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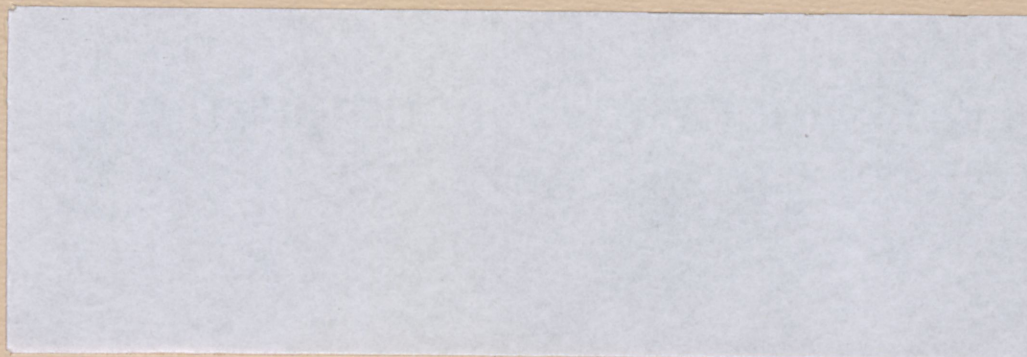
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**AGRICULTURAL DEVELOPMENT SYSTEMS
EGYPT PROJECT**

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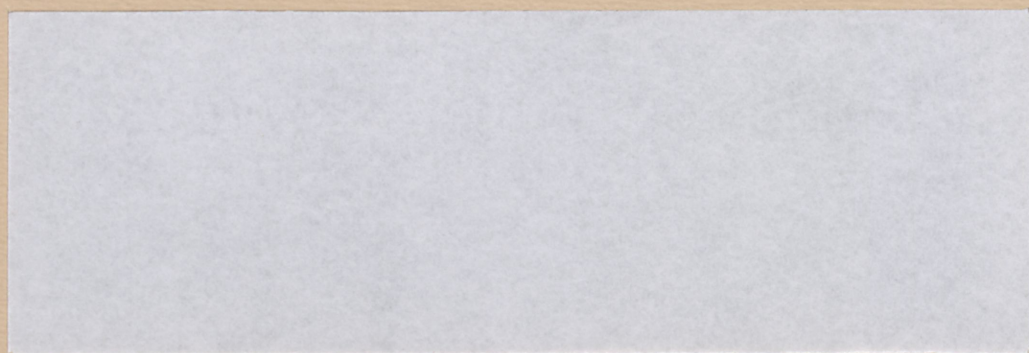


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ECONOMIC
WORKING PAPER

US / EGYPT 



MAJOR FEATURES OF THE FOOD PROBLEM IN EGYPT:
AN OVERVIEW OF INFLUENTIAL FACTORS AND MEASURES OF TREATMENT

by

Amin I. Abdou

**TWO PAPERS ON CONSUMPTION AND NUTRITION
IN RURAL EGYPT**

by

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Assistance from the Agricultural Development Systems Project of the University of California, Egyptian Ministry of Agriculture, and USAID, is gratefully acknowledged, but the author is solely responsible for the views expressed in this paper.

Economics
Working Paper Series
No. 79

Note: The Research Reports of the Agricultural Development Systems: Egypt Project, University of California, Davis, are preliminary materials circulated to invite discussion and critical comment. These papers may be freely circulated but to protect their tentative character, they are not to be quoted without the permission of the author(s).

June, 1982

**Agricultural Development Systems:
Egypt Project
University of California
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Major Features of the Food Problem in Egypt:
An Overview of Influential Factors and Measures of Treatment

Nature and Scope of the Food Problem:

Although average per capita consumption of cereals, and hence caloric and total protein intakes among the Egyptian population are generally reasonably sufficient, the costs of providing these intakes are very high. Imports of wheat and wheat flour in particular are at a relatively high level and increasing. They will reach 5.3 million metric tons in 1988, which is almost 2.5 times the tonnage imported in 1970 (Ross et al., 1979). Additionally, imports of maize which were nil up to 1970, reached 800,000 metric tons in 1978, and animal product imports increased by 50 percent over the same period. On the other hand, exports of rice dropped to 100,000 metric tons, from more than double that figure two years earlier. Citrus exports also fell from 200,000 metric tons in 1970 to 130,000 metric tons in 1978. These shifts have led to a fast growing deficit in the balance of trade.

