

PN - AAV - 024

45226

EGYPT: IMPLICATIONS OF ALTERNATIVE FOOD SUBSIDY POLICIES
IN THE 1980s

by

Harold H. Alderman

and

Joachim von Braun

International Food Policy Research Institute
1776 Massachusetts Avenue N.W.
Washington, D.C.

April 1985

Final Report to the Ford Foundation, Office of Regional Representative
for Middle East and North Africa, Cairo, on the project, "The Develop-
ment and Application of an Analytical Framework to Evaluate Impacts of
Alternative Food Subsidy Policies in Egypt."

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
FRAMEWORK OF THE EVALUATION OF ALTERNATIVE FOOD SUBSIDY POLICIES	5
APPROACH AND FRAMEWORK OF ANALYSIS	9
Overview	9
Specifying Policy Options	9
The Demand Module	11
Consumption, Nutrition, and Income Effects	12
Import Requirements, Fiscal Effects, Foreign Exchange, and Inflationary Effects	13
Specific Assumptions and Projections	14
Demand Parameters Used and Their Application	14
Assumptions on Population Growth and Urbanization	19
Assumptions on Domestic Food Production and Procurement	19
Food Subsidy Budget and Assumptions About the Overall Fiscal Deficit	20
Accounting for Effects on the Exchange Rate	22
Effects of Food Subsidies on Inflation: Assumptions and Computations	23
ALTERNATIVE FOOD SUBSIDY POLICIES	25
Description of the Scenarios	25
Implications of Alternative Food Subsidy Policies	29
Effects on the Subsidy Budget	29
Effects on the Deficit and Inflation	30
Effects on Foreign Exchange	32
Effects on National Food Consumption and Imports	33
Effects on Industrial Output and Investment	37
Income Distribution Effects	39
Nutritional Impact	45
Effect of Changes on the Impact of Subsidy Policies When Income Growth Slows Down	48
SUMMARY OF POLICY CHOICES	51
REFERENCES	57

FIGURE

Figure 1 -- Framework of Analysis for Alternative Options of Food Subsidy Policies	10
---	----

TABLE OF CONTENTS
(Continued)

	<u>Page</u>
TABLES	
Table 1 -- Demand Parameters Used in the Framework	15
Table 2 -- Assumptions About Domestic Food Production	21
Table 3 -- Main Features of Scenarios	26
Table 4 -- Scenario Analyses for Food Subsidy Policies: Fiscal and Macro Effects	31
Table 5 -- Scenario Analyses for Food Subsidy Policies: Effects, for National Level Food Consumption and Trade	35
Table 6 -- Effects of Changes in Food Subsidy Policies for Availability of Foreign Exchange, Industrial Investment, and Output	38
Table 7 -- Some Indicators of Distribution in Alternative Scenarios	40

INTRODUCTION

The Egyptian food subsidy system affects all elements of the society, both through its influence on consumption patterns and through its interrelationship to the macro-economy. Some impacts are quite visible, while other relationships are best elucidated with sophisticated analytical tools. Understanding a wide range of such relationships is desirable in order to fully appreciate the tradeoffs between the welfare gains attributable to the subsidy system and its economic costs. With such information, planners can effectively consider options which maintain the maximum amount of benefits within the framework of other policy goals.

A first step toward this process involves gathering relevant data and modelling the role of various food policies on consumer behavior and in agricultural production, as well as analyzing their impacts on foreign trade and other macro-economic indicators. Such a series of investigations has recently been undertaken by the International Food Policy Research Institute in cooperation with the Egyptian Institute of National Planning and the Ministries of Planning, Economy, Agriculture and Supply, and Home Trade.¹ These studies were coor-

¹ Alderman, Harold; Joachim von Braun; and Sakr Ahmed Sakr, Egypt's Food Subsidy and Rationing System: A Description, Research Report 34 (Washington, D.C.: International Food Policy Research Institute, October 1982); Scobie, Grant M., Food Subsidies in Egypt: Their Impact on Foreign Exchange and Trade, Research Report 40 (Washington, D.C.: IFPRI, August 1983); von Braun, Joachim and Hartwig de Haen, The Effects of Food Price and Subsidy Policies on Egyptian Agriculture, Research Report 42 (Washington, D.C.: IFPRI, November 1983); Alderman, Harold and Joachim von Braun, The Effects of the Egyptian Food Ration and Subsidy System on Income Distribution and Welfare, Research Report 45 (Washington, D.C.: IFPRI, July 1984); and Scobie, Grant M., "Food Subsidies and the Government Budget in Egypt," report submitted to USAID, January 1984.

dinated and designed in a manner that individually provides in-depth perspectives on various aspects of the food system and collectively give a more complete picture than could be obtained by a single sectoral analysis. In order to better assist planners, however, it is useful to devise an analytical framework that evaluates the impacts of policy options and presents these impacts in an integrated manner.

Such an evaluation is presented in this report, which studies possible modifications of the instruments of the food subsidy system. The emphasis on instruments is an important one: while policies reflect national goals, they are only implemented through instruments. The former can be abstract and individually varied in planning models; the latter generally exist only in complex interaction with other instruments designed for a variety of goals. Thus, while a government may institute a policy of, say, subsidized input or consumer prices, or price ceilings and floors for outputs, such prices cannot be set by fiat. Whether such price policies are income transfers for the population as a whole or rents to only a few, or whether they affect the marginal allocation of consumers and producers, depend on the instruments used to support or defend these prices. The analyst, then, must be aware of quantity restrictions and administrative procedures, as well as market prices.

The approach used here depends on observations of the mechanisms of the food subsidy system in Egypt in the early 1980s, including a household survey conducted in 1981/82. While there is some attraction to an approach which identifies and quantifies the objective function of the state and then optimizes within the existing constraints, no

plausible means exist for quantifying the complex set of goals underlying a national food policy. While some attempts have been made to infer social preferences from observations of past policy choices, these approaches involve some second guessing of government priorities and are, furthermore, more suited to project appraisal than modelling major policy options. Accordingly, the approach used here does not presume knowledge of the priorities of the Egyptian government nor does it presume the value of tradeoffs between economic efficiency and social distribution goals. Rather, it presents a variety of indicators from a set of scenarios which serve to illustrate social choices. More specifically, the indicators used here serve to evaluate the effects of changes of food subsidy policies for:

- the food subsidy budget,
- the foreign exchange situation,
- inflation,
- the exchange rate,
- food consumption and nutrition, and
- income distribution.

The number of scenarios presented is only a small menu -- a representative listing which can be adapted to a richer array of options. Planners can choose from this list according to their collective notion of national objectives, even if such a weighting cannot be explicitly stated. The underlying concepts of policy

Roemer, M. discusses such an approach of alternative strategies in "Planning by Revealed Preferences: An Improvement Upon Traditional Methods," World Development (4) 1976, pp. 775-83.

evaluation used are elaborated in the following section. This chapter also includes a subsection that outlines the means by which the economic and social indicators were calculated; that is, the data, assumptions, and parameters are described along with the logic of the model which employs them.

The third section of this paper describes the scenarios investigated, both in terms of the policy options considered and the results of the alternative runs. A concluding section summarizes these observations.

FRAMEWORK OF THE EVALUATION OF ALTERNATIVE FOOD SUBSIDY POLICIES

Narrowly defined, food policy may be understood as the interface between a set of consumer-oriented policies, including nutrition, and a set of producer policies affecting the agricultural sector.¹ In many instances, however, the size of the food system as well as the magnitude of the government's interventions in it are sufficiently large that there is an appreciable impact of food policy on the macro-economy as well as, of course, vice versa. Frequently, the benefits of a particular policy accrue to one sector, or a subsector, and the costs are borne elsewhere. To evaluate a policy from the viewpoint of either sector alone, then, presents an incomplete picture.

For example, food subsidies have an impact on the deficit at the margin which, in turn, affects the rate of inflation and the value of the Egyptian pound. From this standpoint, subsidies are fiscal costs and also contribute to a number of economic costs on the macro-level. On the other hand, these costs are not incurred in a vacuum. By means of such expenditures, the government is able to lower the price of a number of goods and, in so doing, transfer resources back to the populace as well as increase consumption of a number of food items. It is, however, insufficient to compare the value of the fiscal costs

¹ See Timmer, P.; Falcon, W.; and S. Pearson, Food Policy Analysis (Baltimore: Johns Hopkins University Press, 1983).

with the value of the transfer. In general, there is no reason to directly or indirectly tax a population in order to return such revenues via a subsidy unless the government envisions some externalities not captured by consumers when purchasing foods according to their individual preferences or the government seeks to redistribute resources. Accordingly, the distribution of the benefits along with the total level of benefits is an important factor when evaluating transfer programs. Also, if the government seeks to increase consumption of certain goods over that expected in the absence of a specific intervention, then the level of that consumption as well as the value is relevant.

In the specific framework presented here, the major indicator of cost is the fiscal outlay for the food subsidy system. The deficit is, of course, also of interest and is presented below, but the relationship of changes in the deficit following changes in the subsidy system depends upon other spending policies as well as revenues and can only be assumed in this exercise. Another financial indicator which is affected by subsidy policies is the total amount of foreign exchange allocated to food imports. This measure is of direct concern to planners because it determines the ability to import investment goods and industrial inputs as well as other consumption goods.

