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Policy Issues, Project Design and Implementation Plan: Final Research Strategies Based on Host Country Review

Report #1 - Indonesia

CEAP Project in Indonesia
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1. Food Policy Issues and Priorities

The main food policy objectives of the government of Indonesia (GOI) are to increase food production toward self-sufficiency, increase the level of income, improve the distribution of income, and stabilize rice price. Rice is the nations top policy priority crop. In recent years, however, there has been a move to include other staple secondary food crops (PALAWIJA) in the GOI food self-sufficiency plan.

One of the two main policies that the government pursues to promote these objectives is the planning, coordination and delivery of improved farm technology through what is known as the Bimas-Inmas intensification program.[1] The program is designed to promote the use of new improved inputs, disseminate new technology and provide output marketing channels to the participating farmers.

Services to these farmers are provided through a cluster of three or more villages called 'Village Unit Areas.' Each village area has four delivery institutions; namely, agricultural extension, private kiosk for channeling farm inputs, village unit banks to make credit arrangements to the farmers, and village unit cooperatives which are assigned to be the purchaser of farm products from the farmers. The day to day operations of these delivery institutions are ruled by guiding institutions which are government apparatus established at all levels of the administration.

The intensification program is accompanied by a government administered pricing policy. Beginning in 1970, a policy was introduced to set floor and ceiling prices for rice. The floor price is determined on the

[1] Bimas stands for 'Mass Guidance' (Bimbingan Massal). Inmas refers to 'Mass Intensification' (Intensivikasi Massal). Under the Inmas arrangement, the farmers are not entitled to Bimas credit.

basis of an incremental cost-benefit ratio. It is designed to induce farmers to join the intensification program and increase their levels of rice production. Because of the importance of rice in the average diet of Indonesians, its ceiling price is set with consideration of its impact on the level of real income of the urban consumer groups, and the general price level. Based on the experience gained in such dual pricing scheme in rice sector, the concept of floor price has been extended to corn, soybeans and peanuts since 1979.

The government input pricing policy covers fertilizer and pesticides. Various types of fertilizers are used, but Urea and TSP account for about 90 percent of all fertilizers used. The domestic fertilizer prices are well below the import parity prices and Indonesia's own domestic cost of production and distribution. In 1982, for instance, the estimated domestic price for Urea was Rp 90/kg compared to the import price of Rp 160/kg.

In response to such favorable food price policies, Indonesia has attained rapid growth rates in rice production; from average annual growth rates of 4.7 percent in the period of 1972 to 1976 to 8.7 percent in 1977 to 1981 (Annex I, Table 2). The most recent evidence (Hanratty, 85) shows that rice production is continuing to rise, resulting in a heavy downward pressure on farm prices. The success of the rice program is attributed to an increase in the utilization of improved seed varieties and fertilizers, expansion of irrigated lands, and improvement in crop management and practices.

The growth rates in rice production are reflected in aggregate increases in the levels of food consumption and nutrition intakes. Per capita annual consumption of rice grew from an average of 103.7 kgs to

128.7 kgs in the year between 1968 and 1981; an average rate of 2.5 percent per annum (Annex I, Table 1). In terms of rice calorie consumption, calories available increased at annual growth rate of 2.6 percent for the period between 1968 and 1977 (Annex II, Table 12).

Notwithstanding the success of these policies in promoting the rice self-sufficiency objective, there are growing concerns with these policies. At present, these concerns are related to:

a. the rising budget cost associated with the subsidies on rice and fertilizer,
b. the decline in government fixed price margins, and
c. the need for diversification in food production and consumption.

Rice in Indonesia has often been priced below comparable world prices. Table 1 shows a comparison of the retail rice prices with import parity prices. Except for 1973, 1976, 1977 and 1982[2], import parity prices were generally higher for most of the 1970s and early 1980s. In those years when the government had to use imports to make up the domestic productions shortfalls, such pricing policy implied an increased burden on the GOI budget.

The more pressing problem at present appears to be the budget cost associated with direct cash subsidies on fertilizers. According to the recent estimates (World Bank, 1983), the GOI subsidy for fertilizer alone amounted to around US $370 million - $270.2 million on domestically produced and $99.2 million on imported. For fiscal year 1984/85, a total of US $459 million was allocated for the subsidy of fertilizers, pesticides, and seed. In addition to these financial costs, there are implicit costs

[2]The domestic price again fell below import parity after the rupiah devaluation in 1983.

Table 1. Trends in Imported and Actual Rice Prices in Jakarta.

Year	Imported Price / Cost to Retail Jakarta	Actual Jakarta Retail
1970	148.64	112.4
1971	115.45	109.3
1972	127.45	119.0
1973	175.76	205.2
1974	558.69	242.2
1975	380.49	262.7
1976	263.37	309.6
1977	287.33	319.6
1978	382.22	318.8
1979	362.00	272.5
1980	466.40	319.0
1981	470.10	325.0
1982	320.90	348.0

Source Table taken from World Bank Study, 1983.

associated with a growing practice of an excess use of fertilizers on some farms in Java.[3]

The second area of concern is with the decline in farm-retail price margins in recent years. The National Logistics Agency (BULOG) is charged with the implementation of the floor price policy. If the local free market price of rice falls below the specified floor price, BULOG is required to buy rice sold by the farmers. BULOG is also responsible for maintaining the ceiling price through the injection of rice form the national stock into the market when the market prices rise above the ceiling price.

As can be learned from Table 2, the levels of floor and ceiling prices have increased over time. The floor price for milled rice has increased from Rp 37/kg in the early 1970s to Rp 195/kg in 1981/82 -- an average annual growth rate of 14.9 percent. At the same time the ceiling price has increased but at a slower rate of 13.0 percent per annum. This is more evident in the patterns of the price spread over the years. The price spread has declined from a peak of 46 percent in 1974/75 to 15.4 percent in 1981/82 then increased again the next year. Between 1976 and 1982, the price margin was less than 20 percent in all the years except in 1980/81 and 1982/83. Based on the World Bank report (1983), if the stockholding function should become necessary to shift to the private sector, the current price spread (about 20 percent) is not sufficient to induce private traders and millers.

