

5. INCOME SOURCES OF THE MALNOURISHED RURAL POOR IN A DROUGHT YEAR IN BURKINA FASO

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INTRODUCTION

This chapter discusses the income sources of the malnourished rural poor during the drought year of 1984/85 in Burkina Faso. First, the household characteristics of the malnourished versus adequately nourished groups are described. Then, the income sources of these groups are compared.

Reardon and Matlon (1989) examined the incidence of hunger in the Sahelian and Sudanian zones of Burkina Faso (using the same data base as is used for this paper) and showed that during 1984/85, following the Sahel drought, hunger was prevalent in the Sudanian zone (the Mossi Plateau), but was much less so in the Sahelian zone. They hypothesized that the difference was due to lower purchasing power in the Sudanian zone despite the latter's higher rainfall, and despite yields per person that are similar to those of the Sahelian zone.

Reardon, Matlon, and Delgado (1988) investigated the hypothesis of the Sudanian zone's having lower purchasing power, and whether it is linked to differences in the share of non-cropping income in total income across zones. They compared income sources between the Sahel and Sudanian samples, again for 1984/85, and found that the Sahel sample households had a much higher degree of income diversification (into non-cropping sources) than did the Sudanian households, as well as incomes about 25 percent higher, on average. When the drought brought a disastrous fall in the cereal harvest, the zone and households most dependent on agriculture were the most vulnerable, and hence the most affected. Less than a third of the Sahel zone's average household income was earned in own-cropping and agricultural labor; in the Sudanian sample households, the figure was near two-thirds. Given the extreme fluctuations in cropping outcomes over years, this meant that the Sudanian households were both hungrier on average, and more vulnerable.²¹

²¹ This had important food aid targeting consequences: the Sahel received much more food aid than the Sudanian zone during the drought because targeting was done on the basis of crop production outcomes. Consumption, however, was being driven by overall income (from all sources). More food aid should have also been targeted to the Sudanian zone; food aid targeting needed to take purchasing power much more explicitly into account. See Reardon and Matlon (1989).

Reardon and Delgado (1989) extended the above analysis to the third ICRISAT study zone, the Guinean zone, a higher agro-climatic potential zone in southwest Burkina Faso, and investigated the composition of income over all four study years (1981-85). It was found that, for the Guinean zone, diversification was as important as in the Sahelian zone, despite relatively good and consistent cropping outcomes.²² About one-half of total household incomes, on average over both good and poor harvest years during 1981-85, in the Sahelian, Sudanian, and Guinean zones, came from income sources other than cropping and livestock husbandry.

This chapter differentiates itself from prior work using the ICRISAT Burkina baseline data by stratifying the household sample by "degree of consumption adequacy" and then examining the income sources of the strata. The purpose is to see whether the more vulnerable and malnourished have a strikingly different composition of income, and what policy and research implications this might have.

The stratification is as follows: 1) "adequate": households above minimum consumption adequacy (2280 kcals/day average, per adult equivalent—AE); 2) "80 percent adequate": households within two deciles (in terms of consumption per AE) below minimum adequacy; 3) "below 80 percent" adequacy. The latter are the severely malnourished.²³

DATA AND ZONES

The data are drawn from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) cost-route farm household survey in Burkina Faso.²⁴ The data used here cover September 1984 through August 1985—that is, a harvest year following a poor harvest—very poor in the case of the northern two of the three zones. Focusing on a drought year allows us to see the poor at their most vulnerable, and the coping mechanisms that they employ.

The survey used a sample of 150 households, in six villages, in three zones: a) the Sahelian zone in the northwest (agro-climatically a very poor zone, with low rainfall, poor soils, and extremely variable cropping outcomes); b) the Sudanian zone in the Mossi Plateau (agro-climatically a poor to intermediate zone, with low-medium rainfall, poor

²² The ways in which income composition differed between drought and non-drought years are analyzed in an upcoming IFPRI research report (Reardon, Delgado, and Matlon, "Food Security and Income Strategies in Rural Burkina Faso: The Role of Coarse Grains").

²³ Household size and land size are closely correlated in these regions; that is, households appear to be able to adjust farm size easily as household size grows—the probable implication of this is that land is not a constraint. Hence land size was not used as a stratifier.

²⁴ For details on the survey, see Matlon (1988).

soils, and moderately variable cropping outcomes); c) the Guinean zone in the southwest (agro-climatically a moderately-favored zone, with medium to high rainfall, good soils, and relatively stable cropping outcomes).