Despite the rapidly growing volume of wheat and maize imports, the average Egyptian diet (not even that of the lowest income groups) is nutritionally below requirements. It is unbalanced, short of protective foods containing high quality protein, and poor in mineral and vitamin content (Shalabi, 1972). Compared to the best diet, the poor Egyptian's diet consists of double the amount of bread, half that of meat, fats and dairy products and a quarter of that of fruit (Abd El-Salam, 1956).

The problem is more critical in rural areas despite the relatively high proportion of income spent on food (reaching 55 percent in 1974), food price subsidies and the quantity of nonpurchased foods consumed (The National Bank Report, 1978). Village surveys have revealed low consumption levels for legumes, animal products and fruit, especially for the poor villagers

(Abdou, I., et al., 1965). About 83 percent of the rural landholders had a relatively low intake of animal protein since average per capita consumption of meat was less than 12 percent of the American level and dairy products consumption (milk equivalent) was less than 18 percent of the Dutch level (Goueli, et al.). Average deficiencies existed along side a strongly apparent maldistribution. Whereas, no less than 16 percent of landholders' family members suffered from inadequate caloric intake, about 10 percent overconsumed, some consuming almost 360 percent of their caloric requirements (Goueli, et al.). The consumption gap between the high income classes and the lowest income classes (mainly the landless) in rural areas was found to be extremely wide (Abdou, A., et al., 1980).

It would seem, in view of the relatively high level of grain imports, that malnutrition is, most likely, caused by maldistribution rather than by a shortage in aggregate supply (Waterbury, 1974; Pinstруп-Anderson, 1976; Selowsky, 1979). On the other hand, a shortage in aggregate supply can be regarded as the major cause of the low animal protein intake.

Factors Influencing Food Consumption:

Consumption surveys reveal the positive impact of income upon consumption patterns. It was found that length of pay periods inversely affects food consumption (West et al., 1976). The income effect may be suppressed by the existence of nonpurchased foods and/or exclusion of very low income classes from study samples (Ibid.). Size of landholdings and production patterns also influence consumption because of consumption from producers' own crop or animal products, affecting the consumption of cereals and dairy products in particular (Goueli, et al.). Food consumption responds inversely to price changes (Timmer, et al., 1979). Social factors also influence consumption

patterns. The negative impact of the size of households on per capita share of consumption and immigration to urban districts affecting consumption patterns in favor of semi-luxury foods have been noted (Salathe, 1979). Level of education is another factor that affects both the level of and pattern of food consumption.

Measures of Treatment for the Food Problem:

Readjustment and Development of Agricultural Production:

It is generally believed that an integrated plan for the development of agricultural production is required to meet the food crisis (Marie, 1976; Bakr, 1978; Dawood, 1979).

Second, the deficit of 3 million metric tons of concentrated feeds can be met by increasing the production of maize interplanted with soybeans and specifying the area of the latter (about 140,000 feddans) relative to other fodder. Third, the 300,000 feddans developed at Lake Nasser, if devoted to fodder, may be sufficient to produce 360,000 metric tons of meat (Radwan, 1980). Fourth, the total sacrifice of the cotton area to corn and rice (1.7 million feddans) may raise corn and rice production by 1.9 and 1.8 million metric tons, respectively (West, et al., 1976). Fifth, introduction of agricultural and industry by-products (such as rice straw, bran, flax, etc.) into animal feed may be an effective means of treatment for the animal production problem (Mekki, 1979).

