AN ANALYSIS OF SELECTED GOVERNMENT PROGRAMS TO INCREASE RICE PRODUCTION IN INDONESIA

by

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CHAPTER 1

INTRODUCTION

The land area of Indonesia is composed of about 13,000 islands. The archipelago stretches along the Equator between 94°45' and 141°05' East Longitude and from 6°08' North Latitude to 11°15' South Latitude. The sea area of Indonesia is about 7.9 million square kilometers, constituting about 81 percent of the total area of the country.

Although Indonesia includes many islands, only about 3,000 of these islands are inhabited. The most important island groupings are (1) Sumatera, (2) Kalimantan, (3) Irian Jaya, (4) Sulawesi, (5) Jawa and Madura, (6) Bali, (7) Nusa Tenggara Barat, (8) Nusa Tenggara Timur, (9) Maluku, and (10) Timor Timur.

The total land area of Indonesia is about 1.9 million square kilometers. This amount of land area is divided among the island groups as follows: (1) Sumatera: 473,606 square kilometers, (2) Kalimantan: 539,460 square kilometers, (3) Irian Jaya: 421,981 square kilometers, (4) Sulawesi: 189,216 square kilometers, (5) Jawa and Madura: 132,187 square kilometers, (6) Bali: 5,561 square kilometers, (7) Nusa Tenggara Barat: 20,177 square kilometers, (8) Nusa Tenggara Timur: 47,876 square kilometers, (9) Maluku: 74,505 square kilometers, and (10) Timor Timur: 14,874 square kilometers.

The Indonesian islands are covered with mountains, many of which are volcanic. The terrain tends to be harsh and is dominated by steep, uncultivated slopes, tropical forests, and vast tidal swamps, although conditions vary from island to island. Where cultivable lowland does

exist, it tends to have very rich soils, some so fertile that for centuries double-cropping has been possible without the aid of chemical fertilizers or animal manures. Only about 9 percent of the total surface area is cultivated, and most of this is planted with food crops. Of the total, 75 percent is devoted to food crops, primarily rice and corn, but also including cassava, peanuts, and soybeans. The remaining 25 percent is used for the production of estate export crops, including coffee, tea, sugar, rubber, and palm oil. Forestry is also an important industry.

As a consequence of its latitudinal spread across the Equator, the climate of Indonesia is either wet tropical or monsoonal. The climate of Indonesia changes every six months. The dry season, June to September, is influenced by the Australia Continental air masses and the rainy season, December to March, is influenced by the Asia Continental and Pacific Ocean air masses passing over the ocean. Total annual rainfall varies from less than 1,000 mm to nearly 7,000 mm throughout the archipelago. The major concentration of crop production is in monsoonal climates in rainfall zones of 1,500 - 2,500 mm with a single dry season of 3 - 6 months duration.

Average annual temperatures at sea level do not vary greatly throughout the archipelago. Mean annual maxima and minima are normally in the range of 31 - 33° C and 22 - 24° C respectively. As a tropical island, Indonesia has an average relative humidity of 75 - 85%, with maximum humidity 100% and minimum 50%.

Administratively, the Indonesian territory is organized in 27 provinces. Each province contains between 4 and 35 kabupaten (district),

which are subdivided into kecamatan (subdistrict). The kecamatan are further divided into desa (village) and kampung (small settlement). Most villages are led by a lurah (village headman) who acts as an intermediary between the villagers and the regional and central bureaucracies as well as overseeing local concerns.

According to the results of the 1980 Population Census, the Indonesian population in 1980 was 147 million people, with an annual growth rate of 2.3 percent between 1971 and 1980. The annual population growth rate has been projected to decline to 2.2 percent in the period of 1980 - 1985. With that projection it is estimated that the Indonesian population will reach 165 million people in 1985. It is also shown by the 1980 Population Census results that the average population density is 77.0 people per square kilometer.[1] Although the population density is moderately high, the distribution is very unequal between Jawa and the Outer Islands. (The Outer Islands include all those islands outside of Jawa and Madura.) Jawa, which consists of only 6.89 percent of the total area, accommodates about 62 percent of the total population which results in a density of 690 people per square kilometer. The range of population density in the Outer Islands is between 5 - 96 people per square kilometer. The uneven population distribution is partly explained by the focal position Jawa has historically filled as the center of commerce and administration. Perhaps more importantly, Jawa has a high proportion of

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[1]Central Bureau of Statistics, The Statistical Year Book of Indonesia 1983, Jakarta, Indonesia, January 1984.

fertile paddy land, much of which supports multiple crops of rice annually.

The age distribution of the population reveals a high dependency ratio. Only about 27 percent of the population is between 15 and 60 years of age. Life expectancy at birth averages 53 years, which is still considered low.

Indonesia is a developing country, which is shown by the level of commonly used economic indicators. According to the World Bank Development Report 1984, Indonesia is categorized into the group of lower-middle income countries with an annual per capita GNP of US $580 in 1982 and growing at an annual growth rate of 4.2 percent from 1960 to 1982. The composition of GDP from 1960 to 1982 shows that the role of the agricultural sector as the major contributor to GDP has been declining. It contributed 53.90 percent of GDP in 1960, which declined to 26.27 percent of GDP in 1982.[2]

Indonesia's economy is agriculturally based. It occupies about 28.8 million people, or 55.8 percent of the total labor force, and it contributes 24.84 to 53.90 percent of total GDP (Table 1).

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[2]World Bank, World Development Report 1984, Oxford University Press, Washington, D.C., 1984.

Table 1. Importance of Agriculture in Indonesia's Economy (1960 - 1982)

	1960	1970	1980	1981	1982
GDP Billions Rupiah	390.0[a]	3,340.0	45,445.7	54,027.0	59,632.6
% Agriculture in GDP	53.90	47.50	24.84	25.25	26.27

[a]Old rupiahs (1,000 old rupiahs = 1 new rupiah).

Source: 1960 - 1970: Anne Both and Peter McCawley, The Indonesian Economy During the Soeharto Era, Oxford University Press, Selangor, Malaysia, 1981.
1980 - 1982: CBS, Statistical Year Book of Indonesia 1983, Jakarta, Indonesia, 1984.

Land holdings tend to be small, typically below 1 hectare per farm family. Agriculture, and rice production in particular, makes very intensive use of labor. Many farmers with very small land holdings earn a large portion of their income from household sidelines, such as vegetable gardens or small livestock. Tenancy is widespread, with about 60 - 70 percent of cultivated land owned by only 10 percent of the population. Tenancy rates vary from area to area, but on the average probably about 30 - 40 percent of all farm families rent their land.

Besides the fact that agriculture is one of the major contributors to GDP and that a majority of the labor force are employed by agriculture, agriculture is a key sector for several other reasons. First, it is the primary source of food. Because Indonesia is already the largest rice importer in the world, a bad crop year in Indonesia, and in the major rice producing countries, can produce severe shortages and very high prices in Indonesia. And second, agriculture is a source of foreign exchange. In this case the major source is cash crops, which are

mostly concentrated in the Outer Islands. So, it is also a major element of the economy of most of the Outer Islands.

Rice, corn, cassava, sweet potatoes, peanuts, and soybeans are the main food crops. Rubber, tea, coffee, sugarcane, tobacco, palm oil, and cotton are the main cash crops. Rice and corn are the major cultivated food crops. (See Table 2)

Table 2. Cultivated Areas (1000 ha) by Major Food Crops in Indonesia

Major Food Crops	1960	1974	1979	1983
Rice	8,014	8,509	8,803	9,102
Corn	2,435	2,667	2,594	3,018
Cassava	1,467	1,509	1,439	1,185
Sweet Potatoes	369	330	287	261
Peanuts	554	768	784	633
Soybeans	372	411	473	484

Source: President of the Republic of Indonesia, Supplement to the President's Report to the Parliament, Jakarta, August 1984.

The importance of rice in the Indonesian economy can be seen from the viewpoints of rice production and consumption. Rice production occupies more than half of Indonesia's crop land devoted to food production and is the main staple food, although corn, cassava, soybeans, and peanuts are important supplementary foods. In 1983, about 88 million people out of the total Indonesia population of 158.1 million people were engaged directly in agriculture and of these roughly 52 million were engaged in food crop production. Only a small portion of the latter

group would not produce at least a small amount of rice during the year. Rice farming in Indonesia is family oriented and very labor intensive. Rice is typically grown in small paddy fields averaging less than 1 hectare in size, and most rural families grow some rice, although increasingly income is provided by household sidelines.

