20 Tobacco Cultivation, Food Production, and Nutrition among Smallholders in Malawi

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Introduction

Malawi is one of the poorest countries in Sub-Saharan Africa, with a per capita income of about US$170 (World Bank 1990). Although Malawi has an enviable record in achieving national food self-sufficiency, it has achieved that at a very low level of the supply-demand balance; the aggregate picture masks widespread food insecurity at the household level. National statistics indicate that over half of the children under five years of age suffer from malnutrition and almost one in five dies before reaching the age of five. The causes of this grim situation are low incomes, chronic and seasonal food shortages, inadequate diet (especially for weaning infants and children between one and two years of age), and high morbidity rates. To date, policy reforms have included restructuring the Agricultural Development and Marketing Corporation (ADMARC), which is the government marketing agency, and agricultural pricing policies. Smallholder response to higher producer prices has increased sales to ADMARC, but this seems to indicate switches among crops rather than an aggregate increase in output (Lele 1989b). This study was conducted in 1986–87 to assess the impact of the commercialization of maize and tobacco in an area in southern Malawi.

Research Site and Methods

The research site, set in the southern part of Zomba District and about 15 miles from the town of Zomba, is just within the area that had been covered by one of the largest white-owned estates in the Shire Highlands, the Bruce Estates (White 1987; Vaughan 1987). Here, cotton and, later, tobacco had been grown mainly by tenants and, to some extent, by laborers. Many of the older respondents in the sample had worked on the estates, and some of them had learned their skills in

tobacco cultivation there. In addition, farmers have long produced vegetables and grain for sale in the local markets, which are held on different days of the week in different locations, or in the bigger market of Zomba. Today, smallholders who grow tobacco are supposed to be registered with the state's agricultural extension staff, but, in this study, about half of the tobacco growers sold their tobacco through other growers who were registered or through estates. The area is one where sales of crops are a well-established practice, with numerous local markets within a day's travel of two major urban centers, and one where most labor exchanges are remunerated in cash or in kind.

Tobacco- and non-tobacco-grower households with varying sizes of landholdings were purposely selected for this study; the study sample overrepresents larger landholders. Fourteen percent of sample households have landholdings of less than 0.7 hectare, compared with 35 percent of households nationally; 52 percent of sample households have between 0.7 and 1.5 hectares, compared with 40 percent nationally; and 34 percent have over 1.5 hectares, compared with 25 percent nationally (national figures are taken from Hiwa 1988). The mean holding for the sample is 1.5 hectares. The average holding in the Liwonde Zomba Project area just to the north of the research site is 0.8 hectare, slightly under the average for the whole district.[1]

Cash Crops, Production, and Income by Gender

Smallholders have highly diversified incomes, which entails juggling multiple sources of income in trying to achieve family food security and welfare. Malawian smallholders are poor by international or even African standards; mean total income per capita for the sample households over a ten-month period was K 78 or US$35 at 1986–87 exchange rates (table 20.1).[2] The household economy is highly commercialized in that, on average, just over 30 percent of the total income comes from marketed agricultural production, and a further 39 percent comes from off-farm sources. The latter include transfers, mostly from relatives working elsewhere, which make up 15 percent of total income, on average. Some of this transfer income provides the cash for buying fertilizer or paying for hired agricultural laborers, while for poorer house-

1. For more details on sample selection and survey design, see Peters and Herrera (1989).

2. Income, other than the value of retained own-crop production, is based on income data collected during the monthly income and expenditure survey. Similar studies often prefer to use expenditure data for estimating income levels, since income is often underreported. In this survey, however, reported income actually exceeded reported expenditures by an average of 9 percent, so income rather than expenditure is used for the analysis.

TABLE 20.1 Per capita income for different farm households, by type of income, Malawi, 1986–87

Household	Number of Households	Value of Home Consumption[a]	Market Income[b] (kwacha/capita)	Off-Farm Income	Total Income
Total sample	210	23.26	23.95	30.58	77.78
Nontobacco households	148	23.11	17.37	32.30	72.78
Tobacco households	62	23.62	39.65	26.46	89.73
Small tobacco households	25	19.30	27.05	20.72	67.07
Tobacco specialists	37	26.54	48.17	30.34	105.05

SOURCE: Surveys conducted by the authors.

[a]Value of maize retained for home use.

[b]Income from sale of crops and agricultural products.

holds, transfer income supplements the low income realizable from small landholdings.