Credit and Input Subsidies:

Increasing credit to farmers and input subsidies were found to be the most cost-effective measures for the improvement of nutritional status for poor Mexican farmers, who are in conditions similar--to a great extent--to those of Egyptian poor fellahin (Benito, 1979). Moreover, providing aid to

small farmers for animal production is expected to improve their animal product consumption levels and solve the problem of the deficiency of high quality protein intake (Goueli, et al.,).

Income and Price Readjustments:

Income redistribution in favor of the poor is considered an effective means for general elevation of nutritional status (Waterbury, 1974; Pinstруп-Anderson, 1976; Selowsky, 1979). Such action may result in low-income persons modifying their diets so that they are of higher nutritive value and similar to those of higher income classes (Boehm, 1974). Conversely, it was recommended that prices of high quality foods be raised, favoring producers, while keeping staple necessary foods, as the main suppliers of the calories and protein, at low prices (Timmer, et al., 1979).

In addition, economic analysis has shown that food stamp programs (with no resale of stamps) are more cost-effective than cash-transfer programs, group-oriented site-feeding programs or food price subsidies in increasing food consumption (Selowsky, 1979, Alter and Lane, 1980).

Food Enrichment and Cheap Food Mixtures:

On the basis of international prices it was concluded that the cheapest means of meeting protein requirements was a mixture of legumes, rice and bread (Abdou, A., 1980). Additionally, wheat flour enrichment with iron, calcium, and dried fish protein has been considered to be one of the effective methods of overcoming deficiencies in the Egyptian diet (Dakruri, 1975).

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**SOURCES OF FOOD SUPPLY AND
CONSUMPTION PATTERNS IN RURAL AREAS**

by

Amin I. Abdou

Sources of Food Supply and Consumption Patterns in Rural Areas

ABSTRACT

Economic factors influencing food demand, mainly prices and income, were less effective than patterns and magnitude of production in affecting levels of consumption in rural areas. Patterns of production, although leading to intraregional variations, acted in combination with food rations, to effect a great deal of equity among households of landholders with different farm sizes. On the other hand, most of the consumers of animal products were producers relying on their own production. Consequently, encouragement of animal production by all possible means may be an effective measure for the improvement of animal protein intake in rural areas.

Introduction

Food to meet the requirements of the rural population is obtained from different sources. In addition to purchases from the local markets, there are rationed products from government stores and products produced on households' owned or leased land. Food consumption patterns are expected to reflect the different characteristics of the variant food sources.

The market in Egypt is characterized by subsidized prices for some of the most necessary food items in short supply, and free prices determined by the forces of demand and supply for others. Food rationing involves highly subsidized prices and fixed quotas. On the other hand, consumption of self-produced farm foods involves only production and home processing costs, at most. Hence, farm produced foods are expected to be cheaper than purchased foods, unless the latter are highly subsidized. Consumption of their own produce is commonly practiced among Egyptian fellahin, especially small

landholders who are producing principally for subsistence. Consequently, consumption of products produced on their own farms was expected to reflect the prevailing cropping patterns in different agronomic zones.

This study is concerned with the impact of various food sources, among other influential factors, in determining prevailing food consumption levels and patterns. The relevant data base consists of different foods consumed in August and October 1981 by selected households surveyed in ten Egyptian villages.

Consumption of the Farmers Own Produce and Production Patterns

As shown in Table 1, relatively high consumption levels were, on average, observed for major foods produced in the different agronomic zones. The following item-wise presentation details the findings.

Rice

On average, per capita consumption of rice reached 10 kg/month where consumption from farmers' own production comprised about 93 percent of total rice consumption in village 1-4 in the rice zone. The corresponding estimates were about 9 kg/month in village 1-3 which relied entirely on farm production. Despite the relatively low per capita consumption level for village 1-2, monthly comparisons showed that per capita consumption in August (1.5 kg) was a third of that in October (4.5 kg) as the consumption from their own crop percentage rose from nil to about 91 percent. Similarly, per capita consumption in village 3-1 in the vegetable zone doubled in October as consumption from villagers' own crops increased from 17 percent to 72 percent, on average. Such results also reflect the production pattern's impact. On the other hand, abundant supply in local markets, mostly due to prevalent

production sharing on more than 54 percent of total cultivated land in village 1-6, may explain the high per capita consumption despite the relatively low percentage consumed from villagers own crops. Additionally, comparison with villages in Upper-Egypt (4-9 and 5-10) where rice production is nonexistent, as shown in Table 1, reveals the wide differences in per capita consumption and emphasizes the effect of production patterns.