A case in point is the current situation where, as the result of 1983/84 bumper rice harvest, BULOG rice stocks are increasing rice stocks to record heights (Hanratty, 1985). In the face of a limited public

[3]Based on our discussion with Faisal Kasryno, Director, Center for Agro-Economic Research.

Table 2. Floor and Ceiling Prices, Price Margin, Size of Domestic Procurements and Market Operations for Milled Rice.

Year	Floor Price (Rp/kg)	Ceiling Price (Rp/kg)	Price Margin (%)	Procurement ('000 tons)	% of Production	Market Operation ('000 tons)
1969/70	37	50	35.1	349	2.6	364
1970/71	37	50	35.1	349	2.6	364
1971/72	37	50	35.1	349	2.6	364
1972/73	37	50	35.1	349	2.6	364
1973/74	45	--	----	349	2.6	364
1974/75	68.5	100	46.0	536	3.5	342
1975/76	97	120	23.7	539	3.6	559
1976/77	108	125	15.7	410	2.6	979
1977/78	110	127.5	16.0	404	2.5	2,006
1978/79	119.5	140	17.2	881	5.0	1,032
1979/80	158	175	10.8	431	2.4	2,874
1980/81	175	210	25.7	1,635	7.3	2,439
1981/82	195	240	15.4	1,934	8.5	1,973
1982/83	214	280	30.8	1,933	8.1	2,972

Source: World Bank Study, 1983 and BULOG publications.

storage capacity and downward pressure on rice prices, the government has to pursue an aggressive export promotion policy to defend its current floor prices. Other options, like a selective procurement of high quality stocks and non-market domestic distribution, are likely to lower the prices of low quality rice varieties and undermine BULOG's leverage for a successful market operation.

There is a growing realization among policy makers that the government not only has to fine tune its rice pricing policy to accomodate periodic market pressures, but also has to shift its emphasis to PALAWIJA crops. The current development plan (PELIJA IV) expresses such a desire to move toward self-sufficiency in all the main staple food crops.

The need for such a policy shift is of particular importance on the island of Java.[4] First, the current rice policy program has attracted to bring marginal new lands into rice cultivation. Lands which are more suitable for other crops (eg. vegetables) are diverted to rice production. Second, the increase in rice yields are approaching a plateau. Any further efforts to intensify the use of improved inputs are likely to have little effect on rice production. Finally, it is timely for Javanese farmers to produce other protein sources (vegetables, animal products, etc.) in response to the growing level of income of the population.

The course of action in the near future is likely to be an upward revision of the fertilizer-price ratio. There are two important policy questions related to this decision. First, it is important to identify the impacts of these changes in government policy on production and consumption behaviors in the country. In addition, it is important to

[4]Based on our discussion with individuals in Indonesia.

anticipate the incidence of these policy effects on nutritional status of the population. Second, there is the question of government cost. The thrust of our work will focus on these questions, specifically on a quantitative analysis of the effects of these policy changes on food consumption and nutrition.

2. Project Design and Implementation

2.1. Project Objectives:

(i) To enhance methods and procedures for estimating probable effects of policy changes on food consumption patterns and nutrition.

(ii) To apply the new parameter estimates in assessing the consumption/nutritional impacts of a specific policy option.

(iii) To contribute to the capacity of the host country for analysis of policies that affect consumption and nutrition.

2.2. Project Products:

(i) a. A more complete description of consumption patterns and nutritional status by socioeconomic groups. In addition to the standard income level classifications, we will report this information by main household income sources. This has not been possible with SUSENAS data but is with the SURGASAR.

b. Estimation of a new set of price and income elasticities for the major food crops using a household production and consumption decision model. This is made possible by the SURGASAR survey as it incorporates data that can be used to link production, consumption and income in farm households.

(ii) A policy paper which outlines the procedures used, the estimated parameters and reports the results of the analysis.

Suggestions on a timely policy issue all revolved around rice and fertilizer price policies, so we will be prepared to look at these jointly.

(iii) A spreadsheet program and users guide for the use of the new parameters in policy analysis exercises. The exercises will be done in an "if then" mode and be discussed at the final project workshop with likely users of the information and programs.

2.3. Analytical Procedures

2.3.1. Modeling Approach

Two modeling approaches will be utilized. These are the macro (agricultural sector) and micro household models. The in-country macro or sector model will be linked with already existing macro or international commodity market models. Based on these linkages, assessments will be made of government costs, imports, exports and projected relative prices for major agricultural commodities in Indonesia.

The in-country macro or sector analysis will be an extension of previous work on supply and demand projections and price policies developed by Teken and Meyers. Simple projections will be made initially, assuming that consumption will change only in relationship to changes in the composition of population and income. Then, the model will be elaborated to take into consideration income and price effects as the new elasticities are available from the micro model. The same procedure will be used on the production side. This model will be linked on a satellite basis with FAPRI international commodity projections for computation of implicit import or export subsidies or taxes.

The micro model will reside largely on the household survey data. This micro model will feature the household production approach to estimation of behavioral parameters. That is, households will be viewed as both producing and consuming units. Because survey data bases have traditionally concentrated on the consumption side (eg. SUSENAS), this model will be based on the survey Ganda Sasaran (SURGASAR) which includes both production and consumption data. The approach recognizes the influence of production parameters on food consumption and nutrition status of the farm households. The micro model will operate on a satellite basis with the in-country aggregate models of commodity markets.