Using the parameters estimated by Scobie,¹ the net change in inflation and the value of the Egyptian pound can be roughly calculated from estimates of the change in subsidy expenditures. The

¹ Scobie, Grant M., Food Subsidies in Egypt, op. cit.

latter are presented as the value of the pound relative to the base year value and not as an absolute estimation of the (shadow) rate of exchange within the complex system of multi-tiered official and unofficial exchange rates. The former is also expressed in terms of increment to or decrease of the existing inflation rate.

The effects of policy changes on nutrition are indicated by the number of families consuming less than 85 percent of the calorie requirements adjusted for family size, age, and sex composition. Due to individual variation of activity level and basal metabolism as well as temporal variation in intakes, there is always an uncertainty in the relationship of consumption indicators to the true levels of underconsumption.¹ However, the change in this indicator relative to the baseline level should serve as a measure of the nutritional impact of the various scenarios.

All scenarios include an assumption of trend-level household expenditure growth (see below for details of the model), with the growth rate constant across income groups. Under various scenarios, however, the transfers from the government to the consumers via price policy will change. A planner who is interested in the redistribution aspect of the subsidy system can use this information to assess relative transfers to different sectors of the population.

The study is an exercise in comparative statistics and is subject to the limitations of such an approach. It is, by design, a short-run

¹ See the review by Beaton, G., "Energy in Human Nutrition: Perspectives and Problems," Nutrition Review (41) 1983, pp. 325-340.

evaluation for a number of reasons. Firstly, the framework takes as given a number of factors -- for example, income growth rates and growth in agricultural productivity -- which are based on historic rates. The further one projects from the base period, the less accurate such trends are likely to be. In a similar vein, the parameters used are estimated as marginal responses. While they maintain some validity for estimating the orders of magnitude of a change following major price and income changes, there is clearly little to be gained in carrying the projections far beyond the base year. The purpose of the study is to report relative positions of indicators under different policy options, not to forecast exact import or consumption figures far into the future.

The short-run scenarios also do not take into consideration the possible effect of modifications of subsidy policies on investment, and hence, the rate of growth. Given the lead time implicit in planning and implementation, such investment is not of major consequence for the period investigated. Similarly, if income growth or subsidy policies affect population growth, the departure from trend projections is assumed to be unimportant in the short run.

APPROACH AND FRAMEWORK OF ANALYSIS

Overview

The objective of the analytical framework is to trace the effects of alternative policy options for the key variables mentioned above, i.e., consumption, nutrition, income distribution, and selected macro-variables (e.g., the food subsidy budget, foreign exchange expenditures, inflation). The period of analysis covers five years, 1981/82-1986/87. The framework is described below, together with the sources of information used and parameters applied. Figure 1 provides guidance for the following descriptions:

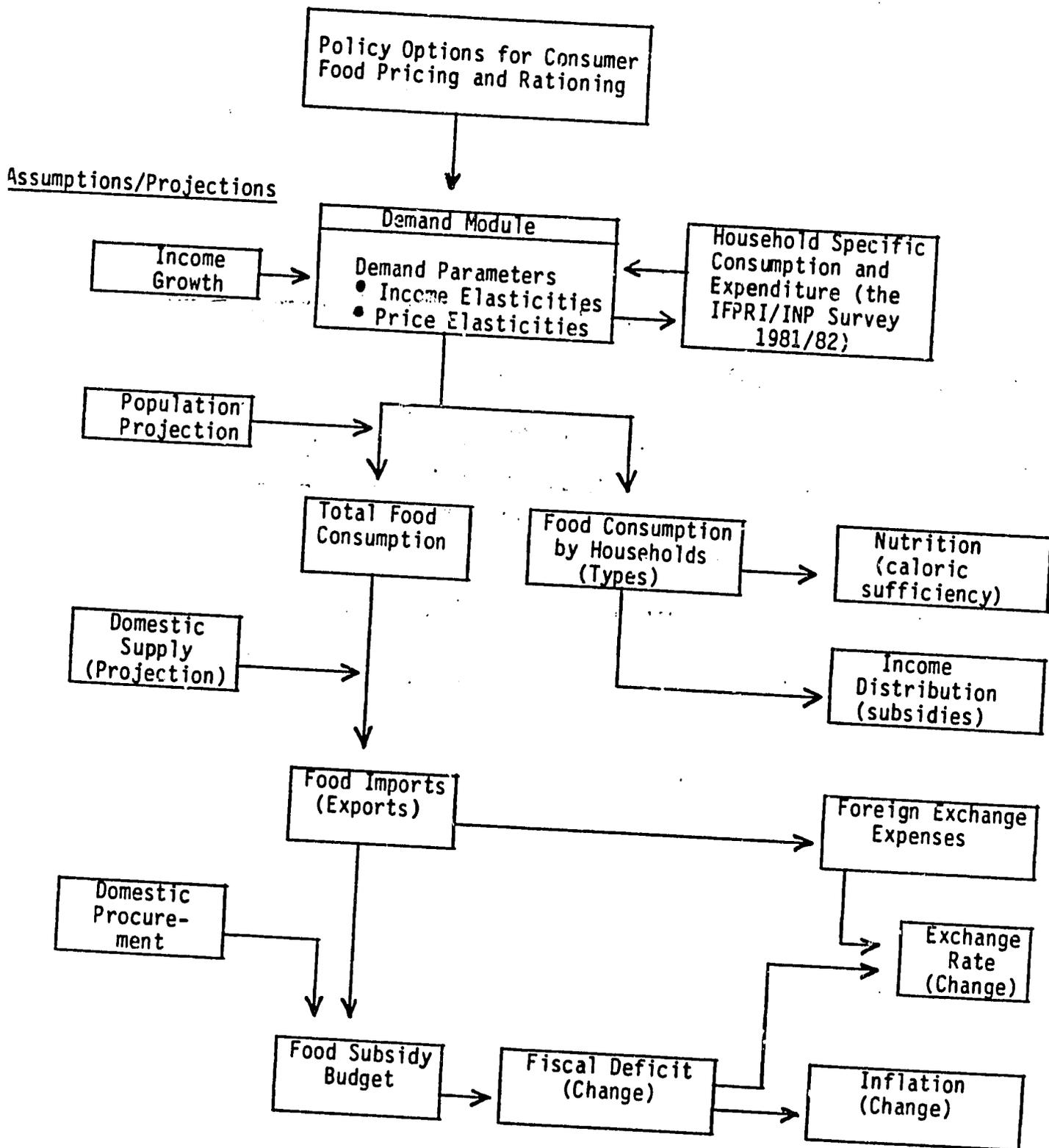
Specifying Policy Options

Policy options are specified by defining alternative scenarios for government-controlled food prices at the consumer level. These include the prices of the following commodities:

- sugar
- cooking oil
- rice
- beans
- lentils
- frozen meat
- processed chicken
- processed fish
- fakher flour (72 percent extraction rate)
- balady flour (82 percent extraction rate)
- noodles and macaroni
- fino and shami bread (from flour of 72 percent extraction rate)
- balady bread (from flour of 82 percent extraction rate)
- fuul
- tamia

The price changes for the specific formulation of policy options are applied to the respective outlets where commodities are acquired

Figure 1 -- Framework of Analysis for Alternative Options of Food Subsidy Policies



by consumers (ration shops, cooperatives, bakeries, and flour shops). The formulation of policy options for pricing is combined with an assumption about income growth and the general rate of inflation in the period of options analysis. These are the main inputs for the demand module, which is the core of the framework.

The Demand Module

The demand module is essentially comprised of the set of parameters which represent consumers' response in food consumption due to changes in income and prices. The relevant elasticities are specific for the low-income families (the lowest expenditure quartile) and the rest of the population, each broken down into its rural and urban segments. The demand parameters are estimated on the basis of the household consumption and expenditure data collected in the IFPRI-INP survey during 1981/82.¹

As the survey is of a cross-sectional nature, no price elasticities could be estimated for bread due to the countrywide invariance of bread prices by type of bread. Therefore, price elasticities of bread were taken from a different source and adjusted for consistency with the price elasticities for flour estimated on the basis of the IFPRI-INP survey.²

¹ Details of the estimation procedure and the data base are provided in H. Alderman and J. von Braun, The Effects of the Egyptian Food Policy.

² The basis of this is a complete demand system estimated with household expenditure and price data from the Central Agency for Public Mobilization and Statistics for 1958, 1965, 1975, in J. von Braun, Ernaehrungssicherungspolitik in Entwicklungslaendern -- Oekonomische Analyse am Beispiel Aegyptens, Kieler Wissenschaftsverlag Vank, 1984.

As indicated in Figure 1, the demand module not only draws its analytical contents from the survey but also uses the consumption, expenditure, and demographic information for each of the options analyzed. It has obvious advantages for consistency in that the estimated parameters are applied to the disaggregated data source they were originally derived from.

Consumption, Nutrition, and Income Effects

The primary outcome of the demand module is the volumes and structures of food consumption by households given the assumptions on prices and incomes of the underlying scenarios. From this, an indication of nutritional adequacy of the diet in terms of caloric consumption is derived and compared with accepted minimum levels.

In addition, the estimation of food consumption by household types (i.e., income levels) and in particular, their acquisition of subsidized food, take into account the income distribution effects of alternative subsidy and pricing policies.