Wheat

Wheat has been released from compulsory delivery in the last few years and the entire yield is freely marketed. In addition, wheat straw and even wheat grain is being widely introduced into animal feed. Therefore, farmers exhibit a growing tendency toward selling their entire production and purchasing their bread and flour requirements at subsidized prices. To cite empirical evidence, the percentage of consumption from the villagers' own crops in village 2-5 was about 8 percent in August 1981, whereas it was found to have been 75 percent in a survey undertaken in 1977. In view of these factors, wheat production appeared to have no apparent influence on consumption levels.

Maize

As is apparent from Table 1, the highest per capita consumption levels were found in villages 2-5, 3-7, 3-8, and 4-9, where averages were not less than 6 kg per month. The very same villages were distinguished by the highest proportion of land devoted to maize production. On the contrary, the lowest average per capita consumption was found in village 1-1 which also was characterized by the lowest proportion of land devoted to maize; and the highest consumption levels in the rice zone were in villages 1-3 and 1-4 where

consumption from the villagers' own crops virtually accounted for total consumption. Per capita consumption in village 4-9, on average, was found to have increased from about 9.1 kg/month in August to about 16.2 kg/month in October as reliance on the villagers' own production rose from 27 percent to 83 percent.

Vegetables

Comparison among agronomic zones revealed the superiority of the vegetable and fruit zone, zone 3, on average, in regard to per capita consumption of summer and nili vegetables. Per capita consumption was 6.1 kg/month for zone 3 as opposed to 4.0 kg/month for the others. On the other hand, village 1-2 was characterized by relatively high consumption of vegetables compared to other villages in zone 1, as opposed to village 2-6, where vegetable consumption was almost nil during the two months of the study. These findings may be due to the relatively high percentage of the total cropped area devoted to vegetables in the first village, and the almost nonexistent percentage in the other. The relatively sizable production of such perishable foods would doubtlessly enrich the local village market lowering prices and encouraging high consumption despite total reliance on the market, the case in village 1-2.

Additionally, per capita consumption of broad beans exceeded 1.1 kg/month in village 1-2 where consumption from the villagers' own crop percentage reached 71 percent, while the general average for all villages was about 0.57 kg/month with only 11 percent consumed from villagers' own crops.

Dairy Products

The highest percentage of consumption of the farmers' own products has always been that of dairy products. In this data set it accounted for 86 percent for whole milk and 66 percent for Kareesh cheese. Production has been a major factor influencing level of consumption. Comparing the consumption level in village 1-1 where total reliance on the market was the case, with that of other surveyed villages emphasizes this argument. Per capita consumption of milk, as shown in Table 1 in village 1-1 was about one-fourth the overall average for the villages surveyed, and per capita consumption of Kareesh was about 59 percent.

Except for village 5-10, only slight differences in the stock of livestock assets were apparent among the surveyed villages, on average, and hence the impact of the size of the stock of livestock assets seemed to be almost nonexistent. Additionally, most of the surveyed farms were small and hence sold most of their produce. Consequently, consumption from their own farm products was only a very small portion of total production, and hence differences were almost negligible. Parenthetically producing milk and not having to rely on the market has apparently worked against the poor food habit, generally prevalent in Egypt, of reluctantly consuming dairy products in the form of milk.