2.3.2. Data Requirements

The proposed analyses will require substantial data. The aggregate data outside Indonesia are already available. Aggregate production, consumption and trade statistics on Indonesia are partly available. For the proposed micro model, the 1980 SURGASAR is the only comprehensive data set available at present. We have acquired the tapes and preliminary tests on the integrity and completeness of the data are underway.

2.3.3. Output Delivery and Contacts

On the basis of the agreement that we established with Dr. Faisal Kasryno, Director, Center for Agro-Economic Research, the Center (CAER) will be the primary collaborating agency in Indonesia. Given their special policy analysis role, research staff, and computer capability, such arrangement is believed to permit specialization of our proposed research to policies contemplated by this unit.

2.4 Implementation Timetable

2.4.1. Data Tapes

The SURGASAR data tapes have been obtained from the Bureau of Census in Indonesia and the data is being transfered into working data sets on the Iowa State University computer system.

2.4.2. Descriptive Analysis

Between July and September, the descriptive analysis of the data will be conducted. This will provide product (i.a.) and set the stage for the parameter estimation.

2.4.3. Workshop #1 at CAER, Bogor

This workshop will have two components: One, presenting the material described under product (i.a.); Two, perhaps for a technically oriented subgroup, presenting the household model that is to be used for the estimation of parameters for farm households and the aggregate model to be used for the policy analysis. There may be some preliminary results from our analysis to include but this cannot be assured. Assuming no unusual problems with the data, we should be able to conduct this workshop in October or November, 1985. Individual consultations could follow the workshop.

2.4.4. Estimation and Model Analysis

For the approximately eight months following the first workshop, work will be conducted on the household and national models and the policy analysis. This activity will lead to products (i.b.), (iii) and a draft of the policy paper (ii).

2.4.5. Workshop #2

This workshop will be final activity in the project, probably July or August 1986. It should be designed in parts to communicate

to several different levels of participants. The purpose of the workshop is to communicate the results of the study and to train the technical collaborators in the further use of the analytical tools that have been developed. This workshop can be planned in more detail during the next visit to Indonesia but probably would include a presentation to administrative persons, such as bureau chiefs and policy advisors. It should also include a training session with people on the CAER staff and perhaps others who would be interested in Bureau of Planning, Universities, BAPPENAS, and BULOG, for example. The results of the estimation and policy analysis would be presented at levels appropriate to each group.

2.4.6. Final Project Report

Following the second workshop, the policy paper would be finalized and the final project report developed. Final revisions in the spreadsheet program and users guide would also be made in response to comments at the workshop.

Annexes

Food and Nutrition Availability and Consumption Practices - A Review of Studies on Indonesia

1. Food Availability and Consumption

Food balance sheet estimates provide a gross measure of per capita food availability in a given period of time. The figures are based on the computation of net available domestic production, net import trade, and net stock changes. The net available domestic production measures gross domestic production adjusted for seed and feed requirements, processing losses, waste, and other non-food uses. The aggregation of net domestic production available less net trade balance and net stock changes then measures the total food that is available for human consumption.

There are marked variations in the growth rates of per capita availability of staple crops in Indonesia, i.e., rice, corn, wheat, cassava and potatoes. Per capita annual consumption of rice grew from an average of 103.7 kgs to 128.7 kgs in the years between 1968 and 1981; an average rate of 2.5 percent per anum. Wheat, an import crop, grew at a comparable rate of 2.2 percent. Per capita availability of cassava increased from 57.4 kgs to 71.6 kgs in the period between 1968 and 1978; an annual growth of 1.4 percent. In the case of corn, the growth was marginal: 0.4 percent per anum. The per capita consumption of sweet potatoes declined in 1968-1978 period at annual rate of -3.5 percent. Thus, except for potatoes, the growth trends of the other crops suggest an increasing availability of food for consumption.

The food crops contribute two-third of the value added in agriculture. Over 50 percent of the contribution of food crops comes from the production of rice. Cassava and corn are the other important food crops. The contributions of these crops, rice in particular, determine the size and the trend of the overall availability of food for consumption.

Since 1968, rice production has progressed in three phases. Between 1968 and 1971, the annual rate of growth in production was 5.5 percent. The

Table 1: Annual Per Capita Availability by Crop, 1968-78.

(kilograms)

Year	Rice[a]	Corn[b]	Wheat	Cassava[c]	Sweet Potatoes
1968/70	103.7	21.5	3.1	57.4	18.0
1971/74	112.5	20.7	4.1	52.9	16.7
1975/78	118.7	21.9	4.3	71.6	15.6
1968/78	112.3	21.3	3.9	60.9	16.6
(% P.A.)	(2.5)	(0.4)	(2.2)	(1.4)	(-3.5)

Source: John A. Dixon. Food Consumption Patterns and Related Demand Patterns in Indonesia. June, 1982. (Note: The data are based on Food Balance Sheet Estimates.)

a: Rice includes milled rice only.

b: This does not include fresh corn.

c: This does not include cassava starch; cassava is given fresh root equivalent.

growth rate averaged 4.7 percent per anum in the period of 1972 to 1976. The slow growth in this period has been associated with the occurrence of draughts. Since 1977, production has grown at annual rate of 8.7 percent.

The rising trend in production has been related to the combined effects of the increased levels of yield and area harvested. The increase in area harvested was mainly in a form of increased cropping cycles in Java. This has been atttributed to a combination of three factors: first, expansion of irrigated lands which permits farming all year round; second, an increase in utilization of short maturing seed varieties; and third, improvment in crop managment and practices. Expansion of new lands and, to some degree, an increase in crop intensity, have contributed to an increased land utilization

in off-Java islands. The increase in production due to yield effect has been associated with improved quality of irrigation lands, the use of improved seeds and fertilizers, and better crop management practices. No conclusive results have yet been established as to the precise magnitude of the separate and joint contributions of these growth factors. Table 2, however, seems to suggest that the effects of improved technical inputs and irrigation are stronger on yields than the area effect.