Household income is income from all sectors, from home production, labor market participation, and transfers. The value of in-kind income (for example, from home production) was imputed using market prices. Consumption was measured by disappearance.²⁵

Characterizing the Malnourished Households

Table 44 presents household characteristics according to the "consumption adequacy" stratification. Here the strata are referred to as "low" (0-79 percent of adequacy), "medium" (80-99 percent of adequacy), and "adequate" (100 percent or more of adequacy). The same terms are employed in the tables.

In the Sahelian zone, cropping outcomes are positively related to the level of consumption adequacy; the adequate households have about twice the level of yields and production per person. It must be noted, however, that the range is still low, so that even though the adequate households produce more, they are still producing at low levels. They also have more land per person, and about twice the level of livestock holdings.

The average production sufficiency ratio—the portion of the year after harvest during which the household can be fed adequately solely from own production—is less than 100 percent for all the strata, meaning that all resort to purchases and food aid. Purchases are important for almost all households (Reardon, Delgado, and Matlon, 1987).

Technology (here, the presence of animal traction) is not very related to consumption adequacy, given poor cropping outcomes for all. The households of the hungry are relatively larger, with higher dependency ratios.

In the Sudanian zone, where hunger is much more prevalent, the inadequate and adequate households are not very different in terms of size and composition. There are no appreciable technology differences. Cropping outcomes are poorer for the inadequate households relative to the adequate, but the difference is smaller than in the Sahelian zone.

²⁵ The disappearance and direct consumption data were not significantly different for the two zones for 1984/85 for which both consumption recall data and consumption-derived-from-disappearance data were available—the Sahelian and Sudanian zones. The consumption recall data are not yet available for the Guinean zone. However, I believe that the closeness of the direct and disappearance estimates for this year for two of the three zones inspires a fair degree of confidence in the use of the disappearance data, and allows comparisons of all three zones.

Table 44--Strata characteristics of Burkina Faso sample, 1984/85

Region Consumption Adequacy	Households	Households Using Animal Fraction	Household Size ^a	Dependency Ratio ^b	Crop Value Per AE ^c	Livestock Value Per AE ^d	Land Per AE ^e	Production Sufficiency Ratio ^f	Yield Hectare ^g
		(percent)					(percent)		
Sahelian									
Low (CV)	10	21	.11 .72	.51 .25	4518 .62	21150 1.43	.84 .27	15 .62	5468 .61
Medium (CV)	7	3	.07 .42	.57 .29	9280 .80	31972 1.47	.77 .30	32 .81	12091 .72
Adequate (CV)	14	6	.08 .51	.40 .45	18627 .32	53971 1.29	1.22 .32	64 .33	16485 .43
Total (CV)	30	10	.09 .62	.48 .36	11368 .73	37039 1.45	.99 .37	39 .74	11349 .70
Sudanian									
Low (CV)	13	16	.11 .54	.57 .22	13613 .36	11383 .42	.56 .30	40 .39	24376 .24
Medium (CV)	14	10	.09 .56	.53 .18	20638 .42	30084 1.82	.74 .27	61 .48	27949 .33
Adequate (CV)	6	17	.10 .48	.52 .15	23253 .68	25068 1.42	.66 .23	71 .73	37570 .66
Total (CV)	34	14	.10 .53	.54 .19	18282 .54	21496 1.77	.65 .29	54 .59	28354 .47
Guinean									
Low (CV)	13	17	.15 .64	.56 .28	19998 .61	19462 1.98	.50 .55	59 .34	44333 .34
Medium (CV)	4	16	.11 .63	.61 .18	25970 .21	10507 .86	.61 .34	66 .25	44054 .20
Adequate (CV)	29	21	.11 .67	.44 .39	41516 .60	20970 1.82	.66 .47	130 .38	63598 .31
Total (CV)	46	19	.12 .66	.49 .35	32965 .68	19638 1.86	.60 .50	101 .52	55502 .36

^a Average size of household in unweighted persons.

^b Average percentage (over households) of children (less than 15 years) in total persons.

^c Harvest of all crops, evaluated at harvest-year average producer prices, per adult equivalent.

^d Livestock holdings, evaluated at harvest-year average sales prices, per adult equivalent.

^e Land cultivated in cropping season of calendar year 1984, average over households, per adult equivalent.

^f Production sufficiency ratio, averaged over households; the ratio is of the amount of calories represented by the grain and pulse harvest of the household to the amount of calories necessary to feed the household at 2,280 kcals per day per AE over the harvest year.

^g Same as crops per AE, but the deflator is now not AE but HA.

Again, production sufficiency ratios average less than 100 percent over all strata.