Poultry and Eggs

As shown in Table 1, about 57 percent of total poultry consumption was supplied from farm production, and average per capita consumption was about 0.58 kg/month which was almost double the corresponding national figure (1977). Similarly, egg consumption from villagers' own production was almost 64 percent of total consumption, and per capita consumption was around

0.23 kg/month versus 0.13 kg/month at the national level (1977). Accordingly, one might conclude that reliance on products from villagers' own farms up to some level positively affects consumption levels. However, exceptional cases may exist such as that of village 2-5 where per capita consumption of poultry was the highest and the consumption from their own flocks' share the lowest.

Comparison between average per capita consumption of poultry and eggs for village 1-2 and corresponding estimates for other surveyed villages reveals the impact of the size of the poultry operation, providing there is a high degree of reliance on farm production. For example, per capita consumption of both poultry meat and eggs in village 1-2 was about four times the corresponding estimate for village 1-4 where the per capita share of poultry raising was one-seventh the level for the first village.

Arguments might be raised regarding the village averages of livestock assets being indirect indicators of the magnitude of supply in local markets, influencing purchases through the market mechanism. However, combining both concepts--livestock assets and the consumption from the farmers' own production percentages--may emphasize the influence of farm produced animal products upon consumption levels.

Food Sources and Farm Size Impact

The data indicated a higher degree of dependence on farm production on the part of larger landholding classes in general. The highest proportion of interviewed households relying on markets, partially or entirely, were those of small landholders. An explanation may invoke the tendency of small farmers to sell most of their production, if not all, and to purchase their limited requirements. On the other hand, holders of larger farms are in better economic circumstances enabling them to keep a considerable amount of their

production for consumption, especially their animal products. On the whole, observations of per capita consumption were fairly consistent. This may be the result of the impact of off-farm income earned by some of the interviewed small producers.

In general, as shown in Table 2, reliance on farm produced foods, especially vegetables, was found to curb consumption level variability among farm size classes. This is because small, as well as large, producers do not bear direct costs when consuming their own-produced foods. However, some cases revealed substantial variability in per capita consumption of animal products correlated with equal variability in holdings of livestock assets.

Food rationing, especially for sugar and vegetable oil, tends to enforce a great deal of equity among different farm size classes. Accordingly, quantities consumed of rationed items characterized by the highest degree of consistency among all food items.

Detailed discussion of different basic foods may shed more light on the argument presented previously.

Rice

It may be assumed that small producers sell their entire rice production and purchase their consumption needs at subsidized prices, while large producers make use of the village facility to grind their rice before selling some and keeping a considerable portion for home consumption. That might explain the low consumption from their own production percentage for holders of less than one feddan (46 percent) in village 1-2, while the corresponding estimate for holders of 4-5 feddans was as much as 100 percent and per capita consumption was almost double that of villages in 1-2. For other villages where a high percentage of consumption from the farmer's own produce or animal

products occurred on the part of small landholders as well, differences were insignificant, even at times contradicting economic logic.

Maize

Data showed that consumption of maize is also characterized by a pattern of higher reliance on farm production for relatively large landholders. Since it is a cereal product, a low income elasticity of demand was expected for maize, and since farm size may be regarded as an indicator of income, variation in consumption levels between different farm size classes was expected to be slight. Moreover, dependence on farm production, as indicated in Table 2, seemed to strengthen the tendency toward consistency among the different farm size classes.

Vegetables and Fruits

As in the case of maize, only slight or moderate variations in consumption levels of fruit and vegetables were apparent in the vegetable zone, (zone 3). An analogous conclusion holds for village 4-9 in Upper-Egypt despite the generally low consumption level in that village.

Dairy Products

The impact of farm production was clearly revealed in the case of dairy products. There were drastic variations in milk consumption between the very few households depending on markets, as shown in Table 2, and insignificant differences among the largest proportion relying on farm production. Exceptions were detected for cases where wide variations in livestock asset holdings led to equal variations in quantities consumed. Examples of these cases are provided by observations in villages 2-5 and 2-6 where the per capita share of livestock assets for holders of more than five feddans was

almost three times the corresponding estimate for holders of less than one feddan and the farmer's per capita consumption of milk was almost double. On the other hand, the consumption level of Kareesh, a principal food in rural areas, was highly consistent among different farm size classes, Kareesh was farm produced in most cases.

