

PA-ABC-433

12/16/86

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**THE IMPACT OF ECONOMIC POLICY AND STRUCTURE  
ON PATTERNS OF FOOD DEMAND IN  
ASIA AND THE NEAR EAST**

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**August 1988**

**Prepared for ANE/TR/ARD Strategy Symposium  
"Agriculture in the 1990s"**

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## ABSTRACT

Many countries in the ANE region have achieved impressive growth in per capita consumption of calories in the past couple of decades. Others have been less successful. The rate of population growth has varied widely among these countries. This has helped some countries and hindered others in their attempt to improve per capita availability of food. The countries in this region have relied on a variety of policy instruments to achieve food consumption and other development objectives. Analysis shows, for example, that per capita consumption in some countries has been stimulated largely by pricing policy, while other countries have relied more on income growth, particularly in rural areas. A comparison also reveals that countries relied to varying degrees on production and trade policy to achieve consumption goals. In some countries the entire increment of Green Revolution induced production was used to enhance per capita availability of cereals, while in others much of the added production was used for import substitution. There is, as well, a group of countries where, despite low agricultural growth, dramatic improvement in per capita food consumption was achieved through expansion of food imports.

In the coming decade, demographic and economic factors suggest that growth in demand for cereal calories will slow down. At the same time, diet diversification, which is already underway, will continue. Part of this process will result in an increasing demand for coarse grains for animal feed to support expanding demand for poultry meat and eggs and other feed intensive protein sources.

## I. *Introduction*

The aim of this paper is to explore some of the variety of ways in which countries in AID's Asia and Near East Region have combined food and agricultural policy instruments in conjunction with underlying behavioral patterns to achieve policy objectives. The paper is not intended to be comprehensive. On the contrary, its focus is on policies which have promoted and facilitated changes in food consumption, particularly calorie consumption, over the last decade and a half. Since a good deal of policy effort is aimed at this objective in most countries, this small case study should shed light on important economic and policy structures that have implications beyond the food consumption objectives discussed here.

The performance of per capita food calorie availability in ten Asian and Near East countries since 1965 is shown in Table 1. There is a greater diversity of performance at the beginning of the period than at the end, as many countries achieved substantial increases in food availability. In Pakistan, Indonesia, and Morocco these gains began in the first decade and continued in the second, with Pakistan's progress slowing noticeably. In the remaining seven countries, virtually all of the progress was achieved in the second half of the period. An interesting aspect of this record of performance is that it occurred within a great variety of economic, social, and policy environments represented by varying agricultural productivity, population growth rates as low as 1.7 percent and as high as 2.8 percent, and important differences in pricing and trade policies.

Table 1

### *DAILY PER CAPITA CALORIE AVAILABILITY*

	1965	1973	1984	1965	Index 1973	1984
BANGLADESH	1964	1949	1906	100	99	97
EGYPT	2435	2631	3280	100	108	135
INDIA	2100	1967	2185	100	94	104
INDONESIA	1742	2031	2489	100	117	143
PAKISTAN	1747	2128	2223	100	121	127
PHILIPPINES	1936	1957	2328	100	101	120
SRI LANKA	2155	1075	2414	100	96	112
THAILAND	2200	2302	2303	100	105	105
MOROCCO	2182	2593	2864	100	119	131
TUNISIA	2296	2376	2888	100	103	126

Although the changes in calorie consumption were the result of a complex of social and economic forces, many of which were beyond the reach of actual economic policy making, nevertheless policy played a critical role in determining the pattern shown in

Table 1. The next section of this paper analyzes factors influencing calorie consumption. This is followed by an examination of the record on sources of supply of cereal calories. Looking at these two sides of the story reveals the various configurations of pricing and trade policies employed by these countries in pursuit of often-conflicting goals such as food self-sufficiency, improvement of nutritional status, and foreign exchange generation. The last two sections of the paper discuss some aspects of food demand diversification likely to occur in the coming decade, as well as some implications of the changing demographic patterns in Asian and Near East countries.

## II. *Food Demand*

In this section an effort is made to identify the relative importance of factors that have influenced calorie consumption in these countries between 1973 and 1984, the period where the most data are available for the most countries. The approach here is to compare simulated with actual changes in consumption using a simple national consumption relationship,

$$\text{Cal}' = \text{Pop}' + Y'E_y + P'E_p + \text{other}$$

where Cal', Pop', Y', and P' are growth rates in total calorie consumption, population, real income per capita, and real food or cereal prices; E<sub>y</sub> and E<sub>p</sub> are income and price elasticities of demand respectively; the "other" category will be discussed below. The last three terms of the relationship are the factors which impact on changes in *per capita* consumption.