Table 2: Annual Average Rates of Growth of Rice: Area Harvested and Yield by Region, 1955-1981.

	Java		Off-Java		Indonesia	
Period	Area	Yield	Area	Yield	Area	Yield
1955/1967	-0.2	0.9	3.0	-0.4	--	--
1968/1971[b]	1.2	4.7	1.3	3.4	1.2	4.3
1972/76[b]	0.7	3.5	2.2	3.2	1.5	3.2
1977/81[b]	3.6	6.7	2.1	4.0	2.9	5.8
1968/81	1.0	3.4	1.1	3.2	1.1	3.2

Sources: 1. L.A. Mears. The New Rice Economy of Indonesia. Jakarta: Gadjah Mada University Press, 1981.
2. World Bank. Indonesia: Policy Options and Strategies for Major Food Crops. Report No. 36865-IND. April 4, 1983.

Despite the rapid growth in production, the level of rice available for consumption has not been sufficient to meet the consumption needs of the people. Since rice prices in Indonesia are allowed to vary in narrow fixed margins, the government has to use imports in addition to its own reserve stocks to make up the production shortfalls (Table 3). The level of rice import, for example, jumped from 0.5 million in 1971 to 1.66 million tons in 1973 as a result of a drop in domestic production and a decline in domestic reserves. Since then, the levels have remained on a higher plateau with a rising trend. Mears (6) attributes such rising trends to the availability

of oil revenues which permit the Indonesian government to increase imports of rice in order to hold domestic prices and build up reserve stock to reduce risks of shortages.

Table 3: Rice Production, Consumption, Imports and Procurement, 1965/81.

Year	Available Production	Consumption	Balance	Imports	Net Change in Stock Government	Private
			(million tons)			
1965	9.22	9.52	-0.30	0.20	-0.10	*
1966	9.67	9.89	-0.22	0.31	0.10	*
1967	9.36	9.74	-0.38	0.35	-0.03	*
1968	10.50	10.78	-0.28	0.63	0.35	*
1969	11.02	11.98	-0.96	0.60	-0.23	*
1970	11.83	12.43	-0.61	0.96	0.27	0.08
1971	12.35	12.96	-0.61	0.50	0.00	-0.11
1972	11.87	13.51	-1.64	0.75	-0.36	-0.53
1973	13.15	13.94	-0.80	1.66	0.41	0.45
1974	13.75	14.36	-0.61	1.07	0.27	-0.19
1975	13.67	14.93	-1.27	0.67	-0.46	-0.14
1976	14.26	15.45	-1.19	1.29	0.15	-0.04
1977	14.29	16.09	-1.80	1.99	-0.15	0.33
1978	15.72	16.87	-1.16	1.85	0.69	0.05
1979	16.09	17.54	-1.46	1.95	-0.29	0.79
1980	18.15	18.67	-0.52	2.07	0.74	0.83
1981	20.06	19.58	0.42	0.55	0.72	0.32

Sources: 1. L.A. Mears. The New Rice Economy of Indonesia. Jakarta: Gadjah Mada University Press, 1981.
2. World Bank. Indonesia: Policy Options and Strategies for Major Food Crops. Report No. 36865-IND. April 4, 1983.

Note: The production figures for 1965 to 1976 were adjusted to make them comparable with World Bank estimates.

* Data not available at the time of writing this report.

Notwithstanding such rising trends in import, however, the contribution of imported rice to total available consumption has been marginal. Its share increased from 6 percent in 1968/1971 to 10 percent in 1977/81. Even when combined with government open stock reserves, their joint contribution was 15 percent of the total available consumption in 1977/81. Despite their lower

share to the contribution of rice availale for consumption, however, they are likely to remain important sources for the government to fall back in periods of poor harvests.

The production performance of the other food crops has been a mixed success. Despite the decline in harvested areas, corn and cassava experienced positive growth rates of 3.7 and 2.1 percent respectively during the period between 1968 and 1981. In the case of sweet potatoes, the positive yield effect was much weaker than the negative area effect and consequently the overall production declined. Various factors have been attributed to the slow growth in secondary crops. First, farmers perfer to produce rice which is a most preferred and profitable crop. Second, the location of production of these crops shows that farmers grow these crops in areas which are unsuitable and less favorable to rice. Third, the government's priority in the intensification program was oriented to improve the technical and financial capacity of the farmers to increase the production of rice. Nonetheless, these crops, corn and cassava in particular, continue to contribute to the overall availability of food for consumption.

2. Food Consumption in Practice

The food balance sheet estimates represent the gross measure of per capita food consumption. The estimates in general set the upper bounds to the actual food intakes. For Indonesia, the Susenas provide information on a regular basis on the household actual consumption of foods. The studies based on these surveys are often used to identify food consumption patterns.

According to Chernichovsky and Meesook (2), an average Indonesian spends 68 percent of its average income on food consumption. The rural

Table 4: Annual Average Rates of Growth of Secondary Food Crops: Area Harvested and Yield by Region, 1968-81.