In view of food consumption patterns and the different access to subsidized food of population groups (i.e., by income-level, employment and rural versus urban) and as consumers' response to changes in (subsidized) food prices differ accordingly, any changes in food price subsidies may result in different changes in the cost of living for different segments of the population. The food subsidy system is driven to a great extent by the stated objective of keeping nominal food prices down in order not to increase the cost of living.¹ The

¹ H. Alderman, J. von Braun, S. A. Sakr, Food Subsidy and Rationing System.

assessment of the distributional effects of the policy revealed that benefits (subsidies) are in general distributed in favor of the poor if measured in relative terms (e.g., in proportion to income), but a number of components of the system favored the rich in the sense that they accrued higher subsidy equivalents per capita.¹

Import Requirements, Fiscal Effects, Foreign Exchange, and Inflationary Effects

The second outgrowth of the demand module leads to a set of macro-economic indicators. First, national food consumption is estimated from household-level consumption in combination with population projections. Second, import requirements and the related foreign exchange account are derived from total consumption contrasted with domestic supply. It should be noted that a very simplistic approach to supply from domestic production is taken here which may be only justifiable on the basis of the short-term nature of the scenario analyses.²

Treating trade as residual may be justified since government-controlled trade in food is largely determined by consumption objectives, as implicitly formulated by the price subsidy and rationing policy.

In a third component of the framework (Figure 1), the fiscal food subsidy budget is derived given the domestic and international procurement and trade, its product-specific prices and its consumer

¹ A. Alderman and J. von Braun, The Effects of Egyptian Food Ration and Subsidy System.

² The supply response issue is discussed in further detail in J. von Braun and H. de Haen, The Effects of Food Price and Subsidy Policies on Egyptian Agriculture.

prices, including handling costs. Finally, the potential implications of a change in the food subsidy budget for the fiscal deficit are accounted for. Implications for the rate of inflation and the exchange rate are derived from that. Implicit elasticities estimated by Scobie (1983) are applied for these purposes.

Specific Assumptions and Projections

The framework is based on a number of assumptions and projections which are spelled out in order to assess the potentials and limitations of the approach.

Demand Parameters Used and Their Application

The demand parameters used in the framework are listed in Table 1. Two important features of the actual application of the income and price elasticities are described below:

- 1) In quantifying the consumption effects of income changes, the changes in income transfers due to changes in the subsidy rates (i.e., for frozen animal produce and wheat products) are considered in terms of how they affect real purchasing power (income).

- 2) Price elasticities are applied to the marginal purchases of each of the rationed or quantity-controlled commodities as actually observed in the survey for individual households. For example, a change in cooperative prices only affects the marginal purchase of families who purchase there. Similarly, when a family purchases quantities greater than the rationed amount, a change in rationed

Table 1 -- Demand Parameters Used in the Framework

a) Urban poor (lowest quartile of income distribution)

Commodity	Income Elasticity	Own-Price Elasticity	Cross-Price Elasticities													
			Noodles	Bal. Flour	Fakher Flour	Bal. Bread	Fino Bread	Chicken	Meat	Fish	Frozen Chicken	Frozen Meat	Frozen Fish			
Sugar	.14	-.03														
Oil	.08	-.13														
Rice	.36	-.14	.24	.30	.05	.05	.05									
Beans	.09	-.18														
Lentils	.33	-.12														
Fino Bread	.25	-.15		.08	.02	.30										
Fakher Flour	.59	-.20		1.4		.02	.04									
Balady Bread	-.02	-.15		.02	.02		.07									
Balady Flour	.09	-.10			.70	.02	.02									
Chicken	.68	-1.58														
Meat	1.58	-2.88						1.6	1.4	1.0	.28					
Fish	.89	-.84						1.0	1.85	1.05						
Frozen Chicken	.55	-1.58						1.2								
Frozen Beef	.07	-.20							1.0							
Frozen Fish	1.21	-.20								.06						
Cheese	.20	-.84														
Eggs	1.37	-1.03														
Milk	1.57	-.88														
Noodles	.51	-.61														
Fuul	.49	-.18														
Tamia	.23	-.18														

Source: Alderman, H. and Joachim von Braun (1984), if not differently explained in the text.

Table 1 -- Demand Parameters Used in the Framework
(continued)

b) Urban Others (upper 3 quartiles of income distribution)

Commodity	Income Elasticity	Own-Price Elasticity	Cross-Price Elasticities														
			Noodles	Bal. Flour	Fakher Flour	Bal. Bread	Fino Bread	Chicken	Meat	Fish	Frozen Chicken	Frozen Meat	Frozen Fish				
Sugar	.20	-.02															
Oil	.10	-.06															
Rice	.13	-.13	.15	.20	.05	.05	.05										
Beans	.14	-.12															
Lentils	.18	-.08															
Fino Bread	.20	-.13		.05	.01	.26											
Fakher Flour	.22	-.18		.85		.01	.02										
Balady Bread	-.05	-.13		.01	.01		.06										
Balady Flour	.06	-.09			.42	.01	.01										
Chicken	.31	-.47															
Meat	.66	-.82							1.0	.60	.4	.28					
Fish	.36	-.21							.4	.67	.30						
Frozen Chicken	.41	-.47							.5								.01
Frozen Beef	-.15	-.18								.4							
Frozen Fish	-.19	-.18									.02						
Cheese	-.04	-.01															
Eggs	.54	-.21															
Milk	.67	-.43															
Noodles	.24	-.30															
Fuul	.30	-.12															
Tamia	-.39	-.12															

Table 1 -- Demand Parameters Used in the Framework
(continued)

c) Rural Poor (lowest quartile of income distribution)

<u>Commodity</u>	<u>Income Elasticity</u>	<u>Own-Price Elasticity</u>	<u>Cross-Price Elasticities</u>													
			<u>Noodles</u>	<u>Bal. Flour</u>	<u>Fakher Flour</u>	<u>Bal. Bread</u>	<u>Fino Bread</u>	<u>Chicken</u>	<u>Meat</u>	<u>Fish</u>	<u>Rice</u>	<u>Maize</u>	<u>Wheat</u>			
Sugar	.14	-.16														
Oil	.14	-.13														
Rice	.56	-.28	.34	.09	.10	.10	.10									
Beans	.19	-.77		1.28												
Lentils	.25	-.83		.98												
Fino Bread	.18	-.40		.40	2.01											
Fakher Flour	.92	-.60		1.50												2.43
Balady Bread	.04	-.30		.06												1.6
Balady Flour	.32	-.50			.20	.02										.40
Chicken	.73	-1.16														
Meat	1.13	-2.16						1.1		1.01						
Fish	.94	-.47						.7		3.07						
Frozen Chicken	.73	-1.16														
Frozen Beef	.07	-.20														
Frozen Fish	1.82	-.47														
Cheese	.63	-.92														
Eggs	1.56	-2.72														
Milk	.16	-.50														
Noodles	1.05	-1.41														.11
Fuul	.68	-.77														
Tamia	1.40	-.77														
Wheat	1.32	-.38														
Maize	.80	-.36														
				1.61				.40								

Table 1 -- Demand Parameters Used in the Framework
(continued)

d) Rural Others (upper 3 quartiles of income distribution)

Commodity	Income Elasticity	Own-Price Elasticity	Cross-Price Elasticities													
			Noodles	Bal. Flour	Fakher Flour	Bal. Bread	Fino Bread	Chicken	Meat	Fish	Rice	Maize	Wheat			
Sugar	.12	-.12														
Oil	.11	-.06														
Rice	.26	-.12	.15	.32	.05	.05	.05									
Beans	.20	.71		.89												
Lentils	.20	-.54		.98												
Fino Bread	.16	-.36		.35	.75											
Fakher Flour	.60	-.54		1.00											1.11	
Balady Bread	.01	-.27		.04											1.3	
Balady Flour	.32	-.45			.10	.01									.30	.34
Chicken	.23	-.27														
Meat	.37	.61							.5	.40						
Fish	.43	-.01							.30	.95	.30					
Frozen Chicken	.41	-.27														
Frozen Beef	-.15	-.18														
Frozen Fish	.63	-.20														
Cheese	.37	-.27														
Eggs	.58	-.53														
Milk	.12	-.20														
Noodles	.48	-.22													.04	
Fuul	.48	-.71														
Tamia	.78	-.71														
Wheat	.59	-.35														
Maize	.56	-.33													.68	.20

prices affects only their real income and not the marginal price. Therefore, in the demand module, it is determined whether a household purchases say, sugar, only at the ration shop, cooperative, or on the open market, and then the price elasticity is applied taking the price difference from the marginal price and the price assumed for the policy option under consideration into account.

Assumptions on Population Growth and Urbanization

It is assumed that population growth declines from 2.9 percent per annum (1982) to 2.5 percent after 1982. The degree of urbanization is assumed to follow the trend of 1966-76 over the period of scenario analyses till 1986/87. It is also assumed that the number of Egyptians abroad remains constant at the 1981 level. This population is excluded from the domestic demand estimates. The assumptions about population are the same for all scenarios analyzed later.

Assumptions on Domestic Food Production and Procurement

As stressed before, the supply side of the framework is highly simplistic. It largely serves for accounting purposes. Its exogenous treatment, however, is not too unrealistic given the focus of the analysis on consumer price policy. Evaluation of the relationships between consumer price subsidy policy and agricultural policy (i.e., price policy for producers) reveals fairly weak linkages between the two which may also translate into only marginal supply effects, at least in the short run.¹ Basically, growth in food production by

¹ See J. von Braun and H. de Haen, The Effects of Food Price and Subsidy Policies on Egyptian Agriculture.

individual items during the period of analysis (1981/82-1986/87) is assumed to follow the path of the previous years (1975/76-1980/81). Details are given in Table 2. Under the assumption of a static cropping pattern, growth in yields determines the growth in crop output. This is the underlying assumption for the stated growth in cereals production as given in Table 2.