The data employed here are shown in Table 2. The focus is initially on per capita consumption, and proceeds sequentially from relationships that are best known to those that are less well understood. The analysis begins with the income elasticities of demand. These are calculated from a relationship estimated earlier by Reutlinger and Selowsky, and are calibrated to each country's initial level of per capita calorie consumption, reflecting the notion that as consumers approach a threshold of high calorie consumption the income-calorie demand relationship diminishes in strength. These elasticities are then employed, along with the actual 1973-84 change in real per capita income, in a projection of per capita calorie consumption in 1984 from the 1973 base. In the second stage, the differences between the simple projection and actual achieved growth in calorie consumption are measured. These differences are compared with change in real food (or cereal) prices for the seven countries where data were available in order to derive implicit price elasticities of demand.

Table 2

*DEMAND INFLUENCING FACTORS*

1984 Index (1973 = 100)

	Income Elasticity Calories	Real Per Capita GDP	Staple Food Prices
BANGLADESH	.17	104	88
EGYPT	.125	140	51
INDIA	.168	122	88
INDONESIA	.162	164	69
PAKISTAN	.155	130	111
PHILIPPINES	.167	123	97
SRI LANKA	.16	137	98
THAILAND	.14	154	81
MOROCCO	.127	123	--
TUNISIA	.139	151	--

The results of these steps are shown in Table 3. For three of the countries, Egypt, India, and Indonesia, a plausible implicit price elasticity of demand for calories of about -0.4 explains the entire difference in calorie consumption remaining after the income based estimate. For the remaining five countries, the implicit price elasticities are of the wrong sign or an implausible order of magnitude (Philippines and Sri Lanka).

In the second stage of analysis, a price elasticity of -0.4 is employed for all of the countries, along with the earlier income-based projections, to simulate the 1984 per capita calorie consumption from the 1973 base. This revised projection is again compared with actual 1984 consumption. The remaining difference is now attributed to "other" factors. Finally, population growth is included to estimate the full consumption relationship for total calorie consumption defined above.

The results of this analysis are summarized in Table 4, where the proportionate contribution of each of the major factors to total calorie consumption growth between 1973-84 is shown. Including population in this table makes the obvious point that demand for calories is largely population driven. Although the point is obvious, it is nevertheless important to consider in an environment where demographic forces are changing, as is the case in many of these countries. This will be discussed more fully below.

Table 3

*FIRST STAGE ANALYSIS OF CALORIE DEMAND RELATIONSHIP*

1984 Index (1973 = 100)

	Projected Cal. Demand	Actual Cal. Demand	Implied Price Elasticity
BANGLADESH	101	97	2.9
EGYPT	105	125	-0.41
INDIA	104	111	-0.38
INDONESIA	110	123	-0.39
PAKISTAN	105	105	0.40
PHILIPPINES	104	119	-5.1
SRI LANKA	106	116	-5.2
THAILAND	108	0	0.4
MOROCCO	103	111	--
TUNISIA	107	122	--

Table 4

*PROPORTIONATE CONTRIBUTION TO CHANGE  
IN TOTAL CALORIE CONSUMPTION  
(percent)*

	Population	Income	Price	Other
BANGLADESH	108	0	15	-23
EGYPT	54	9	37	0
INDIA	71	9	20	0
INDONESIA	56	20	24	0
PAKISTAN	88	12	-11	11
PHILIPPINES	63	7	2	-27
SRI LANKA	56	16	2	26
THAILAND	100	24	24	-48
MOROCCO	74	7	19	
TUNISIA	56	14	30	

In three of the countries where price data are available, Bangladesh, Egypt and India, pricing policy is shown to dominate income influences on consumption. In three other countries, Indonesia, Thailand, and Pakistan, pricing policy and income are about equally important determinants of consumption, with two countries having reinforcing effects. In Pakistan, pricing policy offsets the income impact (this statement will be modified below in exploring the "other" category). In only two countries, the Philippines and Sri Lanka, do income effects dominate pricing policy. In two of the four countries where per capita consumption increased by more than 15 percent, Egypt and Indonesia, pricing policy contributed 37 and 24 percent of the change, respectively.