Crop	Java		Off-Java		Indonesia	
	Area	Yield	Area	Yield	Area	Yield
Cassava						
68/71	-1.8	-1.1	-4.0	4.5	-2.0	0.2
72/76	-3.0	6.1	0.7	6.5	-2.1	6.3
77/81	0.0	1.9	2.0	-0.3	0.6	1.1
68/81	-1.2	2.8	1.9	1.5	-0.5	2.5
Corn						
68/71	-6.9	-0.3	-5.4	1.5	-6.5	0.3
72/76	-1.4	3.9	0.4	4.9	-0.7	4.3
77/81	4.1	6.1	2.5	4.7	3.6	5.9
68/81	-0.4	4.1	0.4	3.3	-0.2	3.9
Sweet potatoes						
68/71	-10.4	-0.6	4.0	2.8	-3.5	1.9
72/76	-3.4	9.0	-2.9	4.7	-3.1	6.8
77/81	-7.5	0.3	-1.5	0.0	-4.9	0.3
68/81	-5.1	3.1	-0.7	1.3	-2.7	2.2

Source: World Bank. Indonesia: Policy Options and Strategies for Major Food Crops. Report No. 36865-IND. April 4, 1983.

population spends more (69.6%) than the urban population (59.7%). The share allocated to food declines as the average income level rises; the poor spend 73 percent while the upper income groups allocate 59.1 percent to foods.

The allocation of the food budget to different food groups varies depending on the location and income levels of the population. An average Indonesian allocates 41 percent of its food budget on the consumption of the staple crops, i.e., rice, corn, wheat, cassava, and potatoes. The rural population spends relatively more than the urban population; 43.04 and 29.53 percent respectively. The share of the staples in the food budget declines as the average income level rises. For example, the poor, according to the two authors, spend 41 percent while the wealthier groups spend 31.3 percent on the staple crops. Fish, meat, poultry, eggs and dairy products --

essential sources of protein -- constitute 11 percent of the average food budget. Those in high income groups appear to consume more of these food products.

Table 5. Proportions of the Food Budget Allocated to Different Food Crops, 1978. (%)

Food Group	Location		Income Group			Indonesia
	Rural	Urban	Low	Medium	High	
Cereals						
Rice[a]	35.11	27.89	36.29	36.86	28.01	33.90
Corn[b]	4.31	0.40	6.41	2.68	1.15	3.65
Wheat	0.68	0.25	0.82	0.48	0.47	0.61
Roots & Tubers						
Cassava[c]	2.16	0.50	2.80	1.65	0.96	1.88
Potatoes[d]	0.78	0.53	0.77	0.69	0.74	0.74
Vegetables	7.32	7.20	8.04	7.05	6.62	7.30
Legumes	3.02	3.85	2.75	3.14	3.68	3.16
Fruits	2.36	3.39	1.67	2.42	3.71	2.53
Fish	6.50	6.90	5.88	6.75	7.24	6.56
Meat & Poultry	2.19	3.91	0.86	2.04	4.94	2.48
Eggs	0.87	2.03	0.59	0.96	1.77	1.07
Dairy Products	0.45	2.03	0.14	0.49	1.66	0.72
Others	34.25	41.12	32.99	34.78	39.04	35.40
% of Total Expenditures	69.63	59.72	72.70	69.91	59.07	68.00

Source: Dov Chernichovsky and Dey Astra Meesook. Patterns of Food Consumption and Nutrition in Indonesia. World Bank Staff Working Papers No. 670. September, 1984.

Note:
a. Rice includes glutinous rice as well as rice by-products.
b. Corn includes both fresh and dried corn on the husk, shelled corn, and corn meal.
c. Cassava refers to fresh and dried cassava and cassava meal.
d. Potatoes cover sweet potatoes, potatoes, taro and sago.

Rice accounts for 34 percent of the average food budget. Its share within the staple crops rises to 83 percent (Table 6). Even though the urban food budget on rice (28%) is less than the rural (35%), the urban population spends more on rice within the staples than the rural population. Compared to the total expenditures on staple crops, the individual shares of the other staples, i.e., corn cassava, potatoes and wheat are higher in rural areas.

There are noticeable variations across regions when we examine the budget shares within the staple crops. Every region spends at least two-thirds of its staple food budget on rice (Table 6). Above this minimum commitment, the range varies in Java between 69 percent in East Java to 96 percent in Jakarta. On the islands off-Java, it varies between 64 percent in Maluku and Irian Jaya and 93 percent in Sumatra. Among the other staples, corn has relatively more share in Central and East Java, Bali, Nusatenggara, and Sulawesi. Cassava is important in Yogyakarta, East Java, Central Java, Maluku and Irian Jaya. These regional variations suggest that rice is still a dominant crop, but maize and cassava are also important crops in Central Java, Yogyakarta, East Java, Bali, Nusatenggara, Sulawesi, Makulu and Irian Java.

The share of rice in the food budget declines (Table 5) as the average income rises. For example, the poor spend 36.3 percent while the rich spend 28 percent. Within the staple crops, however, the upper income groups (Table 6) spend about 90 percent on rice alone. The poor households spend 77 percent on rice. The share of the other staple crops falls as the levels of income rise. That is, the rich tend to concentrate on rice when it comes to allocation of their budget among the staple crops.

Table 6: Proportions of the Staple Food Budget Allocated to Staple Crops, 1978.

	Rice	Corn	Wheat	Cassava	Potatoes
Region					
DKI Jakarta	95.7	0.4	0.6	1.3	2.1
West Java	94.5	1.5	0.4	2.3	1.2
Central Java	75.7	16.6	1.1	5.5	1.1
DI Yogyakarta	82.5	6.7	0.9	9.2	0.6
East Java	69.2	18.3	3.2	8.3	1.1
Sumatra	93.2	0.4	0.9	2.9	2.6
Bali & Nusatenggara	77.8	12.4	2.2	3.5	4.1
Kalimantan	92.7	0.7	1.6	3.5	1.6
Sulawesi	82.2	7.6	2.4	3.5	4.3
Maluku & Irian Jaya	63.8	0.5	2.6	18.4	14.8
INDONESIA	83.4	9.0	1.5	4.6	1.8
Income Group					
Low	77.1	13.6	1.7	6.0	1.6
Medium	87.0	6.3	1.1	3.9	1.6
High	89.4	3.7	1.5	3.1	1.4
Location					
Rural	81.6	10.0	1.6	5.0	1.8
Urban	94.5	1.4	0.9	1.7	1.8

Source: Computed from Table 4 in Dov Chernichovsky and Dey Astra Meesook. Patterns of Food Consumption and Nutrition in Indonesia. World Bank Staff Working Paper, No. 670, September 1984.