Rice is grown and harvested throughout the year as Indonesia has a 365 day growing season. About 94 percent of all rice output is produced on sawah (puddled) lands, with the rest under ladang (dry land) conditions, primarily on less developed land. Twelve provinces produce about 90 percent of Indonesia's rice, with Jawa the most important (64 percent). Other important provinces include Aceh, North Sumatera, South Kalimantan, South Sulawesi, Bali, and West Nusa Tenggara.

From the viewpoint of domestic food consumption, rice is the single most important food source for all income groups in Indonesia, accounting for over half of all calories consumed. While the preferred food grain of all Indonesians is rice, other grains are consumed, primarily corn in the rural areas and imported wheat flour in the urban areas.

In 1981, 60 percent of the average per capita monthly expenditure was used for buying food. About 20 percent of this food expenditure was used to buy rice or rice products.[3]

An estimate of the 1980 Indonesia Food Balance Sheet shows that rice accounted for about 51 percent of the daily calorie intake and 47 percent of the daily protein intake. (See Table 3)

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[3]Central Bureau of Statistics, op. cit., pp. 666 and 667.

Table 3. Food Consumption Pattern, 1980

	Calories per day	Percent of Total
Rice	1,310	50.97
Corn	233	9.07
Wheat flour	69	2.68
Cassava	198	7.70
Other starchy staples	42	1.63
Sugar	153	5.95
Pulses, nuts, seeds	326	12.69
Fruits, vegetables	48	1.87
Meat, eggs, milk, fish	58	2.26
Oil, fats	133	5.18
Total	2,570	100.00

Source: CBS, Statistical Year Book of Indonesia 1983, Jakarta, Indonesia, 1984.

From Table 3 above it can also be seen that rice, corn and cassava are the three most important foodstuffs for most Indonesian consumers, accounting for about two-thirds of average calorie intake.

The Indonesian government starting in 1969 with the First New Order Five Year Plan (REPELITA I) has ranked food self-sufficiency as the top-priority, and this objective has been unambiguously stated in most recent development plans. Since rice is the predominantly basic staple food, it has attracted the most attention.

The government has signaled its intention by launching ambitious development programs to increase rice production. The main goal has been to increase rice production through new cultivation technologies, new pricing policies, and improved irrigation. Rice development projects are spread over all the country.

Substantial investment, such as in irrigation and road networks construction, have been made, along with policies concerning prices, input distribution, and subsidies. Institutional changes have also been made. All of these to create a physical, economic, and social environment where such projects could be technically, economically, and socially feasible.

While aiming globally at evaluating the rice policy, this paper will focus on the rice intensification programs implemented by the government. The paper is organized as follows. In Chapter 2, an outlook of the rice production situation in Indonesia, which includes the area harvested, production, yield, and imports, is given. In Chapter 3, the theoretical background and review of literature on induced innovation is presented. In Chapter 4 government rice intensification programs and irrigation development will be presented. This Chapter will include an analysis of the intensification programs in terms of induced development model. The government pricing policies, which consist of the floor and ceiling prices for rice, and government domestic rice procurement and distribution, will be covered in Chapter 5. And finally, Chapter 6 summarizes the overall paper, drawing some conclusions and making some suggestions for further studies.

CHAPTER 2

RICE PRODUCTION SITUATION

In the 1950's to the early 1960's, rice production increased slowly, little technical progress was made, irrigation systems deteriorated, and there was a shortage of farm inputs. While increases in harvested area and in yield both contributed to the increased rice production in this period, increases in area harvested was more important.

Rice production in both Jawa and the Outer Islands has increased markedly since 1969. While increases in harvested area and in yield both contributed to the increased rice production, the sharp increase in yield was more important. The increase in harvested area and yield is due to various government policies and programs that will be analyzed later in this paper.

The time period of this study begins in 1969 for several reasons. First, 1969 was the start of the First New Order Five Year Development Plan (REPELITA I). Second, it was about 1969 that high yield varieties became available to farmers raising irrigated rice. And finally, it was about this time that the government intensified its fertilizer, seed, and credit program for rice.

In this study the rice producing areas of Indonesia are divided into two regions: 1) Jawa and 2) the Outer Islands. The reason for doing so is because Jawa accounts for 60 percent of Indonesia's rice production even though it accounts for only 8 percent of the harvested area.

A. Production

Except for 1972, which was a drought year, rice production has shown a strong growth rate in the years since 1969. Annual rice production in Indonesia from 1968 to 1983 is shown in Table 4. Rice production in Jawa increased from 7.48 million tons in 1969 to 14.70 million tons in 1983. During this period rice production in the Outer Islands increased from 4.77 million tons to 9.26 million tons. The total rice production in Indonesia during this period increased from 12.25 million tons to 23.96 million tons.

B. Area Harvested

The area of rice harvested in Indonesia has increased from 8.01 million hectares in 1969 to 9.11 million hectares in 1983. Table 5 shows the area of rice harvested in Indonesia. In Jawa the area of rice harvested increased from 4.29 million hectares in 1969 to 4.78 million hectares in 1983. The area of rice harvested in the Outer Islands increased from 3.72 million hectares to 4.33 million hectares at the same period.

C. Yield

The most significant trends in rice production have been the improvements in yield. Table 6 shows the rice yield per hectare in Indonesia. In the 1969 - 1983 period the rice yield in Indonesia increased from 1.53 tons per hectare to 2.63 tons per hectare. In Jawa yield incrased from 1.75 tons per hectare to 3.08 tons per hectare. In the Outer Islands it increased from 1.28 tons per hectare to 2.14 tons per hectare.

Table 4. Rice Production in Indonesia, 1968-1983

(million tons milled rice)

Year	Jawa	Outer Islands	Indonesia
1968	7.04	4.62	11.66
1969	7.48	4.77	12.25
1970	7.87	5.27	13.14
1971	8.42	5.31	13.73
1972	8.06	5.23	13.29
1973	8.86	5.74	14.60
1974	9.44	5.84	15.28
1975	9.33	5.86	15.19
1976	9.56	6.28	15.84
1977	9.33	6.54	15.87
1978	10.64	6.92	17.56
1979	10.68	7.19	17.87
1980	12.53	7.64	20.17
1981	13.96	8.33	22.29
1982	14.18	8.66	22.84
1983	14.70	9.26	23.96

Source: President of the Republic of Indonesia, Financial Note and 1985/86 Budget Proposal, Jakarta, January, 1985.

Table 5. Area of Rice Harvested in Indonesia, 1968 - 1983
(million hectares)

Year	Jawa	Outer Islands	Indonesia
1968	4.26	3.76	8.02
1969	4.29	3.72	8.01
1970	4.30	3.83	8.13
1971	4.41	3.91	8.32
1972	4.33	3.66	7.99
1973	4.57	3.84	8.41
1974	4.73	3.78	8.51
1975	4.65	3.85	8.50
1976	4.47	3.90	8.37
1977	4.38	3.98	8.36
1978	4.75	4.18	8.93
1979	4.63	4.17	8.80
1980	4.78	4.23	9.01
1981	5.05	4.34	9.39
1982	4.75	4.24	8.99
1983	4.78	4.33	9.11

Source: President of the Republic of Indonesia, Financial Note and 1985/86 Budget Proposal, Jakarta, January 1985.

Table 6. Rice Yield in Indonesia, 1968 - 1983

(tons milled rice per hectare)

Year	Jawa	Outer Islands	Indonesia
1968	1.66	1.22	1.45
1969	1.75	1.28	1.53
1970	1.83	1.37	1.62
1971	1.91	1.35	1.65
1972	1.87	1.42	1.67
1973	1.94	1.49	1.74
1974	2.00	1.54	1.80
1975	2.01	1.52	1.79
1976	2.14	1.61	1.89
1977	2.13	1.64	1.90
1978	2.23	1.66	1.96
1979	2.31	1.72	2.03
1980	2.63	1.82	2.34
1981	2.77	1.92	2.38
1982	2.98	2.04	2.54
1983	3.08	2.14	2.63

Source: President of the Republic of Indonesia, Financial Note and 1985/86 Budget Proposal, Jakarta, January, 1985.

D. Rice Import

Domestic production of food has not been sufficient to meet the aggregate demand for food, especially rice, in Indonesia. This is a situation of which the government is aware and has met in the past by

importing grain, principally rice and wheat.

Inspite of rice production increases, in order to provide sufficient supply to maintain stable prices, Indonesia still has to import rice. The amount of rice imported into Indonesia during the 1969 - 1983 period is shown in Table 7. During 1977 - 1980, Indonesia imported about 2 million tons of rice yearly, equal to 10 percent of total consumption. The increasing consumption came from the growing population, higher real incomes, and lower real rice prices in retail markets.[1]

Since 1974, there has been a desire by the government to reduce risks of shortage through a build-up of reserve stocks, so that imports during this period have exceeded the actual deficit between domestic production and consumption. Especially since 1980, when Indonesia started to experience large rice production increases, most of the imported rice has been used for reserve stocks. Because imported rice has better quality, it can be stored without much deterioration.