With the analytic procedure employed here, the "other" category is a residual, but in five of the countries it is a large contributor to the consumption change, in three countries it has a positive influence, and in two countries the impact on food consumption is negative. It is likely that the "other" category is mostly measuring the result of mis-specifying the price and income variables discussed above. The measure of prices here represents a combination of official and free-market prices, with the latter usually measured in a major urban area where official prices tend to have greater impact on market prices. In many cases these prices underestimate true market clearing prices on a national basis. The rationing error thus introduced will show up in the "other" category as a negative contribution to consumption, to offset the overestimate of demand generated by the undervalued price. In the case of Sri Lanka there is another source of price specification error stemming from the fact that the available consumer price series ended in 1981. It is probable that between 1981 and 1983 real cereal (and coconut) prices declined somewhat, which would result in a smaller, though still large, residual "other" category.

The mis-specification of the income variable is easier to speculate about, as the signs of the "other" variable are consistent with aspects of economic behavior that we know to be important in the various countries. The income elasticity used in the demand simulation is calculated as a function only of aggregate per capita calorie consumption and average per capita national income. Yet many of the countries considered here have experienced important changes in income distribution. Evidence presented in Peter Timmer's paper on "The Role of Agriculture in Employment Generation and Income Distribution in Asia and the Near East" prepared for this symposium supports the notion that rural incomes are particularly important determinants of food consumption. In Thailand and Bangladesh, the evidence suggests a relative worsening of rural incomes compared with those of urban workers. This would tend to lower the aggregate income elasticity of demand for calories in a way not specified in the income analysis above, resulting in a negative contribution from the "other" category to offset an overvalued income elasticity. In contrast, the Philippines, Sri Lanka, and Pakistan have large positive contributions from the "other" category. The Philippines, despite a worsening distribution of income in rural relative to urban areas, managed to generate fairly rapid improvements in rural labor productivity. This may have stimulated a demand effect independent of that influenced by income distribution represented, e.g., by a large own-demand for rice on smaller farms benefiting from Green Revolution technology and irrigation expansion. In Sri Lanka, recent changes in economic policy have resulted in rising rural labor productivity. This could be a factor contributing to a large positive "other" category for that country. In Pakistan, also, there is evidence of large improvements in rural incomes and even, perhaps, in rural/urban income distribution. This is due largely to the widespread impact in rural Pakistan of worker remittances from the Middle East. This influence on rural income and income distribution, which has played a strategic role in Pakistan's rural

economy in the 1970s and '80s, is not picked up in the measures employed in the Timmer paper.

### III. *Demand Diversification*

As per capita calorie consumption has increased in Asia and the Near East, the sources of calories accommodating that expansion have varied greatly. The pattern of expansion in eight countries attributed to selected food groups is shown in Table 5. The country experience varies widely with these sources, cereals, fats and oils, sugar, roots, and pulses, together accounting for between 33 and 90 percent of per capita calorie expansion. In no country did cereals account for more than 65 percent of calorie expansion. In Pakistan, cereal consumption declined. In most of the Asian countries, fats and oils account for the second largest source of expansion, with sugar being an inconsistent third. In Bangladesh, per capita consumption of fats and oils was the only major category to show an increase.

Part of this diversification is due to increasing per capita incomes and the demand for greater variety in the diet once cereal and total calorie consumption reach a threshold level. An additional stimulus is changing relative food prices generated by varying combinations of production and trade policies. In Pakistan, for example, where the increase in fats and oils calories was almost three and a half times that required to offset the decline in cereal consumption, the real relative price of vegetable oil decline dramatically during the period.

It is likely that this diversification will increase in the next decade as per capita incomes and calorie consumption increase. One implication is that cereal grain production will probably not have to increase at the same rate as during the past two decades in order to keep up with direct demand expansion.

Table 5

**CONSUMPTION DIVERSIFICATION**

*Proportionate Contribution of Selected Food Sources to  
1973-1984 Change in Per Capita Calorie Consumption*

	Calorie Change	Proportionate Contribution Change in Calorie Consumption (%)				
		Cereals	Oils	Sugar	Roots	Pulses
BANGLADESH	- 43	83	-109	12	9	26
EGYPT	649	41	28	16	3	-10
INDIA	218	36	24	15	15	0
INDONESIA	458	65	18	0	7	0
PAKISTAN	95	-35	123	-28	- 3	-24
PHILIPPINES	371	40	9	13	0	0
SRI LANKA	339	52	13	10	0	0
THAILAND	0					
MOROCCO	271	50	10	15	7	3
TUNISIA	512	63	7	8	1	--

Another dimension of diversification is in the demand for animal protein sources, particularly poultry meat and eggs. Various aspects of per capita protein consumption growth between 1973 and 1984 are shown in Table 6. In eight countries protein consumption expanded beyond population growth by an average annual rate of 1.26 percent, 14 percent over the 11 year period. In Bangladesh and Thailand per capita protein consumption declined, while in Pakistan it was almost unchanged. In nine countries per capita animal protein share expanded at an average annual rate of 1.7 percent, with the animal protein share rising from 10.6 to 12.8 percent. In all countries except Sri Lanka per capita consumption of protein from poultry and eggs expanded rapidly, from a small base, at an average annual rate of 9 percent, with Pakistan growing at 17.7 percent per capita. This expansion, which is likely to continue, will probably be a dynamic source of feed grain demand in the 1990s, partially offsetting the growth diminishing factors mentioned above.