The average intake of the staples, measured in quantity per capita, follows closely the budget shares within the staple food groups. The per capita intake of rice is highest (Table 7) compared to all other staples. Corn and cassava are next in the ranking followed by potatoes and wheat, which is consumed by 8 percent of the population, has the lowest per capita intake level.

The available estimates are not conclusive (see for example table 7 & 8) as to the differences in per capita consumption of rice between rural and urban areas. Dixon, however, suggests (Table 8) that there is a growing tendency to move away from the other staples towards rice in rural areas.

The pattern is more stronger in urban areas where the average diet is centered on rice. In the case of the other staples, the average intake levels are less in urban than in rural areas.

Table 7: Per Capita Daily Consumption of Foods for HHS Rep. Cons., 1978
(in grms, except for eggs)

Food Crop	Rural	Urban	Low	Med	High	Indonesia
Cereals						
Rice	344.5	324.2	310.7	346.3	369.3	340.9
Corn	224.6	91.7	261.6	194.6	155.2	215.5
Wheat	78.4	35.2	110.1	73.1	49.8	67.6
Roots & Tubers						
Cassava	190.2	78.4	215.2	170.2	139.5	176.8
Potatoes	125.4	46.0	157.7	117.4	76.6	107.3
Vegetables	150.1	136.4	143.4	142.0	158.8	147.8
Legumes	46.1	63.6	41.2	43.3	62.1	49.7
Fruits	101.2	97.2	88.1	92.8	113.0	100.4
Fish	42.2	49.5	34.2	41.4	54.8	43.4
Meat & Poultry	34.8	27.3	32.2	30.2	33.1	32.3
Eggs	0.16	0.21	0.16	0.15	0.20	0.18
Dairy Products	17.7	23.0	24.6	18.2	20.2	20.1
Other	223.4	237.3	181.0	211.5	295.5	225.8

Source: Dov Chernichovsky and Dey Astra Meesook. Patterns of Food Consumption and Nutrition in Indonesia. World Bank Staff Working Papers, No. 670. September 1984.

The average intake levels also vary across the regions. Rice is the leading crop in all provinces except Yogyakarta, Maluku and Irian Jaya. The consumption of corn in Yogyakarta, and cassava in Maluku and Irian Java is higher than the consumption of rice on per capita basis. Per capita consumption of rice is highest in Sumatra and West Java. The lowest is in Maluku

and Irian Jaya. For corn, the highest per capita consumption is recorded in Central Java, East Java, Bali and Nusatenggara. Potatoes are consumed more in Bali, Nusatenggara and Sulawesi. Jakarta, the main urban center, has the lowest per capita consumption of all the staples except rice.

Table 8: Annual Rural and Urban Consumption Per Capita, By Crop, 1969/70, 1976, and 1978

	1969/70			1976			1978		
Region/Crop	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
				(kilograms)					
Indonesia									
Rice	103.2	101.3	113.8	111.2	110.5	114.3	109.2	109.2	109.2
Corn	22.0	25.4	3.2	9.9	11.9	0.7	11.4	14.0	1.0
Cassava, fresh	21.9	23.7	12.3	26.2	29.9	9.5	20.2	22.9	8.8
Cassava, gaplek	7.7	8.9	1.4	6.4	7.9	0.2	7.3	8.8	0.0
Sweet potatoes	8.8	9.6	4.3	10.8	12.3	4.1	5.7	6.2	2.6
Java									
Rice	92.7	89.8	108.5	103.3	102.4	107.3	99.8	98.8	104.0
Corn	28.2	33.3	2.9	11.5	14.0	0.5	15.1	17.7	1.0
Cassava, fresh	21.4	23.3	11.5	21.6	24.9	6.7	20.3	22.9	7.8
Cassava, gaplek	9.5	11.1	1.7	8,0	9.7	0.1	9.4	11.4	0.0
Sweet potatoes	7.9	8.6	4.2	7.5	8.4	3.4	3.6	4.2	2.6
Off-Java									
Rice	123.1	12.7	126.6	124.8	124.4	126.6	130.0	130.0	119.6
Corn	10.2	11.2	3.8	7.0	8.3	1.1	5.7	6.8	1.6
Cassava, fresh	22.9	24.3	14.0	34.2	36.5	14.4	20.2	22.4	10.4
Cassava, gaplek	4.3	4.9	0.5	3.8	4.6	0.3	3.1	3.6	0.0
Sweet potatoes	10.5	11.3	4.7	16.4	18.8	5.3	8.8	10.4	2.6

Source: Taken from John A. Dixon. Food Consumption Patterns and Related Demand Parameters in Indonesia: A Review of Available Evidence, June 1982 (the figures are based on Susenas Surveys).

Similarly, the consumption patterns vary across income levels. Rice consumption increases consistently with the levels of income (Table 7). The consumption of the other staples, on the other hand, declines steadily with income. The dependency on rice therefore increases with rising level of income. It is worth noting that the consumption of wheat, like corn and cassava, appears to be declining with rise in income levels.

Dixon (4) and Mears (6), in addition, suggest that consumers in rural areas adjust their composition of staple diets along with the crop harvesting cycles. Main rice harvest occurs during the months of March and May. During this period, when harvested stocks are at peak and market prices are low, consumption of rice rises. Corn, which is usually harvested in the months that preceed the main rie harvest, is used as a substitute when own rice reserves are at a minimum. Cassava, fresh roots in particular, play a similar role in the lean months of rice production.