Procurement is also exogenous in the framework. Ratios of domestic procurement to domestic production of wheat and rice are held constant at September 1981 levels. The procurement operation only matters in the flow of the framework to the extent that it impacts on the fiscal food subsidy budget.

Food Subsidy Budget and Assumptions about the Overall Fiscal Deficit

The total food subsidy budget equals the aggregate of explicit subsidies accrued by rural and urban households on a per capita basis -- as represented by the sample survey -- multiplied by the respective population figures (rural and urban). The overall food subsidy budget is also expressed in relative terms as a share in total government expenditures. Projections of total expenditures are done for this purpose. In addition, it is a task of the framework to assess food subsidies potential effect on the overall fiscal deficit from which implications for the change in the inflation rate shall be derived (see below).

The related projections of the overall budget situation during the period of analysis are based on the following assumptions:

Table 2 -- Assumptions About Domestic Food Production

	<u>Output in 1981</u> (1000 tons)	<u>Assumed Growth in Output or Yields 1981-1986¹</u> (% per annum)
Wheat	1.938	0.0 ²
Rice (milled)	1.409	1.6
Maize	3.307	1.8
Sorghum	653	0.0
Beans	207	0.0
Lentils	5	0.0
Sugar	658	3.0 ³
Vegetable Oil	146	5.0
Meat (Red)	342	2.0
Poultry	140	4.6
Milk	1.902	1.1

¹ If not otherwise mentioned, these growth rates equal those of the period 1975/76-1980/81.

² Growth rates with the sign (-) were actually negative over the period 1975/76-1980/81. They were set to zero assuming improvements in production management.

³ Growth in sugar production was set at this rate assuming that increased beet production for the new plant in the Nile Delta would make the difference.

Source: Data from Ministry of Agriculture, Cairo, and U.S. Attache report, Egypt, Annual Agricultural Situation Report - 1983, pp. 51-53.

- o Government expenditures net of food subsidies grow corresponding to GNP with the respective elasticity observed during 1969/71-1979/81. This elasticity was estimated at 1.319.¹
- o Similarly, government revenues rise with GNP growth. The respective elasticity was estimated at 1.234 during the previous decade.
- o The total fiscal deficit is simply the difference between government revenues and expenditures (net of food subsidies) as projected above (given a scenario-specific assumption of income growth (GNP), and the scenario-specific food subsidy budget). For the base year 1981/82, the following figures were used:²

	<u>In Million LE</u>
GNP	21,000
Government revenues	8,230.6
Government expenditure net of food subsidies	11,413.9
Food subsidies	1,473.1
Deficit	4,656.4

Accounting for Effects on the Exchange Rate

Manipulation of the exchange rate is a well-established price policy instrument in Egypt.³ Although the official exchange rate for basic food imports is fixed for extended time periods, these imports

¹ This means that if GNP grows at one percent, government expenditure grows at 1.319 percent per annum.

² The data are from data on fiscal operations as stated in Ahmed, S., Public Finance in Egypt: Its Structure and Trends, World Bank Staff Working Paper No. 639 (Washington, D.C.: World Bank, 1984), p. 12.

³ G. M. Scobie, Food Subsidies in Egypt.

have profound effects on the foreign exchange requirements, as well as the related effects of food subsidies for money supply and the exchange rate on the open ("black") market. The open market exchange rate is an important cost parameter for import-dependent businesses in Egypt and it may also be roughly understood as an indicator toward which the official exchange rate tends to be adjusted in the long run. .. reduced-form elasticity arrived at by Scobie's more elaborate modelling yields an elasticity of .33 for the "black" market exchange rate with respect to food subsidies.¹ This elasticity is applied to the scenario analysis within the framework. The related results of the scenario analysis should be interpreted with caution, however, since the application of the elasticity for those scenarios which imply major changes of the overall subsidy policy might go beyond the robustness of the parameter estimates upon which it is based.

Effects of Food Subsidies on Inflation: Assumptions and Computations

Scobie evaluated comprehensively the macro-economic effects of food subsidies -- how they may translate into increased fiscal deficit and thus into increased overall inflation.² His findings are used in the framework. Under the assumption that food subsidies add to the fiscal deficit, Scobie arrives at a reduced-form elasticity of the

¹ G. M. Scobie, Food Subsidies in Egypt, pp. 25-27.

² G. M. Scobie, op. cit.

inflation rate with respect to food subsidies of 0.53.¹ This means a 10 percent increase in food subsidies would increase the inflation rate by about 5 percent say, from 20 to 21 percent. The elasticity mentioned above is applied to derive the inflationary effects of the changes in the food subsidy budget as they occur under the assumptions of the alternative policy options evaluated.

¹ It should be noted that this elasticity is, of course, strictly valid only for the relationships of macro-variables as they prevailed during the period of analysis and for the composition of the subsidy budget as of 1981.

ALTERNATIVE FOOD SUBSIDY POLICIES

Description of the Scenarios

The current experiment illustrates the framework with a baseline and six additional scenarios, although the model is flexible and can evaluate a number of other variations if the need arises. Some of the basic features are presented in Table 3.

The baseline scenario (option 1) attempts to represent the actual situation in Egypt in 1981/82. The basis for the study comes from the consumption data in the 1981/82 household survey undertaken by IFPRI and the INP.¹ The survey data have been expanded to the national level using rural and urban population figures. In general, survey consumption differed little from estimates on national consumption calculated from production and import (export) data.

Scenario 2 projects consumption and fiscal costs into 1986/87 under the assumption of constant nominal prices for subsidized food, which means that subsidized food prices remain constant while other prices rise with the prevailing inflation. This assumption evaluates the subsidy position in the second period in the absence of government actions to modify prices which prevailed at the time of the baseline survey. In effect, it operates under the axiom that not to decide is to have made a decision; in this case, allowing subsidized prices to fall in real terms. This scenario, as well as the subsequent ones, assumes a 4.5 percent annual per capita real income growth and a 2.5

¹ See Alderman, Harold and Joachim von Braun, The Effects of the Egyptian Food Ration and Subsidy System, op. cit.

Table 3 -- Main Features of Scenarios

Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 4a	Scenario 5	Scenario 6
Changes Relative to Baseline	Constant Nominal Prices for Subsidized Food Commodities	Constant Real Prices For Subsidized Food Commodities	Subsidized Food Prices to International Level: Bread and Flour (50%)	As Scenario 4 plus Wage Increase in Public Sector	Targetting of Subsidies	Change in Structure of Subsidies
			in percent			
Population growth rate	2.5 annual	2.5 annual	2.5 annual	2.5 annual	2.5 annual	2.5 annual
Real income growth rate (per capita)	4.5 annual	4.5 annual	4.5 annual	4.5 annual plus wage increase of 12.5 LE/mo. in public sector	4.5 annual	4.5 annual
Real change of fino flour/bread prices	-50	0	+50	+50	+50	-14 urban -22 rural
Real change of balady flour/bread prices	-50	0	+50	+50	+50 gen. population 0 urban poor neighborhoods	-18 urban 0 rural
Change of first tier (basic) ration prices	-50	0	0	0	To border price gen. population No change poorest 25 percent	-50
Change of second tier ration prices	-50	0	To border price price	To border price	To border price gen. population No change poorest 25 percent	-50
Change of cooperative prices	-50	0	To border price price	To border price	To border price gen. population	-50 ¹
Change in open market prices	0	0	To border price (including pasta)	To border price (including pasta)	To border price (including pasta)	0

¹ Prices of frozen meat and frozen chicken decline 42 percent in real terms.

percent population growth (3.47 urban, 1.72 rural, net of migration; these are historic rates, see previous section). The effects of reduced income growth is also evaluated below.

In this option, inflation of goods without price controls is assumed to be 15 percent annually. Consequently, prices of foods which are fixed in nominal terms, such as bread, decline relative to other foods and non-foods. In addition, although the prices of ration goods are seldom the marginal prices which determine the consumers' budget allocation, the value of the transfer embodied in the quota increases when the nominal price is constant in a period of inflation.

The third scenario investigates the case of constant real prices of foods. This "no-price change" scenario assumes that the government takes measures to change wheat flour, breads, ration, and cooperative prices at a rate in keeping with the inflation rate of other goods.

The fourth scenario represents a number of major price changes. It investigates a situation in which prices of the second-tier rationed goods are raised to import parity levels as are prices for cooperative goods, including frozen commodities. The price of the basic (first-tier) ration is assumed to remain constant in real terms. Wheat flour and bread prices are assumed to rise 50 percent from the baseline, also in real terms. This is somewhat less than necessary to reach import parity but can be indicative of the direction the economy will move following fairly major price movements. Open market prices of staples also move to import parity, which involves decreases in some prices -- for example, for sugar in Upper Egypt and for rice

in a few delta regions. Meat and dairy prices are assumed to remain constant in real terms.

The model also explores a variation of scenario 4 in which wages for public sector employees are raised in partial compensation for the reduced subsidies. In this option (referred to as scenario 4a), urban workers with membership in workplace consumer cooperatives -- in public sector enterprises as well as the largest private factories -- receive an additional 12.5 LE monthly (1982 value). This is approximately 30 LE per family member which was the average of the implicit value of subsidies in the urban area in the base year.

The fifth scenario considers one of many possible targetting schemes. The price environment for the general population is similar that in scenario 4, except that the basic ration is discontinued for all but the poorest 25 percent of the population. These families, both urban and rural, receive the additional ration as well. Furthermore, it is assumed that they receive a coarse flour ration of two kilo per capita a month in the urban areas and six kilos in the rural area. Because the subsidy on open market flour is reduced in this scenario, this ration serves much as an income transfer equivalent to the value of the flour.