Table 6

*CHANGES IN PER CAPITA PROTEIN CONSUMPTION  
1973 - 1984*

	Protein Growth	Animal Protein Share		Growth Rate Poultry & Eggs
		'73	'74	
BANGLADESH	- .57	6.7	5.1	8.7
EGYPT	1.17	10.3	14.3	6.9
INDIA	.96	5.3	7.0	8.1
INDONESIA	2.0	5.3	7.1	9.6
PAKISTAN	.25	12.7	12.5	17.7
PHILIPPINES	1.4	16.9	20	8.3
SRI LANKA	1.5	6.6	9.3	0
THAILAND	- .1	13.2	13.9	8.7
MOROCCO	.78	10.6	12.5	6.2
TUNISIA	2.0	13.7	18.2	7.3

#### IV. *Implications of Demographic Change*

In this final section attention is turned to aspects of changing demographic structure which have implications for agriculture and food demand in the 1990s. Total population growth is slowing, in some cases dramatically, in all of the countries considered here. United Nations demographic projections for the period 1985-2000 are compared with the 1970-85 performance in Table 7. Population growth is projected to slow by about 21 percent, from a low of 11 percent in Bangladesh to between 29 and 36 percent in India, Indonesia, and Thailand. Considering the importance of population in the food demand relationship (see Table 4), this demographic trend will have an important influence on slowing the demand expansion for staple grains in Asian and Near East countries.

Projections of the rural population are less reliable and difficult to find. The FAO has carried out such an exercise for the rural labor force, however. This projection is shown along with U.N. projections for the total labor force in Table 8. The total labor force is projected to grow at a rate 26 percent greater than the total population, while the rural labor force grows at half the rate of total population. In the FAO projection, rural labor force grows at about 73 percent of the 1970-85 rate. Since growth rates of rural labor will be much more sensitive to macro-economic and relative sectoral performance, these rural labor projections must be treated with caution. Nevertheless, if these comparisons are at all accurate, the 1990s will witness a substantial demographic transition with important implications for rural labor markets as well as aggregate food demand.

Table 7

*POPULATION GROWTH RATES*

	1970-1985	1985-2000	% Change in Growth Rate
BANGLADESH	2.8	2.5	-11
EGYPT	2.3	2.1	-10
INDIA	2.2	1.6	-29
INDONESIA	2.3	1.6	-30
PAKISTAN	2.7	2.3	-15
PHILIPPINES	2.6	2.1	-19
SRI LANKA	1.7	1.3	-24
THAILAND	2.5	1.6	-36
MOROCCO	2.4	2.0	-17
TUNISIA	2.2	1.9	-16

Table 8

*LABOR FORCE GROWTH PROJECTIONS  
1985 - 2000*

	Urban Pop. Share ('85)	Population Growth Rates		
		Total	Labor	Rural Labor
BANGLADESH	18	2.5	3.0	1.9
EGYPT	46	2.1	2.7	1.4
INDIA	25	1.6	1.8	1.3
INDONESIA	25	1.6	2.2	0.3
PAKISTAN	29	2.3	2.8	1.7
PHILIPPINES	39	2.1	2.4	1.5
SRI LANKA	21	1.3	1.6	1.3
THAILAND	18	1.6	1.7	0.6
MOROCCO	44	2.0	3.1	0.5
TUNISIA	56	1.9	2.8	-1.1

V. *Summary*

This paper has shown that food consumption patterns among ANE countries have been influenced by direct policy intervention, particularly pricing policy, as well as more complex processes of economic growth and demographic change. During the coming decade, demand pressure on basic grain staples will probably slow down somewhat due to

slower rates of population growth. The process of diet diversification, already underway in many countries, will continue to be stimulated by improvements in per capita income. Whether or not future pricing policy will support demand patterns similar to those promoted in recent years is an open question, subject to the influence of fiscal constraints and changing features in the political economy.

Further research work is underway now aimed at a more comprehensive and sophisticated analysis of the consumption patterns reported here, including analysis of the mix of related supply-accommodating policies effecting international trade and domestic production.