The food consumption patterns, in short, exhibit variations in space, season and socio-economic groups. First, food constitutes the main component of the household's total expenditures. Second, within the food group, the share of the staple crops, i.e., rice, corn, cassava, potatoes and wheat accounts for no less than one-third of the food budget. The basket of urban consumption is more diversified in terms of the variety of food products consumed. This explains the lower share of the staple crops in urban food budget. Third, among the staple crops, rice is the dominant food crop. Fourth, compared with the other staples, the average diet is more centered on rice in urban areas. Even where the diet is more diversified (e.g. rural Java), the trend is towards a more concentration on rice. Fifth, the high income groups are more dependent on rice compared with the low income groups. The diet for the poor, especially in rural areas, is more diversified, i.e., constitutes a mixture of rice and other staple crops. Comparing the urban

poor with the rural poor, the mono-crop urban diet suggests the food mix of the latter is more diversified. Finally, the secondary crops play more of a stabilizing role in maintaining an even food consumption in rural areas. The only exception is in places like Maluku, Irian Jaya, Yogyakarta where these crops are the main staples, and urban areas where non-rice crops are less important.

Nutrient Availability and Consumption

1. Nutrient Availability

Nutrients of plant origin are the main sources of energy and protein in Indonesian dietary practices. In the years between 1974 and 1978, plants contributed about 98 percent of the available calorie and 90 percent of the available protein consumption (Table 9). The cereal crops, i.e., rice, corn and wheat, as a group, contributed over 65 percent of both calorie and protein intakes. Rice alone accounted for 54 percent of the calories and 51 percent of the proteins. Corn, the next important cereal crop, contributed 9 and 12 percent of calorie and protein consumption. The other food crops, i.e., root crops (cassava, potatoes and sago) and pulses and nuts (ground nuts, soybeans, and coconuts) are less important separately, but, as a group, are a supplement to the overall nutritional level.

Table 9: Percentage Distribution of Calories and Protein by Food Groups, for all of Indonesia, 1974-1978.

	Calories	Protein
Per Capita Daily Availability, 1974-1978	2,272	45.4 gm
Food Group	Percent of total	Percent of total
Cereals[a]	66.5	67.4
Rice, corn	(53.5)	(49.4)
	(10.7)	(14.4)
Roots and tubers[b]	11.5	4.5
Cassava	(9.0)	(3.6)
Sugar	5.0	0.1
Pulses, nuts, and oilseeds[c]	7.3	14.8
Fruits	1.9	1.1
Vegetables	0.4	1.3
Meat	0.8	2.7
Eggs	0.1	0.4
Milk	0.2	0.5
Fish	0.8	7.0
Oils and fats[d]	5.5	0.0

Source: P. Timmer, W.P. Falcon and S.R. Pearson. Food Policy Analysis. Baltimore: The John Hopkins University Press, 1983.

[a]Cereals include rice, corn, and wheat.
[b]Roots and tubers include sweet potatoes, cassava, and sago.
[c]Pulses, nuts, and oilseeds include groundnuts, soyabeans, and coconuts/copra.
[d]Oils and fats include groundnut oil, copra oil, palm oil, and animal fats.

Over the period between 1968 and 1977, the per capita availability of calories increased at an annual rate of 1.3 percent (Table 10). The main source of growth is related to the rising trend of rice calorie consumption. Its daily per capita available consumptoin increased from 981 kcalories in 1968 to 1233 kcalories in 1977; an average growth rate of 2.6 percent per anum. Like rice, the available calorie intake from wheat consumption went up steadily. But, because of its relative low share of total food availability, its impact might not have been significant to the overall growth. The other crops showed mixed results; cassava fluctuated but on average increased, corn fluctuated with a negative trend, and potatoes declined steadily.

It is noteworthy that these staple crops essentially provide three-fourths of the potential calorie consumptions. The growth trends of calories from these sources are frequently associated with their production performance.

2. Nutrient Consumption

The apparent nutrient availability estimates are a gross measure of nutrients available to the population. In order to assess the actual nutritional situation, these estimates need to be translated into actual nutrient intakes. This is what Chernichovsky and Meesook did in their pursuit to identify the segments of the Indonesian population with nutrient deficiencies. According to their study, the diet of an average Indonesian already surpasses the minimum calorie and protein requirements.[1] That is, their diet, on average, constitutes the minimum energy and growth requirements.

[1]Chernichovsky and Meesook adopted a minimum threshold of 1933 calories and 40.43 gms of protein on a daily basis. These figures are lower than the daily requirements that have been used in the other studies, i.e., 2100 calories and 45 gms of energy and protein intake, respectively.

Table 10: Average Daily Availability of Calories Per Capita in Foods, 1968-77.

Food	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	68/77 (% P.A.)
					(K Calories)						
Starchy staples	1503	1471	1523	1518	1456	1690	1638	1638	1658	1734	1.6
Rice	(980.9)	(1063)	(1093)	(1104)	(1079)	(1183.4)	(1164.4)	(1170)	(1180)	(1233)	(2.6)
Corn	(270.5)	(183.6)	(222)	(202.7)	(183.1)	(271.2)	(221.9)	(222)	(175)	(214)	(-2.6)
Sweet potatoes	(49.2)	(46.6)	(43.8)	(43.8)	(38.3)	(43.8)	(43.8)	(4.4)	(41)	(41)	(-2.0)
Cassava	(174.9)	(150.7)	(137)	(128.8)	(128.4)	(153.4)	(158.9)	(164)	(213)	(208)	(1.9)
Wheat flour	(27.3)	(27.4)	(27.4)	(38.4)	(27.3)	(38.4)	(49.3)	(38)	(49)	(38)	(3.7)
Sugar	112	124	124	134	123	113	135	104	118	115	0.3
Other foods	419	424	457	437	456	406	454	400	461	429	0.3
TOTAL	2,035	2,019	2,014	2,089	2,035	2,209	2,227	2,142	2,237	2,278	1.3

Source: Mears Table 3.2, p. 56.