On average, sample households depend for some 30 percent of their total income on own-produced maize. Increasing total income is not correlated with an increasing proportion of income from market income. In this sample, the proportion of market income drops for the two middle quartiles, indicating a greater propensity to retain the maize harvest as income increases. It is only in the top income quartile that market income provides a larger proportion of income than does the value of retained production.

As a percentage of market income and wage income, sales of all food crops are more important for the poorest quartile, as they comprise 20 percent of total income compared to 12 percent for the top quartile. For many of the poorest, casual agricultural wage work (called *ganyu*) is a major income strategy, especially during the rainy season, when food is scarce but local work is more available. Households with more land, more food stores, or more cash to pay wages hire such workers. In this way, the income strategies of the poorer households are joined through the local labor market to the production strategies of the richer households. Some remuneration is in kind, usually in the form of food crops (maize, cassava, and sweet potatoes), but relatives and neighbors are as likely to pay in cash as in kind.

Female-headed households[3] have lower income per capita than male-headed households—K 65.84 compared with K 84.15. However, the highest mean incomes are earned by the female-headed TEBA households, where the husband is a labor migrant in South Africa. These households rely on remittances sent by the husbands. Some of the remittances are used to hire agricultural laborers and to purchase fertilizer. Such households earn a smaller proportion of their income from selling maize than other households. They sell few other crops, so their total crop income comprises only 5 percent of their total income, compared with 18 to 19 percent for other female-headed households and 25 percent

3. On the basis of a very detailed analysis of the composition of households and the pattern of absence or presence by husbands, we deciphered three types of female-headed households: *de jure female-headed households* (40 percent of the female-headed households), where an adult woman is currently without a husband, that is, she is widowed or divorced; *male-absentee households* (41 percent), where the husband was not present for at least half the time during the research period and was engaged in employment activities within Malawi; and *TEBA households* (19 percent), where the husband is a labor migrant in South Africa. TEBA is the acronym for The Employment Bureau of Africa, the recruiting agency for South Africa. Migrants are said in the sample villages to "have gone to TEBA," hence the label used here.

for male-headed households. The other female-headed households fit the usual stereotype of being poorer than male-headed households, with the male-absentee households being the poorest, with a mean per capita income of K 51. Land shortage makes it difficult to earn a sufficient income from farm production alone; thus men tend to be absent from home a great deal, looking for other income opportunities (such as selling crops, catching and/or selling fish, agricultural and nonagricultural manual labor, construction, rough carpentry, and selling firewood or grass).

In the sample as a whole, female income is equal to male income. In male-headed households, however, the share of household income in women's hands is less (37 percent of mean household income), and it declines with increasing total income and with the incidence and scale of tobacco production. It is important to recognize that female-controlled income is that reported by individual women to be in their hands; it is not necessarily the income earned by women. In the sample area, the conventional behavior expected of married men is to hand over all or some of their income to their wives. This area is one where matrilineal succession and inheritance and uxorilocal residence are the norm both statistically and normatively.[4] In addition to women being perceived in a very real way as "owners of the land" and as bearing authority in their own village, along with their brothers, there appears to be a strongly held convention that income in a conjugal home should be as much the wife's affair as the husband's, irrespective of how that income was earned. This does not mean, of course, that there are no differences of opinion over the disposition of income; there are. Nor does it mean that the earner of income does not have a potentially stronger say in the disposition of that income. There is no doubt that women have far fewer options for earning income outside own production or self-employment than do men, and that their wages are often lower. On the other hand, if noncausal wage or salaried work is excluded, women's earnings may equal or exceed those of men who do not have skills to sell in the labor market. Several women who brew beer or *kachasu*, a local gin, were able to make more money than did their husbands working in casual farm labor or other temporary odd jobs. Women selling tomatoes or grains could earn as much or more cash as their husbands doing similar work.

4. All sons, except the one designated successor to his mother's brother and the guardian of his sisters (*mwini mbumba*), have to leave on marriage. Hence, men use land in their wives' villages. Since marriages do take place within a village, some married men live in their own natal villages.

Food Security and Cash Cropping

"Maize is our life," (*chimanga ndi moyo*) say the people of Zomba. Maize is used to make the staple meal of stiff porridge (*nsima*) that is equated with "food" and eaten with a relish, usually vegetables. Similar to reports from Guatemala, the Philippines, and Zambia (see chapters 12, 13, and 19), all households try to provide as much of their own maize supply as they can from their land. Maize occupies most of the land and labor of the area. Eighty-four percent of the cultivated area is planted with maize, virtually all of it intercropped with legumes (cowpeas, pigeon peas, and beans), groundnuts, pumpkins, and other crops, which are used for own consumption and for sale. The mean household area cultivated (1.5 hectares) is a close measure of the land available, since most land is in almost permanent cultivation. The mean household maize harvest of 880 kilograms, or 145 kilograms per capita, falls below the government of Malawis' (GOM) estimate of annual maize needs of 157 kilograms per capita. As with landholding and income data, however, the mean figure masks considerable variation across the sample.