Since 1981 when Indonesia had a bumper rice harvest, the importation of rice into Indonesia has decreased drastically.

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[1]Leon Mears, The New Rice Economy of Indonesia, Gadjah Mada University Press, Yogyakarta, 1981, p. 2.

Table 7. Imports of Milled Rice Into Indonesia, 1968 - 1983

(million tons)

Year	Import
1968	0.63
1969	0.60
1970	0.96
1971	0.49
1972	0.74
1973	1.66
1974	1.07
1975	0.67
1976	1.28
1977	1.96
1978	1.85
1979	1.92
1980	2.01
1981	0.54
1982	0.31
1983	0.79

Sources: 1968-1978: Leon Mears, The New Rice Economy of Indonesia, Gadjah Mada University Press, Yogyakarta, 1981.
1979-1983: Central Bureau of Statistics, Statistical Year Book of Indonesia 1983, Jakarta, 1984.

CHAPTER 3

THEORETICAL BACKGROUND

According to Schultz, peasants in traditional agriculture are rational, efficient resource-allocators, but they remain poor because there are limited technical and economic opportunities to which they can respond. In his opinion, the key to transforming a traditional agricultural sector into a productive source of economic growth is investment to make modern high-pay-off inputs available to farmers in poor countries.[1]

The high-pay-off input model implies three types of relatively high productivity investments for agricultural development: (a) in the capacity of agricultural experiment stations to produce new technical knowledge; (b) in the capacity of the industrial sector to develop, produce, and market new technical inputs to agricultural production; and (c) in the capacity of farmers to use effectively modern agricultural factors.

The wide acceptance and application of the high-pay-off input model is due mostly to the success of the green revolution which consisted of the use of high-yielding varieties, the use of industrial inputs, such as fertilizer and pesticides, and effective soil and water management. In the case of rice, new high yielding rice varieties were developed in the Philippines in the 1960's. These varieties were highly responsive to

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[1]Theodore W. Schultz, Transforming Traditional Agriculture, Yale University, 1964; and Theodore W. Schultz, "Nobel Lecture: The Economics of Being Poor," Journal of Political Economy, 1980, Volume 88, No. 4.

industrial inputs such as fertilizer and other chemicals and to improved soil and water management. The high returns associated with the adoption of the new varieties and the associated technical inputs and management practices has led to rapid diffusion of the new varieties in Asia, Africa, and Latin America.

The significance of this high-pay-off model is that policies based on the model appear capable of generating a sufficiently high rate of agricultural growth to provide a basis for overall economic development consistent with modern population and income growth requirements. The unique implications of the model for agricultural development policy are the emphasis placed on accelerating the process of development and propagation of new inputs or techniques through public investment in scientific research and education.

According to Hayami and Ruttan, advances in biological and chemical technology in crop production have been induced primarily by a desire to increase crop output per unit of land.[2] These advances have typically involved one or more of the following three elements: (1) land and water resources development to provide a more satisfactory environment for plant growth; (2) modification of the plant environment by the addition of organic and inorganic sources of plant nutrients to the soil to stimulate plant growth and by the application use of biological and chemical means to protect plants from pests and diseases; and (3)

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[2]Yujiro Hayami and Vernon W. Ruttan, Agricultural Development: An International Perspective, The John Hopkins Press, Baltimore, 1971, p. 51.

selection and design of new biologically efficient crop varieties specially adapted to respond to those elements in the environment that are subject to man's control.

In their view, it seems clear that there are multiple paths of technical change in agriculture available to a society. The ability of a country to achieve rapid growth in agricultural productivity and output seems to depend on its ability to make an efficient choice among alternative paths. Failure to choose a path which effectively loosens the constraints imposed by resource endowments can depress the whole process of agricultural and economic development. Hayami and Ruttan have proposed the induced development model to explain the mechanism by which a society chooses the path of technological change in agriculture.[3]

In most economies which have achieved a high rate of growth in agricultural production and productivity, public sector research has represented an important component of the total resources devoted to agricultural research. Substantial resources have also been devoted by the public sector to educational and infrastructure investments in support of technical change in agriculture. Hayami and Ruttan, extended the induced innovation model to include the process by which the public sector investment in agriculture research, in the adoption and diffusion of agricultural technology, and in the institutional infrastructure that is supportive of agricultural development is directed toward releasing

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[3]Yujiro Hayami and Vernon M. Ruttan, ibid., pp. 53-54.

the constraints on agricultural production imposed by traditional factors which are characterized by having relatively inelastic supply.[4]

This extended induced development model embraces as critical elements for agricultural and economic development the mechanism of (a) induced innovation in the private sector; (b) induced innovation in the public sector; (c) interaction between technical change and institutional development; and (d) dynamic sequences of technical change and economic growth.

In the case of induced innovation in the private sector, Hayami and Ruttan regard technical change as any change in production coefficients resulting from the purposeful resource-using activity directed to the development of new knowledge embodied in designs, materials, or organizations. In terms of this definition, it is entirely rational for competitive firms to allocate funds to develop a technology which facilitates the substitution of increasingly more expensive factors with less expensive factors. Similarly, in a country in which a factor is more expensive relative to another factor than it is in a second country, innovative efforts in the first country will be directed toward saving its relatively more expensive factors.

In the case of induced innovation in the public sector, Hayami and Ruttan base the innovation inducement mechanism not only on the response to changes in the market places of profit maximizing firms but also on the response by research scientists and administrators in public institutions to resource endowments and economic change. According to

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[4]Yujiro Hayami and Vernon M. Ruttan, ibid., p. 54.

them, technical change is guided along an efficient path by price signals in the market, provided that the prices efficiently reflect changes in demand and supply of products and factors and that there exists effective interaction among farmers, public research institutions, and private agricultural supply firms.

In this model, the response of research scientists and administrators represents the critical link in the inducement mechanism. The scientists and administrators of public sector research programs respond to the needs of society in an attempt to direct the results of their activity to public purpose.

In the institutional innovation mechanism, Hayami and Ruttan hypothesize that the institutions that govern the use of technology or the mode of production can also be induced to change in order to enable both individuals and society to take fuller advantage of new technical opportunities under favorable market conditions.

According to Ruttan, institutional innovation or institutional development refer to a change (1) in the behavior of a particular organization, (2) in the relationship between such an organization and its environment, or (3) in the rules that govern behavior and relationships in an organization's environment.[5]

A major source of institutional change has been an effort by society to internalize the benefits of innovative activity to provide economic incentives for productivity increase. Where internalization of the gains of innovative activity are more difficult to achieve, institutional

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[5]Hans P. Binswanger et al., Induced Innovation, The John Hopkins University Press, Baltimore, 1978, p. 329.

innovations involving public sector activity become essential. The socialization of much of agricultural research, particularly the research leading to advances in biological technology, represents an example of a public sector institutional innovation designed to realize for society the potential gains from advances in agricultural technology.

The process of transforming institutions in response to technical and economic opportunities generally involves time lags, social and political stress, and in some cases, disruption of social and political order.

In the dynamic sequence of technical change and economic development mechanism, the emergence of imbalance or disequilibrium is a critical element in inducing technical change and economic growth. Disequilibrium among the several elements in the system creates bottlenecks. Those bottlenecks then become the focus of attention of scientists, inventors, entrepreneurs, and public administrators whose concern is the attainment of even more efficient resource allocation.

A solution to the problems of a bottleneck generally creates another bottleneck. This acts as a device for transmitting technical change from one process of production to another. The cumulative sequences resulting from technical changes in agricultural production also induce changes in other sectors of the economy. For example, as a result of the development of high-yielding grain varieties, rapid increases in food grain production in south and southeast Asian countries are creating a serious bottleneck in the marketing process. This bottleneck has

increased the return to investments to improve the capacity and efficiency of the marketing system.

CHAPTER 4

THE GOVERNMENT RICE INTENSIFICATION PROGRAMS

1. The Rice Intensification Programs

Increasing food production, especially rice, and improving the income of the small farmers have been the primary goals of agricultural development in Indonesia. The major instrument to reach such an objective has been the efficient provision of a new technology package. This package was formulated as the Rice Intensification Programs, which consisted of the Bimbingan Massal (BIMAS) program, the Intensifikasi Massal (INMAS) program, the Intensification Khusus (INSUS) program, and the Operasi Khusus (OPSUS) program. The progress of the area covered under the Rice Intensification Programs from 1969 to 1983 is shown in Table 8.

