65	48	33	69	25	59	47	34	51	55	47
AVERAGE	**70**	**62**	**68**	**65**	**69**	**60**	**65**	**43**	**19**	**58**	**39**	**40**	**48**	**69**	**47**
%calories animal nature 1	47	37	38	40	36	33	53	36	10	26	18	4	24	63	32
% calories animal nature 2	54	64	44	44	40	43	80	19	4	65	18	38	48	68	44
% calories animal nature 3	75	31	42	44	41	32	33	43	25	10	29	3	34	50	28
AVERAGE	**59**	**44**	**41**	**43**	**39**	**36**	**55**	**33**	**13**	**33**	**22**	**15**	**35**	**60**	**35**

NB. Numbers 1,2 or 3 after variable indicate data are of survey 1, 2 or 3 respectively

Vegetable 2 (3), (no.of meals) = The number of meals at which plain vegetables were the main complement at the second (third) survey.

% calories protein (animal) nature = proportion of food purchases that are of a protein (animal protein) nature at the first (second or third) survey

University of Pretoria etd – Ejupu E C A 2001

availability is the focus of this analysis. Therefore, although such meals are inadequate in that they provide minimal body building foods, they meet the basic need of food, i.e. to keep away hunger (Goode, 1989). Relatively low levels of income justify the assumption that, respondents are more concerned about having sufficient food as a basic need, than whether they are meeting all their dietary needs. Cognisance is however taken of the fact that food groups have different attributes that contribute to ensuring a healthy and active life. Micro-nutrients are a necessary component of all diets and vegetables are an important source. Vitamin "A" deficiency, anaemia and iodine deficiency disorders are examples of micro-nutrient related disorders affecting particularly children and women in Uganda (Uganda-National Food & Nutrition Council, 1996a).

The low sales clusters, no.1 to no.6, consume vegetables as the complement to the main staple on average 3 to 4 times at the second survey and the frequency drops to 2 to 3 times out of the 10 meals in the recall period, at the third survey. The high sales clusters no. 7 to no. 12 eat plain vegetables in 3 to 6 meals out of 10 at the second survey and 4 to 6 times, an increment, at the third survey. In the low production-low sales group (LPLS) 3 to 4 out of 10 meals, were complemented by vegetables at the second survey. This remains unchanged at the third survey except in cluster no.14. As a coping strategy commonly applied during the lean season, the average number of meals where vegetables are the main complement should drop at the third survey, as seen in clusters no.1 to no. 6. The incremental consumption of vegetables or no change as shown in the low production-low sales (LPLS) and high sales clusters suggest that food may be inaccessible despite being available. During the surveys, it was observed that some households had beans, simsim or groundnuts (all relatively high value crops) in-store, consuming only small amounts because it was to be sold later.

Of the food bought, the high producer-low sales (HPLS) and average producer-low sales (APLS) groups evidently buy more proteins, at least 60% of calories bought. Animal proteins are between 36% and 44%, except cluster no.1, where they are 59% of calories bought. Dietary diversification therefore seems to be the reason for food purchases. In contrast, the high sales groups spend proportionally less on either protein or animal protein. By implication, these groups buy more basic foods, i.e. the proportion of proteins bought range from 19% in cluster no. 9 to 58% in cluster no. 10. Cluster no. 7 stands out with a high proportion, 65% of calories bought, are of a protein nature. Animal proteins

University of Pretoria etd – Ejupu E C A 2001

are an even smaller proportion of calories bought. They range from 13% to 33%, again cluster no. 7 stands out with a high proportion 55%of calories bought.

The low producer group on average spends about 50% on protein. Animal proteins in particular make about 35% of the food bought. Food purchases therefore are not just to diversify the diet but to meet food shortfalls too. Cluster no. 14, with 4 households in this group has the lowest calories bought per 100 shs spent on food, i.e. 226 and about 60% of calories bought are animal proteins.