There are two measures of relative subsistence achieved by households. One is the share of own total production income directed to the household's own use, called the income subsistence ratio, which is 34 percent for this sample. The other measure, the agricultural subsistence ratio, is the share of own agricultural production directed to the household's own use, which is 56 percent for this sample (table 20.2). As might be expected, the agricultural subsistence ratio measure is higher, on average, for poorer than richer households, for smaller than bigger landholdings, and for nontobacco growers than tobacco growers, indicating the greater use of agricultural production for own consumption than for marketing. The drop in the agricultural subsistence ratio for the middle landholding group (0.7 to 1.5 hectares) indicates that households feel more able to use some of their agricultural product for earning a cash income, while a rise in the ratio for the larger holdings (over 1.5 hectares) reflects their ability to increase the proportion of maize retained for own use as well as to have a market income. The degree of agricultural subsistence is highest not for the poorest income quartile but for the middle 50 percent, before dropping for the richest quartile.

Overall, the degree of commercialization of maize production is low—only 11 percent of the maize harvest, on average, is sold. The only significant variation across the sample is that the poorest income quartile has the lowest percentage of retained maize (78 percent), for reasons that will be discussed below. Retained maize forms the bulk (70 percent) of the total maize available to the households and half of their total food expenditures over the ten-month survey period. The reasons behind

TABLE 20.2 Subsistence ratios for main sample groups, Malawi, 1986–87

Group	Agricultural Subsistence[a]	Income Subsistence[b]	Consumption Subsistence[c]	Food Consumption Subsistence[d]
			(percent)	
Total sample	56.0	33.6	32.6	51.0
Head of household				
Male	53.1	33.8	33.0	52.2
Female (TEBA)[e]	75.1	31.3	30.4	54.4
Female (Malawi)[f]	57.7	30.7	29.0	42.9
Female (de jure)[g]	58.5	36.9	35.4	52.2
Nontobacco households	61.8	34.4	32.3	49.5
Tobacco households	44.6	31.8	33.3	—
Small tobacco growers[h]	46.2	30.9	31.8	57.6
Specialist tobacco growers[i]	43.6	32.5	34.4	56.8
Landholding class				
<0.7 hectare	59.3	25.4	24.7	37.7
0.7–1.5 hectares	54.1	32.4	31.2	48.2
>1.5 hectares	57.6	39.0	37.9	60.5
Income quartiles				
First (<K44)	55.2	35.6	32.2	46.8
Second (K44–62)	59.1	33.3	33.7	50.7
Third (K62–85)	56.6	33.9	33.3	53.2
Fourth (>K85)	53.0	31.8	31.2	53.3

SOURCE: Surveys conducted by the authors.

[a]Value of home consumption (that is, retained maize)/value of agricultural production (market income plus home consumption).
[b]Value of home consumption/total income minus value of agricultural inputs, that is, hired labor and chemicals.
[c]Value of home consumption/total expenditures (including the value of home consumption).
[d]Value of home consumption/total food expenditures (including value of home consumption).
[e]Husband was labor migrant in South Africa.
[f]Male-absentee household where husband was not present for at least half the survey period and was working within Malawi.
[g]Adult widowed or divorced women.
[h]Received less than one third of their crop income from tobacco sales.
[i]Received more than one third of their crop income from tobacco sales.

people's wish to produce as much of their own maize as possible are related to their assessment of their ability to pay the higher prices in the deficit period (December–January) as measured against their needs for cash immediately after the maize harvest; the insecure set of income opportunities available to them, which are more constricted for the poor; the fluctuation in supply at local ADMARC selling centers; and the costs in time as well as in cash involved in purchasing maize. There are also taste preferences—the locally produced maize is pounded to a fine white flour, *ufa woyera*, and cooked to a white, glassily smooth paste, which is considered far superior to the *ngaiwa*, or whole maize flour, made from hybrid maize purchased from ADMARC. Finally, respondents considered that a store of maize was a more secure source of food than dependence on cash for purchased maize. Factors contributing to this opinion included the difficulties of finding cash when it was needed, the tendency for cash to be used for purposes other than food purchases, the stronger claims by other relatives and neighbors on cash as opposed to household maize stores, and various cultural mechanisms for regulating the amount of maize taken out of the store, including strict control by women.