The progress of the average rice yield under the Rice Intensification Programs from 1978 to 1983 is shown in Table 9.

Since 1977 the area covered under the INMAS program has continuously exceeded that of the BIMAS program. In 1983 more than three-fourths of the total area covered under the Rice Intensification Programs was under the INMAS program.

A. The BIMAS Program

In 1965, the government initiated the BIMAS program. BIMAS is an Indonesian acronym for Mass Guidance. The BIMAS program is a national program to increase food production and to improve the welfare of the farmers. It focuses solely on rice and endeavors to secure higher output

Table 8. Area Covered Under Rice Intensification Programs, 1969 - 1983

('000 ha)

Year	BIMAS	INMAS	Total
1969	1,309	821	2,130
1970	1,248	845	2,093
1971	1,396	1,393	2,789
1972	1,203	1,966	3,169
1973	1,832	2,156	3,988
1974	2,676	1,048	3,724
1975	2,683	1,957	3,640
1976	2,420	1,189	3,613
1977	2,059	2,181	4,240
1978	1,960	2,888	4,848
1979	1,571	3,452	5,023
1980	1,374	4,142	5,516
1981	1,364	4,802	6,186
1982	1,296	5,047	6,343
1983	1,401	5,222	6,623

Source: President of the Republic of Indonesia, Financial Note and 1985/86 Budget Proposal, Jakarta, January, 1985.

Table 9. Average Yield Under Rice Intensification Programs, 1978 - 1983

(tons per hectare)

Year	BIMAS	INMAS	Average Yield
1978	2.44	2.29	2.36
1979	2.46	2.37	2.40
1980	2.79	2.65	2.68
1981	3.02	2.94	2.97
1982	3.02	2.93	2.95
1983	3.13	2.98	3.01

Source: President of the Republic of Indonesia, Supplement to the President's Report to the Parliament, Jakarta, August, 1984.

from increased yield and expansion of hectarage. The BIMAS program is an outgrowth of experiments begun in the early 1960's at the Bogor Institute of Agriculture, directed at increasing land productivity without resorting to mechanization. The experiment was an action research project based on the assumption that extension work could lead to an increase in rice output. Students were assigned to live with farmers in the villages and promote the five endeavors embodied in the BIMAS program.

The BIMAS program components, which provide the incentives and encouragement to achieve the program objectives are: (1) use of high yielding varieties; (2) proper use of modern material inputs such as fertilizer and pesticides; (3) adoption of improved cropping techniques; (4) control of pests and diseases; and (5) efficient use of irrigation

water. These components were accompanied by the provision of credit facilities, the provision of extension services to help farmers adopt the new technology, and the provision of modern inputs at subsidized prices.

Jawa was chosen first for this program because it has an extremely high agricultural population density, a highly developed traditional rice planting technology, existing irrigation systems, and an urgent need to increase sizeably its rice production to meet consumption demand on Jawa. The government determined the BIMAS program to be most feasible and promising for Jawa because expansion of arable land is not possible and because mechanization of farming methods would be too expensive and would displace too many people employed in farming.

Following its first institution, the BIMAS program has been rapidly expanded and modified. In mid-1967 some alterations were made to the Rice Intensification Program. The whole program was divided into the BIMAS program and INMAS (Intensifikasi Massal) - Mass Intensification - Program. The latter program will be discussed in the next section in more detail.

In 1968 a new program was added to be called BIMAS BARU, or New BIMAS, to promote the adoption of the high yielding varieties, IR-5 and IR-8, imported from the International Rice Research Institutes (IRRI) in the Philippines.

In 1969 a new style of BIMAS was added, called BIMAS GOTONG-ROYONG - Mutual Help BIMAS. In this program, the government contracted with foreign companies for them to supply fertilizers and pesticides to the farmers in the amount necessary at the specific times needed in the

designated BIMAS areas. Also included in the package were inputs found in the country: seeds and cash credit called COL, or cost of living, to tide the family over the growing season. The pesticides were handled entirely by the foreign companies through aerial spraying. The companies also provided equipment and advice to the extensionists.

The BIMAS GOTONG-ROYONG program was terminated in 1970 due to serious problems that occur during the implementation of the program. Specifically, this program was so inflexible that everyone received the same inputs, and some questionable practices such as mass aerial pesticides sprayings angered farmers. In addition, farmers had difficulty getting credit when they needed it.

The next scheme introduced in 1971 became known as BIMAS YANG DISEMPURNAKAN, or Improved BIMAS. One aspect of the new scheme was the development of a new concept known as the Village Unit Area. A Village Unit Area consisted of several villages covering a farming area of 600 to 1,000 hectares with 1,800 to 3,000 farmers. A Village Unit Area conceived on the smallest efficient unit of economic activity for the rural community. Within each Village Unit Area are four units of activities supporting the farmers, namely, (1) a team of agricultural extension agents, (2) a retail shop providing fertilizer, pesticides, and other modern farm inputs, (3) village unit bank, and (4) village unit cooperatives for processing, marketing and other economic activities of the farmers.

It is intended that when the Village Unit Area personnel are strong enough to take over its management in credit and extension, it will

emerge as the Koperasi Unit Desa (KUD),[1] or the Village Unit Cooperatives. The Village Unit Area and its more advanced form, the KUD, were also looked upon by the government as the centers of village development and agents of change in the role of the village. More effective utilization of fertilizers and other chemicals was a priority in this program. Credit was allocated on an individual basis, part in cash and part in the form of vouchers for fertilizers and pesticides obtainable at village kiosks or farm input shops.

Encouraging results of BIMAS rice program in Jawa has led to the introduction of similar scheme on the Outer Islands. The system is also being applied on a modest scale with reasonably good results for crops other than rice, including corn, soybeans, peanuts, sorghum, mungbeans, and sweet potatoes.

B. The INMAS Program

In mid-1967, as mentioned earlier in this chapter, some alterations were made to the Rice Intensification Program. The whole program was divided into the BIMAS program and the INMAS (Intensifikasi Massal), or Mass Intensification program. The INMAS program is basically the BIMAS program minus its credit component. Its underlying assumption was that those who had been assisted under the BIMAS program would have increased their production and income substantially so that they would no longer need credit. They would be provided only technical advice and farm inputs at subsidized prices. This strategy called for a well established

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[1]Koperasi Unit Desa (KUD) is the primary farmer cooperative.

extension service. Besides the farmers who had been assisted under the BIMAS program, any farmer who financed his own farm supplies was considered eligible for the INMAS program. To be eligible for the program the farmers must grow an improved variety and use commercial fertilizer. This program proved more suitable to farmers' needs and it increased farmer prestige and pride because it connoted that they were able to pay their own way into the world of modern farming.

This program was an attempt to spread extension services, information, and input supplies without placing an extra burden on public credit resources. It was largely aimed at farmers already familiar with an improved set of inputs and who were presumed to be motivated to maintain new methods of production. While the more thorough-going BIMAS program was concentrated in Jawa, the INMAS program was a relatively more significant part of the whole rice intensification program in the Outer Islands.

C. Other Rice Intensification Programs

In 1979 and 1980, the government instigated two additional programs: (1) INSUS (Intensifikasi Khusus), or Special Intensification program, and (2) OPSUS (Operasi Khusus), or Special Operation program.

The INSUS program is a form of intensification applied by farmers on a group scale supported by agricultural extension services. This program permits groups of up to 50 farmers to make collective decisions about production including land preparation, planting, spraying and harvesting. This program reflects efforts to improve the management and financial capability of individual farmers within a group. Farmers can

participate in the INSUS program the same time that they participate in the BIMAS program or the INMAS program. The objective of this program is to improve the coordination of the intensification program by improving the linkages between farmers, cooperatives, and government officials. The results of this program have been encouraging, especially when observing the yield improvements of the participating farmers. The area covered under the INSUS program has grown from 1.06 million hectares in 1980 to 3.44 million hectares in 1983. The average yield of rice grown under the INSUS program has increased from 3.02 tons per hectare in 1980 to 3.28 tons per hectare in 1983.

The OPSUS program is a form of the BIMAS program which is applied in isolated areas having rice producing potential. These are areas having fertile soil, enough rainfall, and sufficient labor, but because of geographical isolation, adoption of new technology and economic and social innovations have not occurred. In this program the extension workers are encouraged to be more active in assisting the farmers in the adoption of new technology and economic and social innovations.

A summary of the rice intensification programs mentioned above is presented in the following table.