Bread, however, is not rationed in this scenario. It is assumed to be available without quota. However, only in the poorest 20 percent of the urban neighborhoods is bread available at the baseline price. The targetting of subsidized bread, then, is geographical with average income in the census tract the determinant of the target. While there is a great deal of administrative difficulty in applying a

household level target as modeled for the ration system, neighborhood level data is likely available from CAPMAS surveys. Alternatively, educational data may be available from previous census. The average level of education of household heads correlated with average income of urban census tracts (neighborhoods) with a single r of .71.

The sixth scenario includes the changes in subsidy policies implemented between June 1982 and December 1984. Most notable are the changes in flour prices and bread prices (including changes in loaf sizes and extraction rates) announced in 1984. The price changes in Table 3 indicate the weighted effect of these various changes after one considers the inflation rate for the general economy. Note that although these price changes were appreciable, the nominal price change for flour more or less parallels the assumed inflation rate and the change for bread is slightly less than that rate. Consequently, the real price of flour and bread combined falls somewhat, although less than in the second scenario. The price of frozen goods also increased relative to that scenario.

Implications of Alternative Food Subsidy Policies

Effects on the Subsidy Budget

The alternative scenarios specified for the consumer food price policy in the 1980s result in subsidy budgets between about .9 billion LE (scenario 5) and 1.9 billion LE (scenario 2) by 1986/87, measured in constant 1981 LE. Only in scenario 4, 4a, and 5 would the subsidy

budget be reduced below the 1981/82 level. The change in the subsidy budget reported is in real terms (see Table 4). For comparison, some estimates of the nominal food subsidy budget are also included in Table 4.

The composition and structure of the subsidy budget differs between the various scenarios. It is evident that major fiscal savings may only be achieved if substantial changes in real prices of flour and bread, as well as the subsidized frozen meat commodities sold from the cooperatives, were introduced. For example, although scenario 6 -- which is similar to some currently discussed policy changes -- includes major price adjustments for a great number of commodities, it results in only a 10 percent fiscal saving compared to the "no-action" scenario 2. The wage compensation for public sector employees considered in scenario 4a would cost the government about 250 million LE in 1981 prices, or about 470 million LE in current prices.

With the projected fiscal operation of the government in scenarios 2 and 6, the food subsidy expenditures would take over a higher share of the total budget by 1986/87 than in 1981/82. The share might rise from about 10 to 12 percent (Table 4). With scenario 3 (constant real prices) the subsidy budget would roughly maintain its 10 percent share while scenarios 4, 4a, and most significantly scenario 5 (targetted program) would reduce the position of food subsidies in government budget.

Effects on the Deficit and Inflation

In all the scenarios food subsidies would correspond to a large share of the total deficit. In scenarios 2, 3, and 6, this ratio

Table 4 -- Scenario Analyses for Food Subsidy Policies: Fiscal and Macro Effects

	(1) Baseline (1981/82)	(2) Constant Nominal Prices for Subsi- dized Food Commodities	(3) Constant Real Prices for Subsidized Food Commodities 1986/87	(4) Subsidized Food Prices to International Level: Bread and Flour (50%) (1986/87)	(4a) As Scenario 4, plus Wage In- crease in Public Sector	(5) Targetting of Subsidies	(6) Change in Structure of Sub- sidies (for details see Table 3)
Food Subsidy Budget							
- real (constant) LE	1,299 ⁴	1,871	1,573	969	1,226 ⁶	936	1,675
- in nominal LE	1,299 ⁴	4,372 ⁵	3,405 ⁵	1,785 ⁵	2,258 ⁵	1,724	3,720 ⁵
Food Subsidy Budget in % of Projected:							
- total budget	10.1	12.2	10.6	6.8	7.5	5.8	11.2
- fiscal deficit	27.9	32.5	28.9	20.0	21.8	17.6	30.2
Foreign Exchange for Basic Food Imports ¹ (Million US\$)	2,525	4,009	3,756	3,552	3,573	3,572	3,820
Change in Overall Inflation Rate Due to Food Subsidies ²	-	+3.5	+1.7	-2.0	-0.4	-2.2	+2.3
Open Market Exchange Rate (Index) ³	1.00	1.15	1.07	.92	.98	.90	1.10

¹ This includes basic food items (as mentioned in the previous section) handled by the government. The U.S. dollar is valued at official exchange rate (U.S.\$1 = 0.84 LE).

² Assumed base level of inflation is 15%; the number 3.5 for scenario 2 thus means that inflation would increase from 15% to 18.5%.

³ The index shows the value of the U.S.\$ in terms of LE, e.g., if 1 LE = 1 U.S.\$ in 1981/82 on the open market, it was 1.15 LE for 1 U.S.\$, according to scenario 2 in 1986/87.

⁴ The officially reported food subsidy budget for 1981/82 is 1,473.1 million LE (Ministry of Finance). The deviation from the computed figure here may be due to some underestimation of operating costs of the system.

⁵ The nominal food subsidy budget (at current prices) is computed with an assumed basic inflation rate of 15 percent per annum, plus the scenario-specific change in the rate of inflation. This gives, e.g., for scenario 2, an inflator of 18.5 percent per annum.

⁶ Note that increases in public sector wages are counted as "subsidies" as they affect the fiscal cost of the package.

would be around 30 percent. It should be stressed that food subsidies as a total fiscal figure are not the sole cause of the deficit. However, at the margin they may induce a high proportion of the deficit fluctuations.¹ Under the assumption that changes in food subsidy expenses translate into changes in the deficit, the implicit monetary effects of the subsidy policy on inflation are derived for the scenarios using Scobie's model results. Under the assumption of an inflation floor level of 15 percent per annum, the conditions of scenario 2 might induce an increase in the rate of inflation by 3.5 percent (see Table 4). Under scenarios 4, 4a, and 5, the initial level of inflation would be reduced.

Effects on Foreign Exchange

The alternative subsidy policies have very distinct effects on the requirements of foreign exchange for food imports and the exchange rate. In all the scenarios, even the quite drastic scenario 4, the foreign exchange required for food imports in 1986/87 would be substantially higher than in 1981/82. Under realistic assumptions for growth in supply from domestic food production, it seems Egypt will continue to become more import-dependent on the international food markets -- at least in the absolute terms of the food import bill -- even if food price subsidies were cut drastically.

The exchange rate is affected by this increased demand for foreign exchange. It is even more affected by the implicit effects of

¹ See G. M. Scobie, Food Subsidies in Egypt.

the fiscal deficit from food subsidies which impact on the balance of payments, the stock of net foreign assets, and the money supply.¹ Under the conditions of the "no-action" scenario (scenario 2), the open market exchange rate (index) might increase from 1.00 to 1.15 between 1981/82 and 1986/87. Scenario 3, on the other hand, might result in half of such a devaluation effect for the Egyptian pound (see Table 4, last line). With scenarios 4 and 5, the value of the Egyptian pound versus the (constant) U.S.\$ might increase by 8 and 10 percent, respectively. The difference between scenarios 2, on the one hand, and scenarios 4 and 5, on the other, in the index of the open market exchange rate is quite substantial. As a result of a continuously delayed adjustment of the official exchange rate to the actual open market value of the currency, typical distortions in the economy may be an overvaluation of non-tradeables and undervaluation of domestically produced tradeables. This may lead to inefficient taxation of the tradeables sectors and distortions in prices between sectors.

The numerical results presented may not, of course, be interpreted as predictions of the open market exchange rate. Rather, they should hint at the magnitude and the directions which the partial effects of subsidy policies might imply for the exchange rate.

Effects on National Food Consumption and Imports

Food consumption in Egypt will continue to expand rapidly during

¹ G. M. Scobie, Food Subsidies in Egypt, pp. 18-22.

the 1980s given the rates of income growth and population growth. During 1981/82 to 1986/87, overall consumption of key food commodities would show the following changes on food price subsidies under "no-action" scenario 2:

Sugar	:	+ 20 percent
Cooking Oil	:	+ 16 percent
Beans, Lentils	:	+ 2 percent
Rice	:	+ 7 percent
Wheat	:	+ 36 percent
Meat, Chicken	:	+ 28 percent

The most dramatic expansions in consumption would occur for wheat and animal products (see Table 5). The effects on national consumption of the policy changes specified for the other scenarios (Nos. 3, 4, 5, and 6) are quite interesting when compared with the "no-action" scenario 2.