For these reasons, the more staple food supplies that people are able to produce for themselves, the less the risk they face of increased prices or of short supplies. These reasons, combined with the insufficiency of land, even among this better-off sample, leads to the fact that while only 56 percent of the sample sells maize, 99 percent purchases maize. The larger a household's harvest, the more likely some of it is sold. Sellers as a group have significantly higher maize harvests (188 kilograms, compared with 130 kilograms per capita for nonsellers). Forty percent of households with over 200 kilograms per capita of maize harvests are net sellers, compared with 8 percent of those with less than 200 kilograms per capita harvests. On the other hand, although households with smaller maize harvests are less likely to sell, there is no simple relation between the size of harvest and grain sales. As harvests rise, there is first an increase in the percentage of households selling, but then the percentage drops off considerably before rising again at the highest harvests. Households with low maize harvests but few other income opportunities are forced to sell some grain, while an increasing total income enables greater withdrawal from the grain market for sale.

How well, then, do the sample households do in obtaining a supply of maize (that is, harvest minus sales plus purchases)? The most significant correlations in both size of harvest and total maize supply are with income and landholding size. This holds for both total household and per capita maize supply (table 20.3). The top income quartile has over two times the total maize supply achieved by the lowest quartile. The

TABLE 20.3 Total maize supply available to sample households, Malawi, 1986–87

Group	Number of Households	Household Maize Supply (kilograms)	Per Capita Maize Supply (kilograms)
Income quartile			
First (<K44)	52	702	103
Second (K44–62)	53	848	156
Third (K62–85)	53	1,196	189
Fourth (>K85)	52	1,546	318
Landholding class			
<0.7 hectare	4	579	147
0.7–1.5 hectares	28	911	180
>1.5 hectares	29	1,524	228
Nontobacco households	138	1,014	194
Small tobacco growers	25	1,242	158
Specialist tobacco growers	37	1,346	231
Male-headed households	137	1,152	195
Female-headed households			
TEBA[a]	14	1,441	242
Malawi[b]	30	823	157
De jure[c]	29	777	186
Total sample	210	1,072	191

SOURCE: Surveys conducted by the authors.

[a]Husband was labor migrant in South Africa.

[b]Male-absentee household where husband was not present for at least half the survey period and was working within Malawi.

[c]Adult widowed or divorced women.

largest landholders have total maize supplies that are over three times those of the smallest landholders, but because household size tends to increase with land size, in per capita terms the largest landholders have one-and-a-half times the maize supply of the smallest landholders.

Households in the poorest income quartile have the lowest mean hectarage cultivated and reap lower mean harvests (548 kilograms, compared with the sample mean of 880 kilograms). Despite this, they are more dependent on grain sales than the richer households, earning 5 percent of their total income from this source. These poorest households retain a smaller share (78 percent) of their maize harvest, thus selling twice the proportion that other households do. The poor are in a classic double bind: they need cash (for immediate needs or to repay debts incurred in the difficult preharvest period) and so have to sell some of their harvest, knowing full well that they will later have to find other means to purchase grain.

Some families are unable either to generate enough income from their own production to retain their labor on their farms or to raise even

the small capital needed for entering small-scale retailing. They are dependent on the poorest paid self-employed activities and on providing casual labor for others to tide them over until the harvest. Households in the bottom income quartile are able to obtain only 100 kilograms of maize (for ten months) per person. This is under a third of the amount obtained by households in the top income quartile and well below conventional assessments of adequacy.

How do these households cope? The government policy in place over the past 15 years and more of controlling maize prices through the ADMARC system can be argued to have been one means of keeping the deprivation in some check. On the other hand, general economic conditions, agricultural policies that favor larger-scale producers, and a wage freeze have essentially meant declining standards of living for rural households (Kydd and Christiansen 1982). Other coping mechanisms include following a diversified household income strategy. A most important way by which the poor cope is by relying on the social network in which they are embedded, which acts as a kind of insurance system for those in cycles of phases of want. Some households tide themselves over the deficit period by sharing with relatives who have bigger reserves. There is a clear pattern, especially in December and January, of poorer families eating together with other relatives. Even within households, the number of fires (and, hence, cooks) is frequently reduced during the deficit period. Another strategy is to move people rather than food. While it is much more common for children to be moved between households for their meals at different points in their families' cycles and in the seasons, some adults, especially the aged, are also moved.