Program	Purpose	Result
1. BIMAS	Increase rice production and improve the welfare of the farmers through the program's component: (1) use of high yielding varieties; (2) proper use of modern material inputs; (3) adoption of improved cropping techniques; (4) control of pests and diseases; (5) efficient use of irrigation water. These components are accompanied by provision of credit facilities, extension services, and modern inputs at subsidized prices.	Increase in yield from 2.44 tons per hectare in 1978 to 3.13 tons per hectare in 1983.
2. INMAS	This program has the same purpose and components as the BIMAS program. The difference is that this program is not accompanied by provision of credit facilities. This program is aimed at farmers already familiar with an improved set of inputs and who were presumed to be motivated to maintain new methods of production. This strategy called for a well established extension service. This program was an attempt to spread extension services, information and input supplies without placing an extra burden on public credit resources.	Increase in yield from 2.29 tons per hectare in 1978 to 2.98 tons per hectare in 1983.

3.	INSUS	This program has the same purpose and components as the BIMAS and INMAS programs. The difference is that this form of intensification is applied by farmers on a group scale supported by close agricultural extension services. This program permits up to 50 farmers to make collective decisions about production including land preparation, planting, spraying and harvesting. This program could be applied both in the BIMAS program and the INMAS program.	Increase in yield from 3.02 tons per hectare in 1980 to 3.28 tons per hectare in 1983.
4.	OPSUS	This program has the same purpose and components as the BIMAS program. The difference with the BIMAS program is that this program is applied in isolated potential rice producing areas. These areas, due to geographical isolation, have not been touched by new technology and economic and social innovation.	

D. Irrigation Development

The yield increase which can be obtained by the adoption of the new varieties of rice are very substantial. But to obtain the full yield potential of these varieties requires not only large quantities of commercial fertilizer and pesticides but also a well developed irrigation system that provides proper control over the water supplied to the field.

Since water is the limiting factor for multiple cropping and a key input for realization of higher yields from high-yielding fertilizer responsive seeds, advances in irrigation (improved water control on existing lands and the development of new irrigated lands) have played an important role in increasing yields throughout Indonesia. Currently, about 4 million hectares are irrigated. Irrigated area is concentrated on Jawa, which accounts for more than 50 percent of total irrigated area.

The Department of Public Work and Power (DPWP) is responsible for the planning and development of new irrigation projects as well as the management of ongoing government projects. The major programs in the irrigation sector are (1) the irrigation rehabilitation and improvement program, and (2) the irrigation expansion program. Under the irrigation rehabilitation and improvement program, primary and secondary canals that irrigates 1.8 million hectares of land were rehabilitated and improved during the period from 1969 to 1983. In the same period the irrigation expansion program developed new facilities to irrigate an additional 0.5 million hectares.

To improve the effectiveness of the existing irrigation infrastructure, the government rehabilitated and constructed tertiary canals that service 1.9 million hectares to provide more positive flow to the farmer's field.

Beginning in the mid 1970's the government has increased its effort in encouraging the formation of village water user organizations in the hope that such effort will lead to improvements in the farmers' capability and consciousness in managing and maintaining the irrigation infrastructure at the farm level.

E. The Experiment Station

In 1968, the government established the Central Research Institute of Agriculture (CRIA) as a network of national research stations to produce new technical knowledge. This institute is supported by its branches and substations that are located in different parts of the country. These resources undertake research in rice, corn, sorghum, soybeans, peanuts and sweet potatoes.

This research institute has developed new cropping patterns and soil management practices to enable the farmers to increase their production. The new technical knowledge developed by the CRIA among others are new practices of cultivation and crop planting, special fertilizer techniques using large quantities of fertilizer, pest control management, and soil fertility conservation.

In the case of rice, the CRIA has developed new rice varieties and produced breeder seeds. The CRIA also performs the first stage of seed multiplication and their quantity is multiplied again at its

substations. The new varieties being multiplied are supplied by the CRIA as a result of a local breeding program as well ~~well~~ as introduction from overseas research institutes, particularly the International Rice Research Institute (IRRI).

F. The Input Distribution

(1) Seed Distribution.

Traditionally the Indonesian farmers have used a part of their rice production as seed for the next planting season. Seed was exchanged between farmers and farm-produced seed was often sold by merchants at the village level.

Before 1971, the purchase and sale of high-yielding rice seed was implemented by government agencies. New rice varieties were developed and breeder seed was produced at the Central Research Institute for Agriculture (CRIA). Foundation seed was supplied to the seed farms of the extension service. Then the extension service will use the foundation seed to produce stock seed which will be distributed to the Village Seed Projects. From the stock seed the Village Seed Projects will produce extension seed for sale to the farmers.

Due to the qualitative and quantitative increase of demand for seed as a result of the rice intensification program, seed production was insufficient. Since then, the government has given special attention to the development of private seed growers and to the purchase and distribution of seed between government agencies and private enterprises. It established Perum Sang Hyang Sri as a pioneer to stimulate the formation and development of a private seed industry. The

production and distribution of commercial seeds (stock seed and extension seed) is expected to be gradually transferred from government agencies to private enterprises. In this case, the role of the government institutions are to supervise and guide in the production, distribution and quality control of seed.

The basic framework of the seed distribution channels is shown on Chart 1. Within this system the seed can be differentiated into four classes: 1) Breeders Seed (BS), 2) Foundation Seed (FS), 3) Stock Seed (SS), and 4) Extension Seed (ES).

Breeder Seed (BS) is produced by breeders of the Central Research Institute for Agriculture (CRIA). The new varieties being multiplied are supplied by CRIA as a result of a local breeding program as well as an introduction from overseas research institutes, such as the International Rice Research Institute (IRRI). The Breeder Seeds are used to produce Foundation Seed (FS).

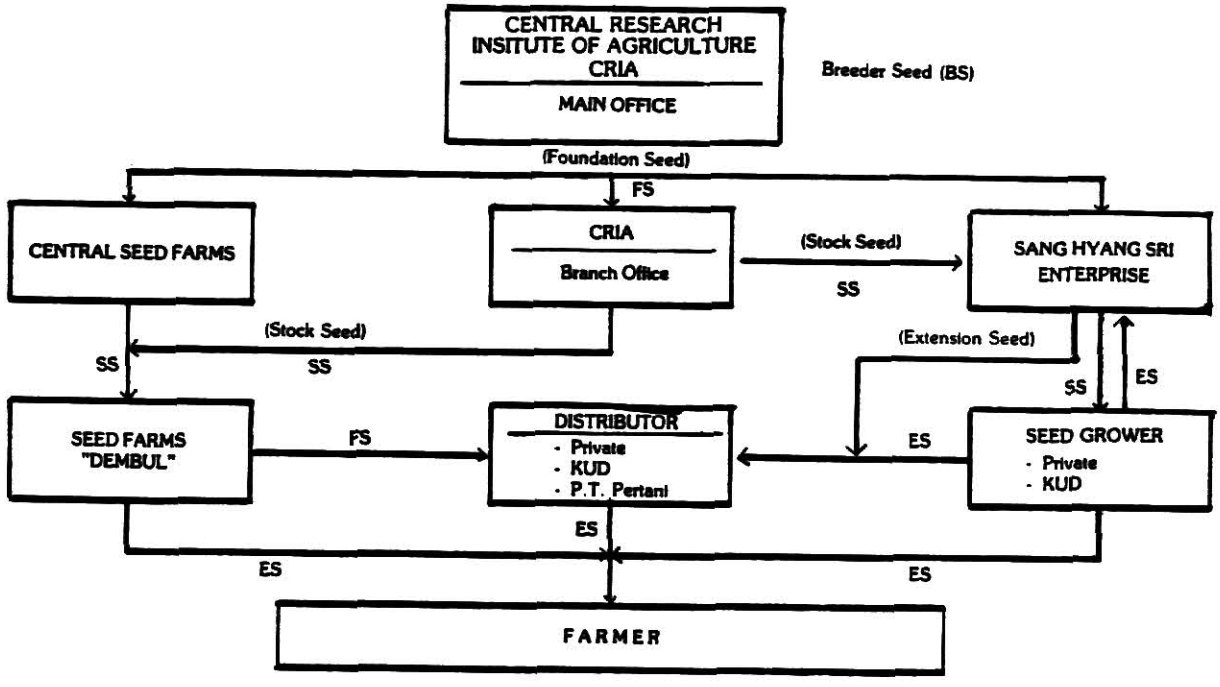
The Foundation Seed will be multiplied by the branches of CRIA, Central Seed Farms, and Perum Sang Hyang Sri to produce Stock Seed (SS). Then, the Stock Seed is multiplied by provisional seed farms, seed demonstration units, Perum Sang Hyang Sri, and seed growers to produce Extetnsion Seed (ES). The extension seed will be distributed for sale to the farmers participating in the rice intensification program.