The estimated own-price and cross-price elasticities determine the results under the respective assumptions on food price policy. In the following, the differences between the scenarios as computed for 1986/87 are expressed in percents taking scenario 2 as a base:

	Differences in Total Consumption Between Scenarios relative to Scenario 2 (%)			
	(3)	(4)	(5)	(6)
Sugar	- 1.6	- 2.6	-2.2	-0.2
Cooking Oil	- 0.9	- 3.0	-2.6	-
Beans, Lentils	+ 9.0	+28.4	+30.3	-0.4
Rice	+11.4	+34.7	+34.3	-0.3
Wheat	-11.8	-25.4	-25.7	-9.0
Meat, Chicken	- 3.2	- 5.2	- 5.0	-0.7

While sugar and cooking oil consumption are only a little responsive to the alternative policy changes, this is certainly not the case with cereals and pulses. With policy options (4) and (5) versus (2), wheat consumption would be curtailed by about a quarter. However, strong

Table 5 -- Scenario Analyses for Food Subsidy Policies: Effects for National Level Food Consumption and Trade

	(1)		(2)	(3)	(4)	(5)	(6)
	Baseline (1981/82)	Actual (1981)	Constant Nominal Prices for Subsi- dized Food Commodities	Constant Real Prices for Subsidized Food Commodities 1986/87	Subsidized Food Prices to International Level: Bread and Flour (50%) (1986/87)	Targetting of Food Subsidies	Change in Structure of Sub- sidies (for details see Table 3)
<u>National Consumption</u>							
Sugar	1,078	(1,413)	1,290	1,269	1,257	1,261	1,288
Oil	460	(459)	534	529	518	520	534
Rice	1,391	(1,473)	1,485	1,654	2,001	1,995	1,480
Beans	349	(300)	330	378	429	430	329
Lentils	132	(87)	159	155	199	201	158
Wheat (Total) ¹	8,123	(7,816)	11,078	9,770	8,268	8,344	10,077
Wheat Flour (72%) ²	1,462	(n.a.)	2,067	1,876	1,602	1,596	2,079
Maize	4,582	(4,615)	4,753	4,803	4,633	4,635	4,744
Chicken	711	(217) ⁴	890	856	843	844	883
Fish	313	(n.a.)	391	386	383	383	389
Meat	518	(466)	683	667	648	650	679
<u>Imports</u>							
Sugar	313	(583) ³	526	504	492	497	523
Oil	275	(313)	349	343	332	335	348
Rice	-131	(-25)	-37	132	479	474	-42
Beans	142	(92)	123	171	222	224	122
Lentils	127	(82)	154	150	194	196	153
Wheat (Total) ¹	6,185	(5,878)	9,140	7,832	6,330	6,406	8,139
Wheat Flour (72%) ²	1,462	(1,388)	2,067	1,876	1,602	1,596	2,079
Maize	977	(1,383)	1,149	1,198	1,029	1,030	1,139
Chicken	41	(84)	220	186	173	174	213
Meat	138	(123)	304	288	268	271	299

¹ Wheat (total) is all wheat and wheat products consumption in wheat grain equivalents.

² Wheat flour (72%) is consumption of wheat flour (72% extraction rate, including shami/afraangi bread) and pasta in wheat grain equivalents.

³ Includes sugar for processing (e.g., soft drinks) which is not included in survey.

⁴ Excludes home production.

substitution effects would push up rice and pulses consumption in this case. Thus, the overall consumption effects for total grains would be much less than it appears at first glance on the wheat market alone; in comparison to scenario 2, total grain consumption would be reduced by 5.2 percent in the case of scenario 3 and by 10.9 percent and 5.5 percent in the cases of scenarios 4 and 6, respectively.¹

The substitution effects between grains have strong ramifications for food trade patterns (see Table 5). The case of rice is particularly striking. While under some optimistic production projections the rice industry may still produce a (small) exportable surplus in 1986/87 under the conditions of "no-action" scenario 2, this could not be the case under the conditions of options 3 and 4. These scenarios include substantial cuts in the wheat subsidy to consumers. Under scenario 4 -- the world price option combined with 50 percent price increases for bread and flour -- about a half million ton of rice would be imported in 1986/87. Bean and lentil imports would also increase significantly (Table 5). The foreign exchange costs of such a change in the import pattern must be carefully assessed in light of the fact that Egypt is a major wheat food aid recipient. Egypt's preferential position as an accustomed recipient of external import price subsidies for wheat may not be fully transferable to rice imports. If actual imports are less than that demanded under the scenarios, the open market price of rice would rise above the world price. The

¹ This includes wheat, rice, maize, pulses (beans, lentils) in grain equivalents.

actual domestic open market price is dependent on the level of excess demand; such levels reflect import quotas which are not studied in the projections.

Effects on Industrial Output and Investment

Scobie's analyses of Egypt's import demand for food and non-food commodities have pointed out the potential destabilization effects for the industrial sector of fluctuating foreign exchange demand for the (subsidized) food imports. This is due to the country's unresponsiveness to fluctuating food import bills: the import expenditure elasticities for food are much lower than those for industrial imports. Thus, any decline in foreign exchange availability will disproportionately affect industrial imports, and through that, industrial output and investment.¹ Scobie's model yields an elasticity of industrial output with respect to foreign exchange supply of .38 and an elasticity of industrial investment with respect to foreign exchange supply of .56. With these elasticities, on the one hand, and the relative differences of foreign exchange required under the scenarios, on the other hand, a rough estimate of the industrial output and investment effects of the alternative food price subsidy policies were derived (Table 6). In comparison to the "no-action" scenario (No. 2), industrial output and investment would be higher under all the other options.

The most extreme difference, of course, is for scenario 4 (world

¹ Scobie, Food Subsidies in Egypt, pp. 44-46.

Table 6 --- Effects of Changes in Food Subsidy Policies for Availability of Foreign Exchange, Industrial Investment, and Output

Scenario versus Scenario 2	Change in		
	Foreign Exchange Available ¹	Industrial Investment (in percent)	Industrial Output
3	2.6	1.5	1.0
4	4.7	2.6	1.8
5	4.5	2.5	1.5
6	1.9	1.1	0.7

¹ The relative change in foreign exchange available is the difference in foreign exchange required for the basic food imports according to scenarios 3-6 versus scenario 2 in percent of total (constant 1981) foreign exchange expenditures.

prices) versus scenario 2. An estimated 1.8 percent of additional industrial output might be attributed to equivalent foreign exchange savings achieved under policy option 4 in comparison to option 2. The other options -- 3 (real constant subsidized food prices), 5 (targeting in combination with increased prices), and 6 (change in the structure of subsidized food prices) -- might result in increments of 1.0, 1.5, and 0.7 percent, respectively, of industrial output. These numerical results cannot, of course, be more than very rough estimates based on the specific assumptions as stated by Scobie.¹ The economic growth, investment, and employment effects of food subsidies certainly require further research. A trade-off between growth and distributional equity should not be decided on the basis of these results.

Income Distribution Effects

Since scenario 1 is the baseline, the indicators in Table 7 report the situation at the time of the survey. As these details are available elsewhere,² little discussion seems necessary here. It is important to note, however, that the definition of urban and rural poor used in this section differ from those in previous reports, although the definition remains the same in all scenarios. In this study, the urban poor are defined as those families with less than 250 LE (1982 value) annual per capita expenditures in 1987. In the rural

¹ Scobie, Food Subsidies in Egypt.

² Alderman and von Braun, The Effects of the Egyptian Food Ration and Subsidy System.

Table 7 -- Some Indicators of Distribution in Alternative Scenarios

(1)	(2)	(3)	(4)	(4a)	(5)	(6)
Baseline (1981/82)	Constant Nominal Prices for Subsi- dized Food Commodities	Constant Real Prices for Subsidized Food Commodities 1986/87	Subsidized Food Prices to International Level: Bread and Flour (50%)	As Scenario 4 plus Wage In- crease in Public Sector	Targetting of Subsidies	Change in Structure of Sub- sidies (for details see Table 3)
	(1986/87)					
Annual Per Capita Transfer from Government to Consumers (LE)	27.18	35.05	28.65	15.88	21.30 ¹	15.20
Transfer to Urban Poor	27.54	33.05	28.93	15.34	22.12 ¹	30.95
Transfer to Rural Poor	19.57	25.16	22.43	13.05	13.05	27.41
Transfer as % of Expenditure of Urban Poor	19.0	18.24	16.0	8.5	11.8	28.95
Transfer as % of Expenditure of Rural Poor	22.0	22.8	20.2	11.8	11.8	15.1
Daily Calorie Intake of Urban Poor	2,270	2,466	2,356	2,244	2,268	26.1
Daily Calorie Intake of Rural Poor	2,028	2,587	2,256	1,956	2,095	2,313
Index of Calorie-Deficient Population (Urban Poor)	100	68	88	100	96	2,430
Index of Calorie-Deficient Population (Rural Poor)	100	62	79	104	104	2,288
					88	75
						73

¹ Counts pay raise as transfer.

area, 150 LE was the cut-off. This represents 15.2 and 14.0 percent of the populations, respectively.¹

There are major differences among the different scenarios, both in the amount of average purchasing power transferred to families and in the distribution between groups.²

Even in scenario 3, which represents a position where relative prices do not change, there is an increase in per capita subsidies in addition to the increase in total outlays for subsidies due to population growth. This is because income growth leads to increased purchases of flour, bread, and pasta. Unlike purchases from the ration shop or the cooperative -- quotas for which are constant in the model -- the increased purchase of these flour products leads to increases in subsidies per capita. Transfers fall as a percentage of income, however, as wages and profits grow under the assumptions in the model.

The per capita growth in transfers in scenario 3 is 1 percent annually while it is 5.2 percent under scenario 2. As discussed above, this scenario represents a position of inertia in subsidy policies and is an extreme position in terms of both costs and benefits.

¹ These cut-off points were based on a technical, not welfare, criterion. Parameters were estimated for the poorest 25 percent of the two populations. However, with income growth, a portion of the group move into a category for which other parameters had been estimated. As our purpose is to investigate relative positions of different policies rather than determine a category of absolute poverty, it is most useful to define poverty consistent with the previously estimated parameters.

² These transfers are calculated as the direct gains to consumers and differ from government expenditures which include margins to millers, bakers, and grocers and which also net out implicit revenues from procurement quotas.