Inter-survey analysis shows an unexpected increase in the proportion of proteins purchased in the second survey period. The increase seems to come mainly from an increase in the proportion of animal proteins purchased. This could be due to the shortages of the commonly eaten beans and peas, at this time of the year. At this time of the year when the demand for food and labour are both high, it is also a common practice for livestock to be slaughtered to pay for wage labour (one day's wage earnings are converted into the meat equivalent). The observed demand for animal protein is consistent across the sample even among the relatively poorer low production-low sales (LPLS) group. This reflects the desire for dietary variety expressed during some group discussions. Women for example sometimes sold their food crops to buy meat or fish to "balance their diet".

Similar findings were made in a study done in three districts in Mozambique. Food purchases made up nearly 50% of all cash purchases despite the low proportion of net staple food buyers. For 51% of the households, the typical hungry season meal was not sufficient to maintain the health of the family. Of these 51%, the reason given by 46% was lack of variation in the diet rather than insufficient quantities of food. It was found that fish expenditures accounted for 48% to 74% of the food purchases. Fish complemented the bland staples while consumption of staples remained mainly from own production (Tshirley & Weber, 1994).

Despite the need for dietary variety, the quantities bought are small, frequently a kilogram of meat or less. This begs the question of how they share it within the household. A kilogram of meat, depending on whether it is pork, goat meat or beef, ranges between 1,500 and 2,200 shs. Fish ranges from 200 shs to 1,200 shs (for a kg or

University of Pretoria etd – Ejupu E C A 2001

less) depending on the season, species and whether it is fresh or smoked. In contrast, a cabbage head costs about 300 to 500 shs off-season and 100 to 200 shs while in season. A bundle of kales/spinach ranges from 100 to 200 shs while in season and 300 to 700 shs off-season. In season, tomatoes will range from 50 to 200 shs and off-season 300 to 400 shs a heap (less than a kilogram).

Whether increased cash income, assumed by the increased commercialisation, translates into higher expenditure on food is uncertain. Weekly expenditures on food in the high producer-low sales and average producer-low sales groups' are lower than those made by the high sales groups but higher than the poorer low producer-low sales group. However, per 100 shs spent on food, there is little difference in calories bought. The difference in expenditure as made by the more commercial high sales groups does not necessarily translate into more expensive calorie consumption. A fair amount of the expenditure is on various vegetables that are cheaper yet make minimal caloric contributions to the diet.

5.6 CHAPTER SUMMARY

The exploratory cluster analysis reaffirms own production as an important factor in ensuring food availability and therefore food security. Households were categorised into the food secure and the food insecure based on production and sales levels. The higher producers are the relatively more food secure across the sample, i.e. within both the food secure and food insecure groups.

The analysis shows that limited sales have a limited negative impact on food availability if cushioned by relatively high production. Food sales of considerable amounts however, render groups more food insecure than those making lower food sales. Such households then seem to rely on the market to try to bridge the food gap so created. This pattern is observed both on an inter-group and intra-group analysis.

Logistic analyses, a pair-wise comparison among three of the groups, find that group membership cannot be predicted from the characteristics of the head of the household; age, gender, education level and main occupation. However, area under cultivation and the dominant cultivated crops, indicate that the more commercial households on average

University of Pretoria etd – Ejupu E C A 2001

have more land under production. On the other hand, more land is also under cultivation where bananas and maize rather than cassava and cereals, are the dominant crops. Output from cassava is relatively higher than that from bananas, per unit acreage.

Alternative sources of income, as presented by the ownership of goats and cattle, or non-farm activities, seem to reduce the pressure to sell food. The groups with relatively high non-food expenditure are the more likely to have more goats or own cattle. The group less likely to own cattle or with fewer goats is more likely to generate more income from non-farm activities. This is also indicative of the need for cash income.

Consumption habits suggest a tendency for the more highly commercial households to consume vegetables more frequently in their meals. The higher expenditure on food does not therefore translate into higher calorie purchases per 100 shs spent. Varying amounts of protein foods, particularly animal proteins are bought by all the groups. There is thus an apparent desire to diversify consumption, but does not necessarily match the sale of food.