(2) Fertilizer Distribution Channels

Chemical fertilizer has a long history of use on Indonesian plantations, but its promotion by the government for smallholder farm crops was not begun until the late 1950's. With emphasis on rice as the

Chart 1

The Distribution Channels for Rice Seed in Indonesia



major food crop, together with the development and publicizing of highly fertilizer-responsive rice seeds by IRRI in the 1960's, the food crop fertilizer distribution in Indonesia is closely associated with rice. The distribution channel of fertilizer is determined by the government. The general channels of fertilizer flow is shown on Chart 2.

PT. PUSRI, which is a government enterprise, besides producing its own fertilizer has a responsibility on fertilizer procurement both from other domestic manufacturers and from imports.

On the distribution side, PT. PUSRI is held responsible to assure that stocks of fertilizer are sufficient in the Line IV (the farm level) of the distribution channel. To perform this function, PT. PUSRI can appoint a private distributor for distributing the fertilizer from the supporting warehouse of PT. PUSRI at the Line III (the kabupaten or district level) to Line IV (the farm level). PT. PUSRI or the private distributor will appoint a retailer at the Line IV (farm level) to sell the fertilizer to the farmers. Appointment of the retailer at the Line IV (farm level) must give priority to the Koperasi Unit Desa (KUD) or Village Unit Cooperatives.

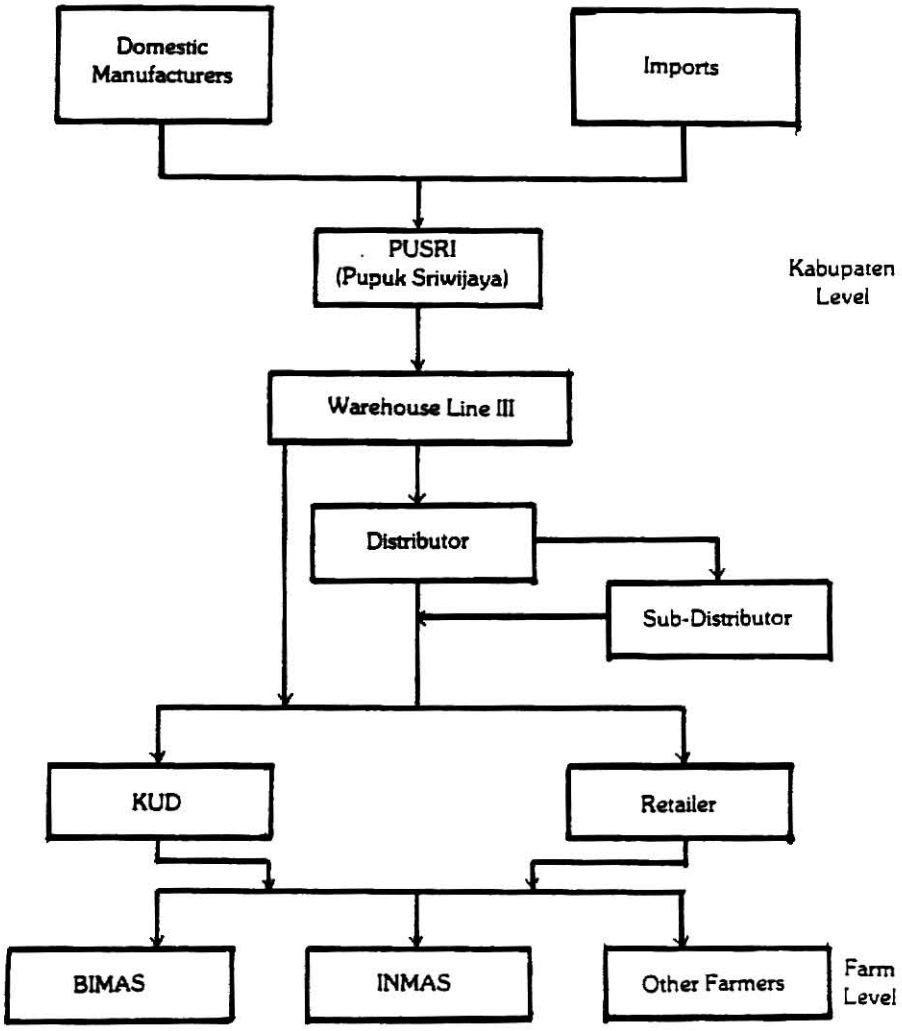
If the private distributor cannot perform its function well, PT. PUSRI must distribute the fertilizer to the Line IV (farm level) directly.

(3) Pesticide Distribution

Pesticide distribution for rice crops has never enjoyed the government concern and support given to fertilizer distribution. To some extent this has been reflection of less acceptance of

Chart 2

Distribution Channel of Fertilizer for Food Crops in Indonesia



pesticides by farmers.

Pesticide use is most economical if used when pest attacks are imminent rather than as a general preventative. This requires mobilization of warning units and reserve supplies of pesticides held for prompt application in emergencies. Such organization has not yet been fully perfected.

PT. PERTANI, a government enterprise, is given responsibility for pesticide distribution to Line III (district level), similar to PT. PUSRI's responsibility for fertilizer. At Line IV (farm level), the KUDs had been given priority to supply the pesticides to the farmers participating in the rice intensification program. Many pesticides are now formulated domestically and are conveniently supplied in small containers suitable for farm use.

2. Analysis

The Rice Intensification Programs implemented by the Indonesian government can be viewed as an application of the "high-pay-off input model" introduced by T.W. Schultz. As mentioned in Chapter 3, the high-pay-off input model implies three types of relatively high productivity investments for agricultural development: (a) in the capacity of agricultural experiment stations to produce new technical knowledge; (b) in the capacity of the industrial sector to develop, produce, and market new technical inputs; and (3) in the capacity of farmers to use modern agricultural factors effectively.

In order to carry out the Rice Intensification Programs, the government has made high productivity investments by giving direct and

indirect subsidies to rice producers to stimulate their production. According to Mears, over 50 percent of the total direct cash subsidies to staple foods during 1972 - 1980, which totalled Rp. 271,982 million, were given to rice. The direct cash subsidy for rice is provided by the government to Badan Urusan Logistik (BULOG) - Agency for National Logistical Management - to perform its various functions involving the marketing of rice.[2] In relation with the Rice Intensification Programs, the direct cash subsidy covers the loss on rice floor price purchases.

Also, other direct and indirect subsidies are given to rice producers to stimulate production. According to Mears, the fertilizer and insecticide/pesticide subsidy may be considered the most important of these because it is known to be taken into account by most farmers in estimating profits and deciding on cropping choices. This budget cash subsidy totaled over Rp. 1 trillion during the ten year period starting in 1971/72, over 60 percent of which was a subsidy to fertilizers produced in Indonesia.[3]

The major indirect subsidies given by the government in the implementation of the Rice Intensification Programs are as follows:[4]

(1) Subsidized credit to farmers (through BIMAS program). to KUD's (for floor price purchases), to BULOG (for rice related activities), and to rice farmers for capital equipment;

(2) Unpaid balances from BIMAS loans;

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[2]Leon A. Mears, op, cit., pp. 422-424.

[3]Leon A. Mears, op, cit., pp. 424-425.

[4]Leon A. Mears, op. cit., pp. 425-426.

(3) Capital equipments to enable the KUD's to serve farmers with inputs;

(4) BIMAS, INMAS, and INSUS programs organizational finance;

(5) Free or subsidized irrigation water;

(6) Government support of extension services to help farmers use new technologies;

(7) Large capital investments in farm-to-market roads and in irrigation;

(8) Government supported seed production research and the infrastructure to multiply and distribute the seeds.

Also, the government in 1968 established the Central Research Institute of Agriculture (CRIA) to fulfill the need to build up a network of national research stations. Cropping patterns and soil management practices have been developed by agricultural scientists from the CRIA to enable the farmers to produce sufficient food for their families with surpluses for the market. Besides that, new rice varieties were developed and breeder seeds were produced at the CRIA. The new varieties being multiplied are supplied by the CRIA as a result of a local breeding program as well as introduction from overseas institutes such as the International Rice Research Institute (IRRI).

Another major investment by the government is the construction of the urea fertilizer factories, since urea is one of the main fertilizers used on rice. The first urea factory was opened in 1964. By 1977 the domestic urea production was estimated to approximately equal domestic food crop demand. Indonesia began exporting small quantities of urea in 1977. Also, Indonesia is approaching the same self-sufficiency for phosphate fertilizer where the fertilizer is produced from imported

raw materials. Thus, Indonesia is no longer dependent on the highly volatile world market for its urea fertilizer which is so important to increase food crop production.