Tobacco Growing, Food Crops, and Food Security

A central question in this study is the effect of tobacco production on income, food security, and nutritional status. Tobacco is the highest value crop in the area and thus has a potentially positive effect on income. On average, tobacco growers have a higher household and per capita income than other households (K 90 compared with K 73 per capita; see table 20.1). There is little difference between tobacco growers and other households in the proportion of income derived from food crop sales. Apart from tobacco sales, the major difference between tobacco growers and other households in sources of income is that the latter derive a higher proportion of their income from wages. However, there is a great degree of variability in the income earned from tobacco. Over half of the tobacco growers earn over one-third of their crop income from tobacco sales. These households (specialist tobacco growers) have a per capita income of K 105, earn 24 percent of their total

income from tobacco, and allocate 24 percent of their land to tobacco cultivation. The remainder, or "small tobacco growers," concentrate far more on food crop production and sale and add tobacco growing to their activities. They do not have less land on average but have larger households. They allocate 17 percent of their land to tobacco, but earn only about 4 percent of their mean per capita income of K 67 from tobacco sales.

A simple measure of returns to tobacco production (gross sales minus costs of chemical inputs and hired labor) suggests a considerable risk for small-scale producers of not achieving a positive return on growing tobacco; 40 percent of the small tobacco growers reported no cash income from tobacco sales, and half of these (that is, 20 percent of the total tobacco growers) had a loss. In contrast, the specialist tobacco growers did better: only three (8 percent) incurred a net loss.

Do tobacco growers reallocate their resources away from maize production to tobacco, or do they add tobacco to the former? What are the causes and consequences of these actions? Tobacco growers have more land, on average, than households that do not grow tobacco. However, their larger household size results in their per capita landholdings and per capita maize harvests, on average, not being larger than those of nontobacco households. On average, tobacco farmers plant less of their land with maize than do nontobacco households (72 percent, compared with 89 percent). Similar per capita maize harvests, however, indicate that, on average, tobacco production does not displace maize below a certain level.

Tobacco growers as a group are more engaged in the market as far as grain sales are concerned; 72 percent of small tobacco households and 62 percent of specialist tobacco households sell grain compared with 47 percent of nontobacco households. However, there is no difference in consumption behavior—a majority of both tobacco-growing and nontobacco-growing households are net purchasers of grain. Moreover, tobacco households do not have a lower consumption subsistence ratio (the value of retained maize to total expenditures, see table 20.2) than nontobacco households; nor do tobacco households have a significantly lower proportion of their total maize supply derived from own retained maize (73 percent, compared with 69 percent).

In summary, tobacco growers, who on average derive a much higher proportion and absolute value of income from crop sales, use resources not only to grow crops for sale but also to provide a higher proportion of their own staple food. One might almost say that far from consumption subsistence (for staples) being an index of less commercialization in total agricultural production, for these smallholders it is one of more commercialization. The paradox is only apparent: households with sufficient

land and other resources to do so opt for both increased crop sales and high levels of own staple food provision.

The risk in tobacco production demonstrated in the variable earnings derives from the following: first, a failed crop means not only a lack of cash income but also a negative return because of the high cost of inputs required for tobacco production. Second, the use of available land, labor, and cash for inputs necessarily diverts these from other crops, especially maize. And third, the production and processing of dark-fired tobacco is intrinsically more demanding and risky than that of other crops in the area. For these reasons, tobacco has the potential not only for profit but also for loss.

The proportion of household land allocated to tobacco is slightly higher for those with holdings under 0.7 hectare (25 percent) than for those with larger holdings (19 percent for holdings between 0.7 and 1.5 hectares, and 22 percent for holdings over 1.5 hectares). It is obvious that statistical analysis is severely limited with such small totals, but an inquiry may give some clues for future consideration of the relationship between food security and cash cropping for land-scarce households. The small group of six households growing tobacco with under one hectare of land received more than one-third of their crop income from tobacco and were all male-headed households. Using male and female labor, they combined tobacco growing and vegetable growing, the highest value crops in the area, with off-farm employment. All but one of these households derived a higher proportion of income from off-farm sources than the sample mean. Crop sales replace the dependence on grain sales found among other land-scarce households. Only two of the households managed to reap maize harvests above the sample mean. Of the remaining four households, three were able to purchase maize to increase their total supply to almost double their harvest, whereas the fourth increased the harvest stored by only one-third.