In this scenario, nominal prices are constant in the cooperatives and ration shops; hence, the gap between them and the opportunity cost increases as open market prices rise. Note that this gap generally increases at a faster rate than overall prices rise.¹ Another source of increased subsidy is the falling relative price of wheat, which leads to substitution toward that commodity and an increase in the real income of the population, some of which lead to more purchases of non-subsidized food as well.

Scenario 6 contains some elements of scenario 2 -- fixed nominal prices in the ration shops, and some elements of scenario 3 -- changes in the marginal price of bread and flour which keep real prices more or less constant. Accordingly, the average transfer to the consumer lies between those of scenarios 2 and 3. In this scenario, the growth rate of transfers is 2.6 percent. This is less than income growth and therefore results in transfers becoming a smaller share of total expenditure than in the base year.

Since major components of the subsidy program are eliminated in scenario 4, it is not surprising that total transfers decline appreciably. Given income growth, the share of transfer to total expenditure is approximately half of its earlier position.

When the compensating wage increases in scenario 4a are considered as transfers, the decline in total transfers is less steep. Nevertheless, as it affects only about a third of the urban population

¹ The smaller the percentage of subsidy to total cost in the base year, the greater the proportional increase in subsidy under this scenario.

and none of the rural, average transfers in scenario 4 are much below the baseline.

In scenario 5 the total transfers to consumers are less than in the other experiments. This reflects the decrease in the costs of the basic ration which is eliminated for three-fourths of the population.

The distribution of the transfers among urban and rural groups and among income classes changes somewhat over the scenarios. While the per capita transfer to the rural sector was 74 percent of that to the urban in the base year, it rises to 81 percent in the second and third scenarios and to 92 percent in scenario 4. In scenarios 2 and 3, this is attributable to the greater price and income responsiveness in rural areas. In scenario 4, the changes in the cooperative and second-tier ration system eliminate subsidies which were originally skewed to the urban community. In scenario 5, the rural transfer actually exceeds the urban transfer due to the value of the wheat flour ration. However, as is indicated below, this is partially offset by higher prices in the rural areas. While scenario 6 has average transfers midway between the second and third scenario, the share of transfers to the rural sector is similar to the first scenario. This is due to the greater increase in rural flour prices, which is not offset by other changes like it is in the fourth scenario.

Since the wage policy assumed in scenario 4a is only a benefit to the urban population, it is not surprising that 4a presents a decline in the relative position of rural transfers. They are only 56 percent of urban transfers in this scenario.

In each case in which the average transfer increases, the absolute gap between that average and the value of the transfer to the poor increases. Similarly, the gap decreases in scenarios 4 and 5 when the total value decreases. Relative shares, however, follow a less consistent pattern. The relative share of transfers to the rural poor rises in the second, third, and fourth scenarios mainly for the same reasons that close the gap for the rural sector as a whole. For example, the slight increase of the per capita transfer to the rural poor relative to the national average in scenario 3 is mainly attributable to the higher income elasticities for food commodities estimated for this group. In scenario 6, the position of the rural poor deteriorates relative to the rest of the rural sector. Similarly, for every pound received per capita by the general population in the sixth scenario, the rural poor receive only 66 piasters. In 1981 the corresponding figure was 72 piasters. As the transfers to the rural poor in scenario 4a are the same as in scenario 4, their position relative to the general population is worsened. In the targetting scenario (5), of course, they are the principal beneficiaries, receiving nearly twice the transfer of the general population. Note that in this targetting scenario, there is still an appreciable transfer to the rest of the population. The population defined as non-poor in Table 7 includes households in the target population. Furthermore, some subsidy remains on flour and bread. The average transfer to the non-poor is 12 LE in scenario 5.

While the urban poor received a greater transfer than average in scenarios 1 and 3 (but not more than the urban middle class), in

the other scenarios the transfers to these families are less than the overall population mean. The decline in relative position is most apparent in the second scenario, in which the growth of transfers to the general population and to the rural poor exceeded the growth in income. In this scenario, the growth in subsidies to the urban poor, while appreciable, was less than the mean growth, accounting for the decline in the share of transfer as a percent of total expenditures.

The urban poor, like the rural poor, are the principal gainers in the targetted subsidy program. They do not, however, gain relative to the overall population and decline relative to the urban middle class when wage compensation is considered. This indicates that despite a decline in public sector wages relative to the private sector which has occurred since 1973, the public sector is not disproportionately represented in the poorest 15 percent of the urban population.

Nutritional Impact

Although in all scenarios income growth net of changes in subsidy-related income transfers is positive, there are large differences in the total and average calorie intakes by the poor and the general population. The effect of income growth alone is indicated by the intakes in scenario 3. The rural poor increase their intakes by over 200 calories and the urban poor have an average increase of 80 calories per person per day. The increase is greater in the rural area due to higher income elasticities for most commodities in that sector. In addition, most commodity elasticities decline with income and incomes are lower in the rural areas.

Although transfers to the rural poor in the sixth scenario are less than they are in scenario 3, the lower relative price of fine flour encourages substitution which offsets the reduced effect of income on calorie intake. Consequently, there is a slightly greater increase of calories for this group than in scenario 3. For the urban poor, the income and the substitution effects reinforce each other and there is a sizeable calorie intake relative to both the base and no-real-price-change positions. Recall that even with the reported increases in nominal flour prices, real bread and flour prices decline in this scenario and at a greater rate in urban areas.

The experiment in scenario 2 shows an even greater drop in the relative prices of wheat products and larger increases in the value of the transfer embodied in the ration. Consequently, the increase in calorie intake in this scenario is quite high, although it reflects the current consumption effects of increased transfers from the government which comes at the expense of future generations. In this scenario, average intakes of the rural poor exceed those of their urban counterparts and reflect their greater price responsiveness. The index of underconsumption for the poor declines in both sectors. While over 40 percent of the group defined as poor were classified as calorie-deficient in the base year, this declines to approximately 25 percent in 1987.

Another way of illustrating this point is to note that with the population growth and the definition of the category of the poor used in this scenario, the 6 million poor Egyptians in 1981/82 have increased their families so that they number over 7 million in 1987.

Nevertheless, while 2.5 million of these poor were from families in which the average daily calorie intake was less than 85 percent of requirements in the base year, less than 1.8 million were categorized as such under scenario 2.

A different nutritional picture is presented in the fourth and fifth scenarios. In these cases, the increase in relative prices of foods leads to substitution of other goods. This effect is sufficiently large in scenario 4 to offset the increase in calories due to changes in income, and average calorie intakes decline for both urban and rural poor despite sizeable income growth. This decline is greater in the rural sector, where calorie intakes were already lower than intakes of the urban poor. While the index of underconsumption indicates only a small increase in the number of families within the category of urban and rural poor, the families now classified as not meeting 85 percent of calorie requirements include 2.9 million people. Furthermore, some families not defined as poor in the base case, using the income cut-off, are also predicted to have decreases in calorie consumption and, hence, may also be at increased risk of undernutrition. This situation is not appreciably altered in the wage increase variant of scenario 4, although there is a slight decline in urban underconsumption.

In scenario 5, the targetting leads to urban transfers equivalent to the base year and rural transfers to the poor are greater than the base year. Nevertheless, there is not an appreciable increase in calorie consumption relative to the baseline and a decline relative to scenario 3. This reflects the increase in the marginal prices of sub-

sidized foods, except balady bread in poor urban neighborhoods. Rural incomes, in particular, are redirected to other foods and to non-foods. Note, however, that the index of undernutrition does decline in this scenario relative to the baseline scenario. Moreover, it is much lower than that of scenario 4 or 4a, although the total cost of subsidies is less.

Effect of Changes on the Impact of Subsidy Policies
When Income Growth Slows Down

In the previous sections various policy options were explored under the assumption that real per capita income growth was 4.5 percent annually. While this represents the trend level in the years preceding the baseline, it may be optimistic for a period with declining oil prices and slow growth in Suez Canal traffic and tourism. Accordingly, scenarios 4 and 6 were also run with an assumption that the per capita real income growth slowed to 2 percent annually.

This variation of the income assumption affects the aggregate figures only slightly. For example, as income growth has only a small impact on the subsidy bill, the average transfer per capita declines from 30.95 in the high-income growth version of scenario 6 to 30.67 in the low-income variation. Similarly, the government outlay for subsidies is only 1.1 percent lower in the low-growth variation. With lower national income, however, the share of subsidies to total budget is 11.7 percent compared to 11.2 percent in Table 4.

Moderate income elasticities, on the average, also account for only small differences in total consumption or imports under the low-

growth scenarios. For most macro indicators, then, there is little implication for changes in income growth rates. A minor exception to this statement may be found with rice exports, which more than double from 41,000 tons with high-income growth in scenario 6 to 94,000 tons in the low-income alternative. Even this higher figure, however, is only a small portion of total production.

The main implication of low growth concerns nutrition. The index of underconsumption in the low-growth version of scenario 6 is 80 for the urban and 87 for the rural population.¹ Note that with a 2.5 percent population growth rate, a reduction of the percentage of families with inadequate calorie availability by 13 percent, which is indicated for the rural poor, implies that the total number of individuals at risk of malnutrition remains virtually unchanged in the two periods.