According to Binswanger and Ruttan, the Indonesian Rice Intensification Programs can be viewed as institutional innovations designed to centralize the mobilization of resources to meet rice production goals.[5] Since it is difficult to internalize the gain of innovative activities in Indonesia, institutional innovations involving the public sector activity became essential.

As mentioned earlier, the Rice Intensification Programs consist of: (1) the BIMAS Program, (2) the INMAS Program, and (3) the INSUS Program. The components of the intensification programs are: (a) use of high yielding varieties; (b) proper use of modern material inputs such as fertilizer and pesticides; (c) adoption of improved cropping techniques; (d) control of pests and diseases; and (e) efficient use of irrigation water. These components are accompanied by provision of credit (especially for BIMAS program), extension services to deal with technology and modern inputs at subsidized prices.

In order to carry out the Rice Intensification Program successfully, the government has made several major institutional changes. First, the socialization of the agricultural research, particularly the research leading to advances in biological technology, represents an example of a public sector institutional innovation designed to realize for society the potential gains from advances in agricultural technology. The

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[5]Binswanger and Ruttan, op. cit., p. 402.

government has established the Central Research Institute of Agriculture (CRIA) as a network of national research stations. This research institute has developed the cropping patterns and soil management practices to enable the farmers to increase their production. Also, this research institute has developed new rice varieties and produced breeder seeds. The new varieties being multiplied are supplied by the CRIA as a result of a local breeding program as well as introduction from overseas institutes, particularly the International Rice Research Institute (IRRI).

Second, to promote and encourage the farmers to apply the five components of the BIMAS program the government has established an Agricultural Extension Services (AES) network. The agricultural extension process is the principal formal means involved in communicating new skills and techniques to the rice farmers. It is based on the belief that agricultural activity will increase if farmers learn the new skills and techniques. The more profitable the new skills and techniques appear to the farmers, the more eager they would be expected to be to acquire and utilize them.

Until 1980, the over 7,800 field extension workers concentrated on obtaining farmer participation and acquainting rice farmers with the aspects of the intensification programs, fertilizer and pesticide use, credit, irrigation, high yielding and disease resistant seeds. The field extension workers selected leading farmers who carried out demonstration plots and organized farm groups for meetings with the field extension workers and agricultural specialists. The role of specialists was

to provide two way contact between the field extension workers and farm groups with the research efforts of the research institute.

The intensification programs with the extension help has taught a large proportion of Indonesian rice farmers the value of high yielding and pest resistant varieties, and of fertilizer and pesticide applications. The farmers have discovered the benefits of following extension service advice.

Third, the government created and introduced a new concept of Village Unit Area, which consists of several villages covering a farm area of 600 to 1,000 hectares with 1,800 to 3,000 farmers. The Village Unit Area is assumed to be the smallest efficient unit of economic activity for the rural community. Within each Village Unit Area there are four units of activities supporting the farmers, namely, (1) a team of agricultural extension agents, (2) a retail shop providing fertilizer, pesticides, and other modern farm inputs, (3) Village Unit Bank providing credits, and (4) Village Unit Cooperatives for processing, marketing and other economic activities of the farmer.

When the Village Unit Area personnel are strong enough to take over its management in credit and extension, it will emerge as the Koperasi Unit Desa (KUD), or the Village Unit Cooperatives. The Village Unit Area and its more advanced form, the KUD, were also looked upon by the government as the centers of village development and agents of change in the role of the village.

Fourth, to improve the farmers' capability and consciousness in managing and maintaining the irrigation infrastructure at the farm level,

the government has invested more efforts in encouraging the formation of village water user organizations.

Finally, to support the rice intensification programs the government installed a special agency named Badan Urusan Logistik (BULOG) - Agency for National Logistical Management. With connection to the rice intensification programs, the responsibility given to BULOG is to maintain the floor price for rice by procuring rice. BULOG purchases rice from the farmers through the Village Unit Cooperatives. The farmers growing confidence that they were guaranteed a floor price became an important factor in the farmers' willingness to risk the increased fertilizer use.

CHAPTER 5

THE GOVERNMENT'S RICE PRICE POLICY

Basically, the objective of the government's provision and distribution of food, especially rice, policy is to assure that the price of rice is always within a reasonable range from the view of both the consumers and the producers. Also, it is to assure that rice can be provided in a sufficient amount and at reasonable prices for all the people in the country all year long.[1] Thus, the people can buy rice at a price they can afford and the farmers can sell their rice at a price high enough to encourage increased production. To achieve these objectives the government implemented the floor price and ceiling price for rice.

In order to achieve those objectives and execute the policies efficiently and effectively, the government in 1967 installed a special agency named Badan Urusan Logistik (BULOG) - Agency for National Logistical Management - charged with the management and operation of the national reserve or buffer stock. Since that year this agency has been given many other responsibilities, among others are the distribution of sugar and wheat flour, the importation of sugar and wheat grain, and the administration of food aid.

Three extremely important responsibilities relative to rice are charged to BULOG as follows:[2]

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[1]President of the Republic of Indonesia, Supplement to the President's Report to the Parliament, Jakarta, August 1983.

[2]Badan Urusan Logistik (BULOG), The Problem of Stock-Size in the Indonesian Rice-Stock-Policy, Jakarta, February, 1975, p. 2.

(1) To supply rice regularly to the armed forces and to the government civil servants at prices that maintain a high degree of stability to real incomes of these key groups.

(2) To purchase rice in the domestic market so as to support a minimum floor price for farmers, sufficient to induce them to increase production through intensive use of fertilizer, high yield varieties, and other important farm inputs.

(3) To be prepared, by maintenance of rice reserve or buffer stock, to inject rice into the market so as to help maintain a stable economy by preventing rice prices from rising above a predetermined ceiling price.

Also, BULOG maintains some of the warehouse and milling facilities it needs.

A. The Floor Price for Rice

In 1968 the government began to recognize the necessity of paying farmers an adequate price incentive for farmers to be willing to expand their purchases of fertilizer and other high-yield increasing inputs. This was translated into the "Rumus Tani" - Farmer's Formula - which indicated as a guideline that the price of a kilogram of rice should be about equal to a kilogram of urea fertilizer. This was a first attempt at introducing floor price for rice on the farm.

In 1970, with the setting of a ceiling price for fertilizer, it was possible to set a floor price for rice that stimulated increased rice production. By the early seventies BULOG had so improved its ability to defend retail prices by market injections and to support a floor price by purchasing rice during the crop season that the government announced a

policy of a floor price and ceiling price for rice. The spread between the ceiling and floor prices was to be adequate to cover the costs of seasonal holdings by traders.

The floor price policy is to guarantee that the rice farmers can receive an adequate price for the rice they sell, that is, a price high enough to increase their income and stimulate them to increase their production. When the floor price was first established by the government in 1970, support for farmers was assured only by BULOG's willingness to buy from private traders or millers at the rice mill at the announced floor price. The presumption was that this would force private buyers to pay farmers close to the guaranteed floor price for rice at the farm gate. But, it was suspected that the traders would tend to use their monopsony position at the farm level to be able to buy the rice at prices far below the floor price.

To defend against that possibility and to assure that the farmers can really benefit from the implementation of that policy, the Koperasi Unit Desa (KUD's) - Village Unit Cooperatives - were added to the price support network in 1973. If the price of rice in the market is above the floor price, then the farmers can sell their rice in the market. But if the price of rice in the market is below the floor price, the farmers can sell their rice to the KUD's and receive the floor price for their rice. Then the KUD's will sell all the rice they purchased from the farmers at a guaranteed price above the floor price to BULOG.

As BULOG now paid floor price plus commission, it was hoped that this competition from the KUD's would eliminate any possibility of excess profits by the middleman so that the farmers would receive the actual

floor price for their rice. Because beginning in 1973 the government price policy was to maintain the floor price at the KUD level, the farmers then could be assured of receiving at least the floor price if they transported their rice from the farm to the KUD's.

With the implementation of this system, the KUD's had an opportunity to expand and improve their capability in doing business and to expand their role in the rural economy. In order to accelerate the development of the KUD's, the government offered a price difference between procurement from the KUD's and procurement from the non-KUD's. The procurement price from the KUD's is slightly higher than the procurement price from the non-KUD's.

To stimulate production, the floor price is increased annually. The floor price for rice is shown in Table 10. By increasing the floor price for rice annually it is expected that the rice producers will respond by increasing their production.