In summary, this very small group of six land-scarce households invested its labor in the intensive production of high-value crops of tobacco and vegetables, combined with off-farm income. The contribution of tobacco to land-scarce households with enough labor can be positive, given its relatively high value. But, for this group, the outcome in terms of purchasing power of combining tobacco production in this way is variable, since 50 percent still attained less than 157 kilograms per capita of maize (over ten months).

Expenditure Patterns and the Role of Own-Produced Food

The acquisition of food depends not only on own production, of course, but also on the use of cash income from marketing crops and

from other sources. Overall, this sample of smallholders has budgets that are dominated by women's expenditures. More of women's expenditures go to food purchases than men's, although men do buy food, including maize—13 percent of male expenditures are on maize, compared with 25 percent of women's expenditures. Men's expenditures are directed more to nonfood items, including education (though only tiny amounts are spent on this), health costs, and agricultural inputs, as well as on alcoholic drinks (mostly beer and *kachasu*).

Increasing income is associated with a decrease in the budget share allocated to purchased foods, although while the share to purchased maize goes down, that to meat, fruit, and drink rises. The pattern of expenditures among tobacco growers is similar to that among other households. To the extent that tobacco growing results in higher income, the effects are similar to higher income among other households, that is, more is spent on the more expensive foods such as meat, fruit, and fish and on more drinks and agricultural inputs and less is spent on grain, vegetables, and roots. Moreover, the higher the tobacco income, the lower the share of expenditures in women's hands.

In these findings, we see the commonly expected phenomenon of a declining share of expenditures to food as income rises (Engel's law). However, once the value of retained maize is included in total expenditures, the decline in the budget share of food with an increase in income is far less marked. Thus, the share of home-produced food does not decline with increasing income: the differences are slight, but if anything, the share rises before dropping slightly in the top quartile (see table 20.4). As discussed earlier, retained maize makes up the bulk of household maize supply. The strategy followed by all households to achieve as high a proportion of total staple food supply with own production results in high subsistence ratios on a consumption basis, even for the most commercialized households in production terms. The lack of a decline in the share of home-produced food in total budget as income increases again suggests a population with a chronic food shortage that is reluctant to reduce its grain supply proportionately with a rise in total income.

Nutritional Outcomes

Overall, women and preschool children in the sample were found to be stunted but not acutely malnourished. Weight-for-height of both preschoolers and adult women were within normal limits, while children showed moderate to severe deficits in height-for-age and weight-for-age. The low prevalence of severe malnutrition contrasts with findings from other studies in Malawi (Malawi, Centre for Social Research 1988) and may be due to the fact that the study sample did not include completely

TABLE 20.4 Absolute value of per capita nonfood purchases, food purchases, and home consumption, and their share of total expenditure (including home consumption), Malawi, 1986–87

Group	Number of Households	Nonfood Purchases		Food Purchases		Home Consumption[a]	
		Value (kwacha)	Share (percent)	Value (kwacha)	Share (percent)	Value (kwacha)	Share (percent)
Total sample	210	30.65	36.74	21.54	30.67	25.03	32.59
Head of household							
Male	137	33.19	38.00	21.21	28.98	25.79	33.02
Female	73	25.89	34.39	22.16	33.83	23.61	31.77
TEBA[b]	14	50.65	42.33	28.02	27.31	35.42	30.35
Malawi[c]	30	21.38	33.14	22.87	37.91	15.11	28.95
De jure[d]	29	18.99	31.85	19.73	32.77	24.79	35.38
Nontobacco households	148	29.28	35.43	22.48	32.30	25.26	32.27
Small tobacco growers	25	27.46	38.74	18.31	29.43	20.18	31.83
Specialist tobacco growers	37	38.30	40.63	19.96	24.99	27.40	34.38
Landholding class							
<0.7 hectare	29	23.97	34.90	23.96	40.39	15.69	24.71
0.7–1.5 hectares	110	28.38	36.34	22.53	32.42	22.39	31.24
>1.5 hectares	71	36.90	38.12	19.01	23.98	32.95	37.90
Income quartiles							
First (<K44)	52	13.00	32.60	13.47	35.22	12.03	32.18
Second (K44–62)	53	21.04	34.80	18.01	31.55	19.18	33.65
Third (K62–85)	53	28.55	38.02	20.78	28.73	24.28	33.25
Fourth (>K85)	52	60.24	41.58	33.97	27.19	44.78	31.24

SOURCE: Surveys conducted by the authors.