Poultry

Considerable differences in consumption levels among landholding classes were detected for the very few poultry consumers depending on markets, a result possibly explained by differences in purchasing power. A completely different situation prevailed for poultry producers as a whole. Consumption level variations were negligible since scales of poultry raising were, on average, almost the same. However, a relatively wide dispersion occurred within classes of small landholders, strongly related to an equal dispersion in scales of poultry raising, especially in village 1-3.

Egg consumption was also characterized by substantial differences for those relying on markets. However, despite the differences in scales of poultry raising only insignificant variations in consumption levels were observed, which might have been the result of the generally low level of consumption.

Rationing Impact

As mentioned previously, food rationing represents the major factor offsetting the impact of other factors leading to variability in consumption levels among different income classes, or landholding classes, since landholdings are a proxy for income. Accordingly, consumption levels of vegetable oils, tea, and sugar, all subject to food rationing, were

characterized by the highest degree of similarity among all the sample observations. Other foods of minor importance in food rationing like broad beans and lentils, logically showed a higher degree of variability. Such results may be deduced from Table 3 through estimation of variance coefficients ($sd/x \times 100$), which were apparently inversely correlated with the percentage share of rations in total consumption of certain foods. As an example, the highest variance coefficient for cottonseed oil consumption reached 50 percent for village 2-5 in August, where the share of rations was at a minimum (31.0 percent), while the variance coefficient reached 280 percent for lentil consumption in village 3-7 in August, when the share of rations dropped to nil.

Summary and Conclusions

Consumption patterns in different regions of Egypt, which are predominantly rural, are heterogeneous. Food patterns and habits differ from one region to another and are mainly associated with availability which is mainly determined by production patterns. Accordingly, delineating food problems and pinpointing shortages should be based on intra- and interregional investigations considering the existent heterogeneity.

It was also found that economic factors underlying demand, mainly prices and income, are not the most dominating determinants of consumption levels in rural areas. Patterns and magnitude of production are often more influential. The proportion of villagers' own products consumed have, in fact, noticeably diminished in the last few years for some products subject to price subsidies. Farmers purchase their requirements and devote larger portions of their produce to the feeding of animals. Nevertheless, farm produced food, although leading to intraregional variations in consumption levels in combination with

food rationing, makes for a great deal of equity among landholders with different farm sizes. This situation is different from that prevailing in urban areas when the differences in quantities of various foods consumed between the lower and upper income classes is wide.

It appears that even though farmers producing animal products have a high propensity to sell most of their production and keep little for their own consumption, they constitute the majority of animal products' consumers. Nonproducers hardly consume any quantities of such products. In view of these findings, it may be concluded that an increase in consumption levels of foods of animal origin in rural regions, and hence, the alleviation of the shortfall in the per capita intake of high quality protein, can be achieved through encouragement of livestock production using methods such as extending credit to small producers, and, most of all, devoting more effort to effectively allaying the animal feed shortage crisis.

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SOURCES OF FOOD SUPPLY AND
CONSUMPTION PATTERNS IN RURAL AREAS

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Table 1. Per Capita Consumption of Some Major Foods Related to Cropping Patterns and Livestock Holdings 1980-81 (kg/month)