Livestock holdings are not appreciably different among the strata (compared to the strong differentiation in the Sahel). Because of overgrazing and disaccumulation of herds due to drought, cattle holdings are smaller in this zone than in the Sahel; cattle holding as an insurance mechanism also plays a smaller role. There was significant disinvestment of cattle in both the Sahelian and Sudanian households during the drought period (Christensen 1989).

In the Guinean zone, land holdings were not appreciably different among the strata, but yields and total harvests per person were. As in the Sudanian zone, livestock does not play a crucial role in differentiating the strata. In both of the "inadequate" strata, households are larger with higher dependency ratios as in the Sahel. Perhaps this implies that they are in an earlier stage in the Chayanovian life cycle. As in the Sahel, the majority of households are in the adequate stratum.

Income Sources of the Malnourished

Table 45 presents a breakdown by income source, and total income (per adult equivalent), using the same stratification.

In terms of the prevalence of inadequately nourished households in the total households in each zone, the Sahelian zone had 58 percent, the Sudanian had 80 percent, and the Guinean only 42 percent.

In the Sahelian zone, following the very poor harvest, those households with inadequate consumption had significantly lower incomes than those with adequate consumption. The share of cropping income in total income was actually higher for the adequate stratum, but the absolute level of non-cropping income was higher for this group.

In terms of the composition of income for the two inadequate strata, only about 11-22 percent came from cropping, and another 14-19 percent from livestock.

The most striking differences in income sources as between those with low levels of adequacy and the other groups were in the gathering and commerce sectors. The malnourished depended relatively more on the commons—gathering condiments/foodstuffs, wood, etc. The increasing degradation of the commons will thus especially hurt the malnourished. This coincides with the results concerning consumption composition reported in Reardon and Matlon (1989) that gathered food constituted about one-tenth of consumption of the poorest in the Sahelian zone during the same drought year—hence the products of the commons were their buffer for survival.

Table 45--Income sources by consumption adequacy stratum, Burkina Faso, 1984/85

Region	Consumption Adequacy	No. HHs	Crop Prod	Ag Wages	Lvstck	Trnspt	Cons	Comm	Cottage Manuf.	Gather	Srvce	Food Prep	Nonfcl Nonfrm	Food Aid	Intra Vill	Gf/Ai Inpts	Abroad	Total Income
Sahelian																		
Low		12	3348	1022	4247	24	298	3334	4897	2554	1827	593	5985	1056	940	42	1076	31439
(Percent)			11	3	14	0	1	11	16	8	6	2	19	3	3	0	3	
(CV)			.83	1.08	1.51	1.90	1.66	2.58	1.50	2.65	2.62	1.31	.98	.66	1.03	1.94	2.26	.49
Medium		6	7569	511	6668	390	34	0	4670	627	580	267	10584	2199	396	67	0	34562
(Percent)			22	1	19	1	0	0	14	2	2	1	31	6	1	0	0	
(CV)			1.01	1.90	1.32	2.20	1.59		1.59	3.20	2.35	1.92	1.26	.64	1.70	1.78		.29
Adequate		13	16535	2767	9652	0	95	184	5554	515	0	821	11094	1876	317	41	162	50540
(Percent)			33	5	19	0	0	0	11	1	0	2	22	4	1	0	0	
(CV)			.34	1.92	1.31		1.87	2.99	1.92	2.19		1.90	1.01	.62	2.26	1.58	6.77	.28
Total		31	9708	1668	6981	81	164	1388	5134	1337	824	630	8992	1613	577	47	492	40104
(Percent)			24	4	17	0	0	3	13	3	2	2	22	4	1	0	1	
(CV)			.81	2.16	1.42	4.60	2.09	3.97	1.68	3.28	3.75	1.80	1.10	.70	1.47	1.74	3.48	.41
Sudanian																		
Low		14	12221	76	1944	2	127	294	1256	219	548	1185	477	83	259	27	645	19444
(Percent)			63	0	10	0	1	2	6	1	3	6	2	0	1	0	3	
(CV)			.40	2.24	.95	5.64	1.13	3.39	.69	3.12	3.70	1.13	4.48	1.67	1.28	2.18	1.65	.31
Medium		14	17912	5515	2427	17	136	715	550	251	581	973	862	115	425	11	1104	31758
(Percent)			56	17	8	0	0	2	2	1	2	3	3	0	1	0	3	
(CV)			.52	2.09	1.10	3.46	1.73	2.66	1.23	2.16	2.60	1.24	1.77	1.15	1.58	2.89	1.94	.34
Adequate		7	21202	8627	1968	0	197	801	2341	0	0	1639	10633	112	160	90	873	48643
(Percent)			44	18	4	0	0	2	5	0	0	3	22	0	0	0	2	
(CV)			.75	1.36	1.04		1.45	2.94	1.56			.93	1.28	1.45	1.47	1.42	2.20	.34
Total		35	16230	3901	2141	7	144	560	1184	189	455	1188	2595	102	306	33	872	30008
(Percent)			54	13	7	0	0	2	4	1	2	4	9	0	1	0	3	
(CV)			.61	2.37	1.03	4.96	1.45	2.96	1.50	2.91	3.49	1.10	2.73	1.36	1.58	2.23	1.94	.50