Despite such an aggregate adequacy, however, the nutrition consumption is uneven across socio-economic groups. Chernichovsky and Meesook find that the average calorie and protein intakes in three provinces of Java (Central, East and Yogyakarta) are lower than the regional-based mainimum requirements (Table 11). These provinces exhibit the highest proportions of households with calories and protein deficiencies. The other provinces which have met the minimum basic calorie and protein requirements constitute lower proportions of households with nutrition deficiencies.

Table 11: Per Capita Daily Requirements and Consumption of Nutrients, 1978

	Calories		Protein	
	Actual	Minimum	Actual	Minimum
Region				
DKI Jakarta	1946	1926	56.03	40.35
West Java	2097	1935	53.97	40.51
Central Java	1605	1937	38.53	40.56
DI Yogyakarta	1584	1978	35.09	41.60
East Java	1664	1958	41.81	41.04
Sumatra	2408	1909	62.20	39.82
Bali & Nusatenggara	2229	1917	55.44	40.01
Kalimantan	2431	1914	67.30	39.94
Sulawesi	2253	1907	62.21	39.76
Maluku & Irian Jaya	2010	1913	57.14	39.97
Indonesia	1987	1933	50.94	40.43
Location				
Rural	2002	1939	50.34	40.43
Urban	1912	1929	53.91	40.41
Expenditure Group				
Low	1747	1961	41.97	41.19
Middle	1988	1913	49.95	39.91
High	2279	1916	62.90	39.97

Source: Dov Chernichovsky and Dey Astra Meesook. Patterns of Food Consumption and Nutrition in Indonesia. World Bank Staff Working Papers, No. 670. September, 1984.

Based on 1976 Susenas V study, HUTABARAT provides estimates that link expenditure levels with calorie and protein intakes. Table 12 provides a condensed version of his original table (Dixon, p. 6). According to the minimum calorie and protein requirements adopted in this study, i.e., 2100 kcalories and 45 gms of protein, the minimum threshold is surpassed at an average expenditure of more than Rp 5,000 per month. The lower three expenditure groups average a daily consumption of 1851 kcalories of energy and 35.1 gms of protein. This, according to the distribution of the population, constitutes 72 percent of the Indonesian population.

Table 12: Total Calorie and Protein Intake Estimated from the Susenas V Survey, 1976.

Monthly Expenditure Per Capita (RP)	Share of the Total Population (%)	PER CAPITA DAILY Calories (Kcalories)	Protein (grms)
below 2,000	15.3	1,381	22.2
2,000-3,000	23.8	1,870	32.3
3,000-5,000	33.1	2,055	43.0
5,000 & above	27.8	2,611	64.0
Average	--	2,064	43.3
Min. Reqt.	--	2,100	45.0

Source: John A. Dixon. Food Consumption Patterns and Related Demand Patterns in Indonesia. June, 1982.

The study by Chernichovsky and Meesook, which is based on 1978 Susenas, reveal that those in the lower 40 percent of the income distribution consume on average 81 percent of the required calorie level. Moreover, it points out that nutritional deficienty prevails across all income levels, but it declines with rising income. For example, the proportions of the population with calorie deficiency fall from 69 percent in the lower income stratum to 37 percent in upper stratum (Table 13). Similarly, the proportions with

protein deficiency decline from 58 to 19 percent, respectively. Nutritional deficiency is, therefore, related to income levels but, there are other additional factors that explain the variations in nutrition consumption.

Table 13: Proportions of the Population With Nutrient Deficiencies, 1978 (%)

	Calories	Protein
Indonesia	54.32	39.75
Rural	53.59	41.09
Urban	57.90	33.05
Expenditure Group		
Low	68.83	58.09
Middle	53.04	36.71
High	37.37	19.27

Source: Dov Chernichovsky and Dey Astra Meesook. Patterns of Food Consumption and Nutrition in Indonesia. World Bank Staff Working Papers, No. 670. September, 1984.

Chernichovsky and Meesook attempt to identify the key attributes of nutrition deficient population. They considered in particular the variations in nutrition consumption due to differences in income levels, family size, education, and sources of income. The level of income, according to their findings, is the key factor that discriminates the nutrition deficient and non-deficient population. Larger family size appears to be a characteristic of households with nutrition deficiencies. Education is useful in discriminating calorie and non-calorie households in Java only.

The influence of expenditure level as a key discriminating factor could be linked to the food consumption patterns. According to the 1978 Susenas based study, three-fourths of the calories come from the staple crops. Rice,

an important staple crop, is the primary source of calories. The other sources are cassava, corn, vegetable and fruits, and legume crops. The staple crops also contribute over half of the protein intake. Here again rice is an important source. Legume crops, fish, vegetables and fruit are the other important contributors to protein.

Cassava and corn, in addition to rice, are important sources of calories for the poor. Rice, vegetables and fruits, and legumes contribute largely to their protein intake. The upper income groups depend heavily on rice for their calorie consumption. Rice, legumes, meat, poultry, eggs and dairy products are the important sources for their protein consumption. Fish, an important source of protein, is consumed relatively in equal proportions across income groups.

In fact, the contributions of these food products to calorie and protein nutrients are consistent, by and large, with the food consumption behavior of the population in different income groups. Rice consumption steadily rises with income while the consumption of the other staples declines. The poor thus obtain its calorie nutrient from more diversified staple diet. Across regions, cassava and corn are particularly important sources of calories where their consumption is more prevalent. Similarly, the food budget shares and the per capita intake of legumes, meat and poultry, eggs and dairy products rise with the levels of income. It is, therefore, evident that variations in calorie and protein consumption are associated with a shift in food composition which in turn is related to distribution of income of the population.

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