Slage No.	Rice			Maize (Flour)			Summer and Mill Vegetables			Milk		Kareeah		Per Capita Share of Cattle and Buffaloes (head)	Poultry		Eggs		Per Capita Share of Poultry Raising
	Per Capita	Auto- Consumed	Total Cultivated Area	Per Capita	Auto- Consumed	Total Cultivated Area	Per Capita	Auto- Consumed	Total Cultivated Area	Per Capita	Auto- Consumed	Per Capita	Auto- Consumed		Per Capita	Auto- Consumed	Per Capita	Auto- Consumed	
		percent			percent			percent			percent		percent			percent		percent	
1-1	9.6	15.8	34.4	0.9	6.7	2.0	5.4	5.3	2.0	0.2	0	0.4	0	0.19	0.7	24.2	0.1	31.4	0.8
1-2	3.0	68.0	47.5	2.4	87.8	27.9	8.2	0	17.2	0.6	100.0	1.4	100.0	0.22	0.8	85.6	0.4	80.8	7.7
1-3	9.1	100.0	38.5	5.2	100.0	29.7	4.4	15.6	1.1	0.4	91.2	0.5	91.2	0.21	0.4	78.0	0.2	76.2	1.6
1-4	10.1	93.3	54.5	6.1	91.5	18.0	4.7	10.8	0.5	0.2	100.0	0.3	92.9	0.27	0.2	95.4	0.1	91.1	1.1
2-5	2.4	0	0	8.3	92.5	60.9	2.7	31.5	10.2	1.6	92.7	1.9	63.0	0.27	1.2	9.7	0.3	43.6	—
2-6	1.6	56.9	37.0	3.6	33.0	32.7	0	0	0.7	0.1	78.6	0.7	65.5	0.30	0.4	98.3	0.4	88.4	2.5
3-7	2.1	53.1	12.4	8.3	28.8	68.8	7.3	12.1	7.5	0.4	100.0	0.4	100.0	0.18	0.8	95.0	0.2	87.0	2.6
3-8	2.6	0	0	6.1	82.5	100.0	5.4	37.8	42.7	2.1	82.5	0.7	49.0	0.13	0.7	43.0	0.4	26.0	—
4-9	1.0	0	0	12.9	62.3	69.5	0.7	49.6	10.4	1.0	99.5	1.0	63.7	0.20	0.6	49.4	0.2	70.6	1.6
5-10	0.4	0	0	0	0	25.0	0.5	4.0	5.6	1.3	95.1	0.6	77.5	1.70	0.4	74.2	0.2	90.4	0.0
average	4.5	33.0	31.1	5.7	62.5	37.5	4.5	12.0	8.6	0.8	96.4	0.7	66.3	0.21	0.6	56.8	0.23	63.9	1.8

— missing information.

Table 2. Per Capita Consumption of Some Major Foods Related to Supply Sources (kg/month)*

Village No.	Farm Size (fed.)	Rice			Maize		Milk (whole)			Poultry		
		Produced	Mixed	Market	Produced	Market	Produced	Mixed	Market	Produced	Mixed	Market
1-1	<2	--**	--	7.9	--	0.5	--	--	--	0.7	--	0.4
	4<	11.7	--	10.6	--	1.1	--	--	--	0.7	1.0	0.7
1-2	<2	3.1	5.0	1.4	5.1	0.8	0.5	--	--	0.4	--	0.4
	4<	3.5	--	--	6.6	0	0.6	--	--	1.0	--	0.8
1-3	<2	15.9	--	--	5.0	--	0.4	--	0.2	0.4	--	0.2
	4<	9.2	--	--	5.3	--	0.4	0.1	--	0.4	0.7	0.1
1-4	<2	9.4	8.5	8.3	5.3	4.6	0.6	--	0	0.3	--	0.1
	4<	10.8	--	--	6.5	--	0.4	--	0	0.3	--	0
2-5	<2	--	--	2.4	9.4	6.2	2.0	--	0.3	--	1.8	1.1
	4<	--	--	2.8	7.3	0	3.3	--	4.0	2.0	--	0.9
2-6	<2	1.8	2.5	1.5	2.7	3.3	0.3	--	0.04	0.6	--	0.1
	4<	1.8	--	8.0	3.6	2.7	0.6	--	0.04	0.0	--	--
3-7	<2	3.0	--	1.78	6.3	7.9	3.0	--	0	0.0	--	1.1
	4-5	2.7	--	1.4	6.0	10.0	0.6	--	--	0.9	--	--
3-8	<2	--	--	2.4	6.1	0.6	3.8	--	0.3	1.1	0.9	0.6
	4<	--	--	3.2	8.5	8.0	4.1	2.3	1.6	0.4	1.7	1.3
4-9	<2	--	--	0.9	19.3	9.9	2.0	--	0	0.4	0.8	0.5
	4<	--	--	1.0	14.4	11.0	2.0	--	--	0.4	0.6	0.6
5-10	<2	--	--	0.4	--	--	1.7	--	0.1	0.5	--	0.1
	4<	--	--	0.5	--	--	1.2	--	1.0	0.5	--	0.4