[a]The value of retained maize harvest.
[b]Husband was labor migrant in South Africa.
[c]Male-absentee household where husband was not present for at least half the survey period and was working within Malawi.
[d]Adult widowed or divorced women.
[e]Received less than one-third of their crop income from tobacco sales.
[f]Received more than one-third of their crop income from tobacco sales.

landless households or those people employed as full-time laborers on estates. The early deficit in height found among young children in the sample, together with the short stature and normal weight-for-height of their mothers, suggests a pattern of intergenerational stunting.

Income was positively associated with nutritional outcomes (tables 20.5 and 20.6). Per capita income (including value of retained maize harvest) and per capita expenditures were the most powerful correlates of child stature. Similarly, the results of the dietary intake surveys show that, within a context of generally low caloric levels, households with more resources are able to provide more adequate levels of energy intake during the deficit period (December and January). However, child energy intake showed fewer correlations with resource measures during this period, probably indicating that morbidity, which is at its highest in this period, constrained child food consumption independently. After the harvest, when morbidity was reduced, child energy intake correlated with the retained maize harvest. Regression analysis also indicates that per capita income explains a significant proportion of variance in household, maternal, and child energy intake in the deficit period but not in the postharvest survey. These findings and the much lower energy intake elasticity to postharvest income suggest that households that have small maize supplies and low cash resources to satisfy energy requirements during the season of scarcity are highly vulnerable to food scarcity, whereas immediately after the harvest, differences across households

TABLE 20.5 Correlations of child size (in terms of Z-scores) with household variables

Variable	Height-for-Age	Weight-for-Age	Weight-for-Height
Total household income	0.14520*	0.20178*	0.15543*
Total expenditures per capita	0.20646**	0.22630**	0.11777
Production used for own consumption	0.13790*	0.20927**	0.15953*
Income from tobacco as a percent of crop income	−0.04289	0.00049	0.06642
Hectares cultivated by households	0.07037	0.13702**	0.14433*
Households' harvest (kilograms)	0.11581	0.21628**	0.20346**
$n = 215-217$			

SOURCE: Surveys conducted by the authors.

* = Significant at 5 percent level.

** = Significant at 1 percent level.

TABLE 20.6 Correlations of child size with household resource variables

Variable	Height-for-Age Z-Score	Weight-for-Age Z-Score	Weight-for-Height Z-Score
Total food expenditures	0.20851**	0.25048**	0.14850*
Female share of expenditures	−0.03044	−0.01125	0.00675
Off-farm income as percent of total income	0.05109	−0.02591	−0.07766
Number of preschoolers	−0.04176	0.00066	0.06200

SOURCE: Surveys conducted by the authors.
* = Significant at 5 percent level.
** = Significant at 1 percent level.

diminish. Once the relative "plenty" of the postharvest season passes, the poorer households are once more dependent on their lower cash incomes to secure food.

There is a strong seasonal pattern in nutritional status. Moderate to severe malnutrition was more prevalent among preschool children during December and January, when food is most scarce, work is hard, and morbidity is at its highest. Household, maternal, and child energy intakes were all low in comparison with recommended intakes, particularly in this deficit period. This seasonal variation is exacerbated by low income. Thus, only the top income quartile had a significantly higher energy intake in this period to compensate for the extra demands. In contrast, children in the bottom quartile consumed significantly fewer calories on average during the deficit period than during the postharvest period. This seasonal change in prevalence of malnutrition implies that the poor are vulnerable to fluctuations in food supplies and are unable to meet seasonal energy needs. The findings are typical of a population with chronic malnutrition due to insufficient dietary intake, excessive morbidity, or both, during early childhood.

While the anthropometric measures did not predict the subsequent incidence of disease, the incidence of diarrhea among preschool children did predict subsequent nutritional outcomes. Thus, the Z-scores for height, weight, and weight-for-height during the first anthropometric survey in October 1986 did not correlate with the incidence of diarrhea or other symptoms during the first period of observation (November 1986 to February 1987), whereas the incidence of diarrhea correlated with height-for-age and weight-for-age in the second anthropometric survey in February 1987.

Study results clearly show the effect of infectious disease, in the context of chronic food insecurity, on child growth. Each bout of diarrhea or infectious disease that is not followed by compensatory feeding during convalescence results in additional stunting. Normally nourished children had disease symptoms 30 percent of the time during the preceding three months, while those with mild malnutrition had them 35 percent, those with moderate malnutrition had them 37 percent, and those with severe malnutrition had them 54 percent.