(Continued)

Table 45--Income sources by consumption adequacy stratum, Burkina Faso, 1984/85 (continued)

Region	Consumption Adequacy	No. HHs	Crop Prod	Ag Wages	Lvstck	Trnspt	Cons	Comm	Cottage Manuf.	Gather	Srvce	Food Prep	Nonlcl Nonfrm	Food Aid	Intra Vill	Gf/Ai Inpts	Abroad	Total Income
Guinean																		
Low		15	15323	746	9586	1575	225	2604	4276	2145	2067	8098	1198	0	195	97	44	48181
(Percent)			32	2	20	3	0	5	9	4	4	17	2	0	0	0	0	
(CV)			.63	.77	1.83	3.04	2.00	1.27	1.80	1.34	1.50	.90	3.03		2.12	1.73	3.73	.71
Medium		4	15925	2259	2627	0	585	570	6648	858	0	3763	0	0	99	924	299	35739
(Percent)			45	6	7	0	2	2	19	2	0	11	0	0	0	3	1	
(CV)			.50	.89	.60		1.32	1.66	1.29	1.44		.29			2.04	1.89	1.64	.48
Adequate		26	31965	918	10457	0	26	5806	4071	912	4490	9655	3528	0	205	315	746	73528
(Percent)			43	1	14	0	0	8	6	1	6	13	5	0	0	0	1	
(CV)			.67	.87	1.62	4.58	3.00	2.23	2.28	1.18	3.80	2.04	2.30		1.75	3.41	2.40	.59
Total		45	25038	964	9548	537	138	4305	4342	1328	3313	8664	2458	0	193	288	472	61933
(Percent)			40	2	15	1	0	7	7	2	5	14	4	0	0	0	1	
(CV)			.76	.96	1.72	5.28	2.62	2.36	1.97	1.46	3.96	1.80	2.69		1.88	3.27	2.97	.66

Notes: Home production activities other than cropping are not evaluated.

The number of households per stratum differs slightly from the earlier table because some households had to be dropped because of missing data.

All levels are FDFA per adult equivalent over the year.

Crop Prod = Value (at average producer prices over harvest year) of the harvest of the household in calendar year 1984.

Ag Wages = Wages earned by household members working for other households, doing cropping work.

Lvstck = Net value of livestock sales and home consumption.

Trnspt = Net income earned in the transport sector.

Cons = Net income earned in construction.

Comm = Net income earned in commerce.

Cottag Manuf. = Net income earned in cottage production (of mats, etc.).

Gather = Net income earned by gathering and selling (for example, leaves or wood).

Srvce = Net income earned in the service sector (for example, braiding hair).

Food Prep = Net income earned making and selling prepared food.

Nonlcl Nonfrm = All migration income (sent back and brought back, in money and in kind).

Food Aid = Imputed value of all food aid received from NGOs, government).

Intra Vill = Intravillage gifts or interhousehold gifts within a village.

Gf/Ai Inpts = Gifts of aid received of inputs.

Abroad = Gifts received from non-household members living abroad.

Agricultural wages were not an important part of the malnourished households' income. In this zone the land holdings per person do not differ greatly, and the agricultural labor market is not well developed.

Interhousehold gifts ("intravillage"), despite conventional visions of a village welfare "net" in the Sahel, were a tiny part of total income; food aid was more important. Together these sources were only 5-7 percent of all groups' income. For the most malnourished, interhousehold gifts composed only 3 percent of income—which was greater than the share in the other strata, only 1 percent, but still very small. This coincided with responses received in my qualitative interviews in the villages in 1985. Respondents said that interhousehold gifts were "ritual", and not meant to redress critical problems of individual households. The latter were redressed by earning off-farm income.

Perhaps the most important policy result implied by the figures in the table is that despite income and consumption-adequacy differences, the share of food aid in total income was actually greater for the less hungry.²⁶ Food aid was not appropriately targeted at a household level—that is, it was not targeted by household purchasing power or other indicators, but was just targeted to the zone in general because of perceived production outcomes. Below we shall see that it was not targeted according to need at a household level.

Transfers received from abroad (usually from family members living on the coast) were most important for the malnourished—but still only 3 percent of income.