*Average for two months (August ^{and} to October).

**No observations fall in category.

Table 3. Per Capital Consumption of Major Rationed Items Related to Rationed Proportions (kg/month)

Village No.	Month	Sugar			Tea			Cottonseed Oil			Broad Bean			Lentils		
		\bar{X}	Sd	Rations Percent	\bar{X}	Sd	Rations Percent	\bar{X}	Sd	Rations Percent	\bar{X}	Sd	Rations Percent	\bar{X}	Sd	Rations Percent
1-1	Aug.	1.9	.30	39.6	.10	.02	39.6	.57	.17	36.5	1.3	.67	0	.39	.36	0
	Oct.	2.0	.36	38.5	.10	.02	47.0	.55	.20	34.4	1.1	.49	0	.38	.23	0
1-2	Aug.	1.2	.04	62.8	.13	.04	63.0	.30	0	100.0	0	0	0	.16	.10	51.
	Oct.	1.8	.30	42.1	.21	.05	38.4	.30	0	100.0	0	0	0	0	0	0
1-3	Aug.	1.5	.08	100.0	.08	0	100.0	.33	.13	74.9	.13	.23	27.7	.35	.16	33.
	Oct.	1.6	.12	96.1	.08	.02	66.8	.49	.09	59.9	.09	.12	33.7	.32	.11	36.
1-4	Aug.	1.5	.10	97.9	.08	0	100.0	.30	0	100.0	0	.16	36.9	.34	.18	41.7
	Oct.	1.5	0	100.0	.08	0	100.0	.30	0	100.0	0	.17	36.3	.32	.11	53.3
2-5	Aug.	1.8	.85	40.5	.16	.15	23.8	.46	.23	31.0	.23	.31	0	.24	.26	0
	Oct.	2.1	1.81	69.8	.11	.09	66.7	.52	.38	54.0	.38	.53	30.5	.24	.26	27.3
2-6	Aug.	1.9	.35	40.5	.10	.02	40.2	.32	.23	46.3	.12	.15	27.7	.16	.10	0
	Oct.	1.6	.15	49.2	.06	.01	68.1	.24	.08	63.5	.08	.12	0	.14	.07	0
3-7	Aug.	1.7	.30	43.3	.18	.04	42.6	.35	.08	86.5	.08	.41	0	.05	.14	0
	Oct.	1.7	.35	44.5	.28	.08	28.9	.30	.05	100.0	.05	.25	0	.60	.13	16.5
3-8	Aug.	1.8	.99	49.7	.08	.01	98.0	.63	.36	61.4	.36	.30	2.8	.38	.65	3.1
	Oct.	1.6	.59	51.9	.07	.02	100.0	.43	.16	68.4	.16	.17	0	.31	.22	0
4-9	Aug.	2.3	.62	68.3	.10	.02	89.7	.34	.12	89.5	.12	.35	25.5	.28	.23	44.
	Oct.	2.2	.50	65.5	.10	.03	82.3	.35	.17	87.0	.17	.32	31.5	.35	.18	40.8
5-10	Aug.	1.5	.43	46.2	.08	.03	76.2	.31	.12	43.6	.12	.78	0	.21	.35	18.2
	Oct.	1.8	.68	73.4	.10	.05	71.8	.34	.16	76.9	.16	.44	0	.27	.24	46.4