The positive effects of income on nutritional status have already been noted; in contrast, morbidity was found to be largely independent of measures of income and wealth. For example, there was a significant difference in the mean Z-scores of weight between those children in the top income quartile who had experienced diarrhea throughout the survey period and those who had not. Hence, even within the highest income group, freedom from diarrhea improved the capacity for growth. In spite of the higher income and larger landholdings of tobacco growers, their children were not significantly different in nutritional status from those of nontobacco households (table 20.5; see correlation of Z-scores with tobacco as percent of crop income).

In summary, higher income provides for higher calories for households, especially those in the top 30 or 35 percent of the income distribution. The poor households are particularly vulnerable to food shortage in the deficit period of preharvest and have lower levels of caloric intake. On the other hand, the high incidence of morbidity in an area of endemic malaria, respiratory illness, and diarrhea acts as "a grand leveller," affecting nutritional status independently of income levels and having a strong influence on anthropometric outcomes.

Consumption expenditures and the share of tobacco in land use and income are probably endogenous, thus a function of many of the same characteristics that simultaneously determine calorie intake and child growth. Using the data set described above, Sahn and Shively (1991) used a linear combination of exogenous variables in order to instrument per capita expenditures and tobacco share to resolve the endogeneity problem. With a calorie consumption and a height-for-age function, they then estimated income-nutrition relationships, using consistent two-stage least-square estimates. Calorie elasticities with respect to expenditures derived from these estimates range from 0.59 for the upper expenditure tercile to unity for the poorest households. The tobacco share variable and its interaction with expenditures were significant. When the total derivative was taken, the tobacco share elasticity was very near zero when evaluated at the mean (about $-.03$). Thus, while of negligible magnitude, the impact of tobacco intensity on calorie consumption

shifts signs with income (Sahn and Shively 1991, 22). This significant but small adverse effect did not carry over into nutritional status differences: while per capita expenditures show the expected positive effects of additional income on child nutrition, no significant effect of cash cropping was found by Sahn and Shively (1991) in the height-for-age function. Consistent with findings from Kenya (chapter 16), decreased levels of stunting in female-headed households compared to male-headed households were found in separate model analyses for the two household categories (Kennedy and Peters 1992).

Conclusion: Policy Issues Relevant to Cash Cropping and Food Security

In a country as poor as Malawi, anything that promises an increase in income to people is welcomed. Hence, high-value crops such as tobacco are attractive. Income plays an important role in influencing household calorie consumption and preschooler nutrition in this poor area. Furthermore, if that income is earned through growing tobacco rather than through producing maize, adverse impacts are not found for nutrition, as pointed out on the basis of the Sahn and Shively (1991) analysis with the data set collected for this study.

This study revealed wide variability in income realized from dark-fired tobacco production. Farmers' strategies indicate their awareness of risk. Thus, while tobacco producers have more land available to them, on average, they, like nontobacco farmers, aim to produce a high share of their own maize needs, and they do not have a lower consumption subsistence ratio (the value of home-produced retained maize to total expenditures). To that extent, cash crop income is part of the strategy, not the whole strategy, for production and income.

The implications for food security are particularly critical in the promotion of cash cropping in a land-scarce area or for land-scarce households. Since the risk is higher for low-resource farmers, the attendant risks to cash crop production have to be taken seriously by policymakers and donors and not ascribed to "backwardness" or "tradition." The conditions governing the supply of necessary inputs (seeds and fertilizers), credit, and information, and those conditions controlling the collection and marketing of the crops are essential to lessening the risks for the small farmer.[5] Equally important is the supply of food available

5. A different issue, not considered here, is the protection of such high-value crops by governments regulating production and marketing. In Malawi, smallholders are barred from growing burley and flue-cured tobacco and have to register to grow the dark-fired, air, or sun-cured tobacco allowed them. Currently, production of burley tobacco is being opened up to smallholder farmers.

relatively secure, the canny farmer will not change the strategy of producing a high share of the family's food supply.[6] Where policy changes and "policy reform" are in full swing, as in Malawi and other countries in Africa, then it is doubly important to consider these conditions.

6. The liberalization of the maize market in 1987, which closed down many rural supply centers and opened the marketing of grain to an underdeveloped private trade, resulted in a four- to fivefold increase in the price of purchased maize in the following season. Although the conditions in 1988 and 1989 have prevented such a price increase, the farmers are doubtless reinforced in their reluctance to rely on purchased supplies of their basic food.