Looking at the indexes of malnutrition in the low-growth alternative of scenario 4, there is a particularly striking difference from the high-income scenario. In the high-growth version, the favorable effects of high-income growth managed to counterbalance the reduction in calorie intake that would follow an increase of food prices so that the percentage of families consuming below 85 percent of calorie requirements remained roughly constant. In the low-growth scenario, however, the index of underconsumption has risen appreciably to 116

¹ Given slower growth rates, more families are below the poverty cut-off in this alternative -- 20 percent of the urban and 19 percent of the rural populations, respectively. However, the index is based on the currently defined poverty group as stated above. The index, then, measures effects of subsidy options rather than modifications of the classification of the poor.

on the rural sector and 111 in the urban sector. Given the population growth, this implies an increase of more than 28 percent over the number of families at risk in 1981/82. This is the clearest example of a possible tradeoff between economic health and the health of the poor. If planners feel that aggregate income growth -- or only income growth of the poor -- will be closer to the low rate, then the need to explore the other policy options presented or combinations of them, including targetting of food subsidies toward the poor, is most apparent.

SUMMARY OF POLICY CHOICES

1) Egypt's economy is moving toward a situation of difficult policy choices. The core of these discussions involve the appropriate allocations of resources for present consumption versus investment to create long-term employment and growth. In terms of present consumption, the principal issues are pricing of energy and basic foods.

2) Food subsidy policies are only one sub-element of the policy choice problem. Food subsidies are neither the sole cause of the Egyptian economic problem nor would their abolition provide the remedy for the fiscal, foreign exchange, and employment problems the country is facing in the 1980s. This research cannot satisfactorily address these macro-economic problems. Rather, it provides the basis for policy guidance for answers to the following question: if a decision on food subsidy policies is to be made, what are the effects of alternative options on macro-variables as well as on the various segments of the population and the poor, in particular?

3) Accounting for fiscal and economic costs of food subsidies only makes sense if those outlays are related to the benefits of food subsidies. A "costly" food subsidy program may be economically efficient if its policy objectives are reached efficiently. Therefore, the policy options should be simultaneously evaluated for their costs and for the distribution and magnitude of their benefits.

4) If no action were taken over the period 1981/82 to 1986/87 -- that is, subsidized food prices stay at nominal constant levels, as several did through the 1970s -- the food subsidy budget would

increase by 44 percent in real terms. By 1986/87, it might cover 12 percent of the total government budget, or one-third of the fiscal deficit. Foreign exchange required for basic food imports at a constant exchange rate would rise by about 60 percent. These fiscal and foreign exchange effects would further increase domestic inflation and the devaluation of the Egyptian pound on the open market.

5) A most drastic scenario in which it is assumed that real prices of bread and flour increase by 50 percent and all other subsidized food prices apart from the tamween (ration) increase to international levels -- thus the subsidy on them is totally removed -- yields a reduction in subsidies of about one-half as compared to the "no-action" scenario. However, the effects for foreign exchange savings are much less impressive at first glance than the fiscal effects. A savings of only 11 percent is expected compared to the "no-action" scenario. This is a result of high substitution effects between commodities if their price ratios change. However, the potential revaluating effect of reduced subsidies for the exchange rate might still be substantial due to the monetary effects of subsidies and their impact on deficit financing.

6) A scenario roughly designed along the lines of policy changes currently being considered (scenario 6) reveals that only minor fiscal savings might be achieved in real terms (-10 percent of food subsidies versus "no-action"). This scenario also indicates a major administrative difficulty in the price structure; since major food prices are set by the government, the mechanism to alter them is cumbersome and price changes may only keep pace with inflation rather than outstrip it.

7) The analysis shows that major fiscal savings may be obtained only by substantial modifications of the bread and flour price subsidy and the subsidies paid to customers of the cooperative shops (e.g., for meat and poultry, macaroni), or by targetting. The latter can both reduce the costs of the system and reduce underconsumption. A degree of leakage must still be expected, both for administrative reasons and because the cut-off point for a poverty line must be subjective.

8) Food self-sufficiency objectives, especially for cereals, are a major driving force behind demands for corrections in food price policy. Solving the perceived problem of increased import dependence by promotion of domestic food supply has only been partly successful in the past. Yet, an attempt to solve the problem by curtailing effective demand via respective consumer price policy measures would not provide a feasible method for meeting self-sufficiency goals. As compared to the "no-action" scenario, substantially cutting subsidized grain prices in other scenarios would result in a maximum reduction in cereals consumption of about 11 percent. This would increase self-sufficiency in cereals from about 44 to 49 percent by 1986/87. The broader food policy implications of alternative food subsidy policies require taking the effects of subsidy policy for domestic food and agricultural production into perspective.

9) Food policymakers should be prepared for the surprising side effects of considered changes in subsidy policies. A case in point is the likely response of the rice market to changes in the wheat, bread and flour subsidies. A substantial cut in wheat subsidies would cer-

tainly induce a rapid increase in rice consumption even if rice were not subsidized. In the respective scenario, rice would be a major import crop with about half million tons imported annually. Of course, the rice trade may be constrained by the government policy. Yet, it is evident that under such a policy -- restriction of rice imports and reduced wheat price subsidies -- rice might end up as a protected subsector in agriculture since open market consumer prices in rice tend to translate into equivalent farmgate prices for producers. Such a further distortion of farm prices -- from a protected rice industry -- would adversely affect resource allocation in agriculture in the long run (e.g., land for cotton, the major competing summer crop).

10) Nutritional status seems to be either constant or generally improved under the optimistic assumption of high-income growth. The effects of income growth are either reinforced by reductions in food prices or they roughly counterbalance the impact of substitution away from more expensive grains. Only under the pronounced real price changes of the fourth scenario, and then only for the rural poor, is the proportion of malnourished expected to increase. The absolute number of families consuming less than the calorie requirements decreases for both sectors in scenarios 2 and 6, and for the rural poor in scenario 3. It remains roughly constant in the urban sector in the no-price-change scenario.

11) Conversely, when income growth is low, a noticeable decline in adequacy of calorie intake can be anticipated following major real price changes. Furthermore, when real wheat prices decline slightly,

as they do in scenario 6, population growth nearly offsets the decline in number of families at risk of underconsumption attributable to income and price changes.

This possibility should also be addressed when the national income increases at a high rate but the effects on the poor are somewhat less. If the economic possibilities of the coming years are not evenly distributed to the urban and rural poor, then the nutritional impacts of subsidy changes should resemble those of the low-growth scenario.

12) It is clear that the distribution of total benefits from the subsidy system vary among the scenarios. The relative responsiveness of the rural sector in general and the poor in particular to changes in prices and income accounts for greater gains by that sector from unrationed commodities when prices or incomes increase. Similarly, with larger budget shares to flour and bread, the rural poor see a greater decline in their real income when prices rise.

In addition, since the current system contains many components, some of which benefit the urban sector more than the rural and others which are relatively distributed in favor of the rural regions, the selection of which programs to modify alters the distribution of benefits. In scenario 6, in which actual price changes are different in the two sectors, the result is a predictable worsening of the relative position of the rural sector.

13) Compensating wage hikes may make subsidy cuts politically more palatable, but they reduce the fiscal savings with little nutri-

tional benefit. Furthermore, they are not targetted appreciably to the poor and increase urban-rural income disparities.

14) The model employed here can be adapted to explore other pricing or targetting modifications if the appropriate mechanisms can be specified.

For example, the model can explore changes in pricing policies for selected commodities, rather than outlets, or for modifications in the first-tier ration system other than that indicated in scenario 5. Furthermore, changes in other policies, such as removal of subsidies on maize for animal feed -- a change which would reduce government outlay by approximately 100 million pounds although would have only minor effects on foreign exchange requirements -- can be explored. Finally, it should be recalled that food subsidies are only one of many instruments utilized by the government to meet its diverse goals. Changes in other arenas -- for example, in agricultural policy or in energy pricing -- will also have major impacts on the general economy and indirectly on food consumption.

REFERENCES

- Ahmed, S. Public Finance in Egypt: Its Structure and Trends. World Bank Staff Working Paper No. 639. Washington, D.C.: World Bank, 1984, p. 12.
- Alderman, Harold and von Braun, Joachim. The Effects of the Egyptian Food Ration and Subsidy System on Income Distribution and Welfare. Research Report 45. Washington, D.C.: International Food Policy Research Institute, 1984.
- Alderman, Harold; Joachim von Braun; and Sakr, Ahmed Sakr. Egypt's Food Subsidy and Rationing System: A Description. Research Report 34. Washington, D.C.: International Food Policy Research Institute, 1982.
- Beaton, Ghassemi. "Energy in Human Nutrition: Perspectives and Problems." Nutrition Review 41 (1983): 325-340.
- von Braun, Joachim. Ernaehrungssicherungspolitik in Entwicklungs-laendern -- Oekonomische Analyse am Beispiel Aegyptens. Kieler Wissenschaftsverlag Vauk, 1984.
- von Braun, Joachim and de Haen, Hartwig. The Effects of Food Price and Subsidy Policies on Egyptian Agriculture. Research Report 42. Washington, D.C.: International Food Policy Research Institute, 1983.
- Ministry of Agriculture, Cairo. Annual Agricultural Situation Report, 1983, pp. 51-53.
- Roemer, M. "Planning by Revealed Preferences: An Improvement Upon Traditional Methods." World Development 4 (1976): 775-83.
- Scobie, Grant M. "Food Subsidies and the Government Budget in Egypt." Report submitted to USAID, January 1984.
- _____. Food Subsidies in Egypt: Their Impact on Foreign Exchange and Trade. Research Report 40. Washington, D.C.: International Food Policy Research Institute, 1983.
- Timmer, P.; Falcon, W.; and Pearson, S. Food Policy Analysis. Baltimore, Md.: Johns Hopkins University Press, 1983.