Migration income (nonlocal off-farm income) was important for the inadequate-consumption strata (19-31 percent). Cottage manufacturing and commerce are relatively more important for these groups, and these vary more directly than other sources with cropping outcomes.

In the Sudanian zone, the two inadequate strata relied greatly on agriculture; about 2/3 - 3/4 of their income came from cropping and local agricultural wages. Thus, these households were very vulnerable to vacillating cropping outcomes. An explanation of this reads as follows:

While cultural differences clearly exist between the two regions [Sahel and Sudanian zones], it is also clear that they alone cannot provide a satisfactory explanation [of the difference in degree of diversification]. Traditions presumably develop in response to specific physical, political and economic conditions....Yet these conditions change and insufficient adjustment time can be a key constraint to the modification of income strategies. Until relatively recently,

²⁶ This result is discussed in more detail in Reardon and Matlon, 1989.

crop farmers on the Mossi Plateau [Sudanian zone] had fared adequately by pursuing a production strategy based on the separation of livestock and crop management functions, whereby they could enjoy the benefits of cattle-based insurance mechanisms with low maintenance costs. Sufficient pasture away from the village and a subordinate pastoral ethnic group made this possible. Relatively rapid sociopolitical, demographic, resource base, and climatic changes have undermined this strategy. On the other hand, migration and the establishment of links with the regional nonagricultural economy also require investment of capital and time, and appear, at least to the present time, to have been largely neglected...Currently, the relative dearth of assets militates against the former and the rapidity of the alteration of the situation against the latter...Farmers in the Sahel, by contrast, have traditionally been exposed to severe production variability. The latter, combined with the cultural presence of pastoralism, led the sedentary agriculturalists to build up their asset or insurance base. At the same time they invested in links to sources of effective demand for their products and labor in the urban areas, abroad, and in other regions whose agricultural situations were not highly covariant with the Sahel. It appears that time, need, and relatively liquid stores of wealth may have combined to make practicable the sectoral and geographical diversification of their income strategy (Reardon, Matlon, and Delgado 1988, p. 1,072).

Moreover, the better nourished households had a much higher share of income from migration—which appears to be an important coping mechanism.

Finally, the share of food aid in total incomes of all strata was minuscule. Hence, despite the greater prevalence of hunger, food aid was not targeted to this zone because the targeting was done on the basis of crop production in that year, and not purchasing power—despite the latter being the important factor in maintaining consumption adequacy in poor years, as the table shows.²⁷ As in the case of the Sahelian zone, interhousehold gifts were only a tiny part of income.

In the Guinean zone, the incomes of the consumption-inadequate strata were not significantly less diversified than the adequate, but mean incomes were much lower. Reliance on food preparation (local beer, condiments) and migration, as well as livestock husbandry, were important for the inadequate group.

In this zone the proportion of households in the inadequate strata is much lower than in the other zones, as is the degree of income-structural differentiation among the strata.

²⁷ This argument is developed in more detail in Reardon and Matlon, 1989.

CONCLUSIONS

First, the incidence of malnourishment in the drought year 1984/85 was the highest in the zone which can be characterized as "intermediate" in agro-climatic terms. The poorest zone in agricultural terms had only an intermediate incidence of hunger—mainly because of the higher degree of diversification of household incomes, to compensate for poor cropping outcomes.

Second, the malnourished had lower overall incomes. Policies which raise overall incomes reduce hunger.

Third, interhousehold transfers/gifts played a very small role in the incomes of the malnourished. Perhaps the very existence of a sizable malnourished group in the Sahelian zone indicated that a "safety net" of shared welfare was not functioning. This is less the case in the Sudanian zone, where hunger was more widespread.

On the other hand, food aid was targeted to the zone (Sahelian) where the degree of purchasing power from diversified sources was higher, hence the incidence of hunger was lower. The Sudanian zone, which had higher per hectare crop output, had similar per person crop output to that of the Sahelian zone, but less diversified incomes. Hence, they were more vulnerable to cropping outcomes.

The upshot is that food aid needs to be targeted according to the variables that determine the existence of hunger—and if hunger is not tied only to cropping outcomes, but rather to other variables such as the asset base and the level of purchasing power, then targeting needs to take into account the latter. Moreover, the interhousehold welfare net did not appear to be significant, at least in this case, and should not be assumed by policymakers to be functioning as an alternative to external food aid, or diversified incomes to compensate harvest fluctuations.

The malnourished are dependent on local off-farm work opportunities—the role of the latter is not very different than it is in the case of the well-nourished, although they have not usually been as successful at taking advantage of these opportunities. It appears that the development of these would create the purchasing power necessary to alleviate hunger in drought years.