Table 10. Floor Price for Rice and Thailand Rice Price 1973 - 1983

Date Price Effective	Rice Floor Price[a]		Thailand Rice Price
	Rp./ton	US $/ton	FOB Bangkok[b]
1973	20,900	50.36 (77.48)	583
April 1, 1973 - May 23, 1973	25,550	61.57 (94.72)	627
May 24, 1973 - March 31, 1974	30,400	73.25 (112.69)	487
April 1, 1974 - Jan. 31, 1975	41,600	100.24 (154.22)	343
Feb. 1, 1975 - Jan. 31, 1976	58,500	140.96 (216.86)	253
Feb. 1, 1976 - Jan. 31, 1977	68,500	165.06 (253.94)	279
Feb. 1, 1977 - Jan. 31, 1978	71,000	171.08 (263.20)	365
Feb. 1, 1978 - Jan. 31, 1979	75,000	120.00 (184.00)	342
Feb. 1, 1979 - May 2, 1979	85,000	135.57 (208.57)	417
May 3, 1979 - Jan. 31, 1980	95,000	151.52 (233.11)	450
Feb. 1, 1980 - Jan. 31, 1981	105,000	167.46 (257.63)	472
Feb. 1, 1981 - Dec. 31, 1981	120,000	186.33 (286.66)	484
Jan. 1, 1982 - Jan. 31, 1983	135,000	194.95 (299.92)	290
Feb. 1, 1983 - Jan. 31, 1984	145,000	149.48 (229.97)	277
Feb. 1, 1984 - Jan. 31, 1985	165,000	160.35 (246.69)	250

Sources: 1970-1981: Leon Mears, The New Rice Economy in Indonesia, Gadjah Mada University Press, Yogyakarta, 1981.
1982-1983: President of the Republic of Indonesia, Supplement to the President's Report to the Parliament, Jakarta, August 1983.

Thailand Rice Price: United States Department of Agriculture, Rice Outlook and Situation Report, Various Issues.

a) Milled dry unhusked rice, 14% moisture content.
b) Thailand milled rice, 5% brokens.

Numbers in parenthesis are U.S. $/ton for milled rice using 0.65 conversion ratio from milled dry unhusked rice to milled rice.

In 1985 effective date from February 1, 1985 to January 31, 1986, the floor price for rice was increased to Rp. 175.00 per kilogram.[3]

The floor price support was very successful after 1972. The farmers growing confidence that they were guaranteed floor price support became an important factor in the farmer's willingness to risk the increased fertilizer use that contributed materially to the large production increases of the late 1970's. Thus, the floor price provided important support for the government's growth objective. The concurrent improvement in implementing the floor price support for production means more security for farm incomes.

An important factor that made the floor price support for rice successful is the government's intention to increase its bufferstock of rice, especially in the recent years where the rice production increased substantially. With the intention of the government to increase bufferstock, which is mostly done by increasing rice procurement domestically, the possibility is better for the farmers to receive a price accordance with the floor price policy. The strategies to increase the floor price annually and to increase the amount of rice buffer stock has increased the farmers' income and their production substantially. These strategies are appropriate when Indonesia is still in a rice deficit situation. But as Indonesia faces a rice surplus situation, these strategies will have to be adjusted, such as determining the size of rice bufferstock and setting the floor price with regard to the world

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[3]"Rice Production Abundance," Kompas Newspaper, January 24, 1985, sec. 1, p. 12.

price of rice. It could be seen from Table 10, that although the Indonesian rice floor price is lower than the Thailand rice price, the difference is becoming smaller. In terms of quality, the Thailand rice has a better quality than the Indonesia rice. To avoid possible surplus problems, the government should develop better quality rice varieties. The improvement of the Indonesian rice quality probably will have two major effects.

First, it will reduce the importation of better quality rice due to the increased demand for domestic rice. This will reduce the surplus of rice for export. And second, it will make the Indonesian rice more competitive in the world market. Thus, it will give an opportunity to Indonesia to export its rice.

Also, the government should be concerned about future pricing for rice, in this case the floor price with regard to the world price. So, in terms of world price Indonesian rice will also be competitive.

In order to support the steadiness of the bufferstock policy, BULOG has been building warehouses throughout the country. The KUD's have been provided credit facilities to build small warehouses to accumulate and store the rice they purchase from the farmers. The KUD's have also been provided credit facilities for operating dryers, sun dryers and mechanical dryers, so the KUD's can sell the rice they purchase from the farmers to BULOG at the required quality.

The warehouses and the dryers have increased the government's capability to implement the floor price and ceiling price of rice all over the country.

B. The Ceiling Price for Rice

The objective of the rice ceiling price policy is to assure that the price of rice does not exceed the price that is within the reach of the people's purchasing power. The ceiling price for rice is differentiated between rice surplus regions and rice deficit regions. The ceiling price for rice in the deficit regions is higher than the ceiling price for rice in the surplus regions. The purpose of setting this ceiling price difference is to induce the private traders to transport rice from the surplus regions, particularly in Jawa, to the deficit regions.

To assure that the price of rice is always below or at most the same as the ceiling price, the government, through BULOG, has implemented several distribution activities. There are two major rice distribution activities: (1) market distribution, known as Market Operation, and (2) distribution to the functionary group, which are the military and civil servants and their dependents.

Distribution to the market, or Market Operation, is executed in places where the price of rice tends to approach the ceiling price, which usually happens in the time of rice scarcity just before harvest time. This distribution is made at the district level.

In order to carry out this ceiling price policy the government, through BULOG, has to maintain reserve stocks to sell at the district level whenever the market price reaches the ceiling price. The reserve stocks needed come from BULOG's domestic procurement in connection with maintaining of the floor price policy and from import.

Prior to 1980 BULOG experienced problems in obtaining an adequate share of rice crop for its needs, especially in shortfall years when free market prices are high and imports large, more than two million metric tons in some years, have been necessary. Especially since the mid 1970's, the total rice distributed has far exceeded domestic procurement.

Since Indonesia's bumper rice harvest in 1981, BULOG has had no difficulties in meeting its domestic procurement targets. Domestic procurement has increased substantially so most of the rice reserve stock needed to carry out the ceiling price policy is provided domestically. The import of rice has decreased drastically since 1981.

CHAPTER 6

CONCLUDING REMARKS

With regard to the important role of rice in the Indonesian economy, the government has ranked rice self-sufficiency as a top priority objective. The government has signaled its intention by launching ambitious programs of rice development, known as the Rice Intensification Programs, consisting of: (1) the BIMAS Program, (2) the INMAS Program, and (3) the INSUS Program. The main goal of these programs are to increase rice production through new cultivation technologies, pricing policies, and improved water control.

The introduction of high yielding rice varieties together with the government's efforts to encourage farmers to use these varieties and more purchased inputs such as fertilizer and pesticides, and the improved availability of these inputs has resulted in a marked improvement in the annual rate of increase of rice production in Indonesia. The rice production increased from 12.25 million tons in 1969 to 23.96 million tons in 1983. This substantial increase is due mostly to the improvement in yield which increased from 1.53 tons per hectare in 1969 to 2.63 tons per hectare in 1983.

The Rice Intensification Programs can be viewed as an application of the "high-pay-off model," since the government has made high productivity investments in terms of giving heavy direct and indirect subsidies to rice producers to stimulate their production. Besides the subsidies given to the rice producer, the government has invested heavily on infrastructure development, such as road network and irrigation systems.

Also, the government has invested heavily in the construction of fertilizer factories. Along with the intensification programs the government also has established a network of national agricultural research stations.

The Rice Intensification Programs can be viewed as institutional innovations designed to centralize the mobilization of resources to meet rice production goals. Since the internalization of the gain of innovative activities are difficult to achieve in Indonesia, the institutional innovations involving the public sector activity became very essential.

In order to successfully carry out the intensification programs the government has made several major institutional changes. First, the government has established the Central Research Institute of Agriculture (CRIA), as a network of national research stations, to realize to society the potential gains from advances in agricultural technology, such as cropping pattern and soil management practices, and new rice varieties. Second, the government has established an agricultural extension service network to promote and encourage the farmers to take advantage of the Rice Intensification Programs. Third, the government created and introduced a new concept of Village Unit Area, which is assumed to be the smallest efficient unit of economic activity for the rural community. Fourth, the government has invested more efforts in encouraging the formation of village water user organizations so the farmers can improve the management and maintenance of the irrigation infrastructure at the farm level. Finally, the government, in order to support the rice

intensification programs, has established a special agency named Badan Urusan Logistik (BULOG) - Agency for National Logistic Management. This agency has the responsibility to make domestic rice procurement to maintain the price of rice paid to the farmers at or above floor price.

Since rice production in recent years has increased continuously in substantial amounts, it is suggested by the author that the BIMAS program, that is the rice intensification program with a credit component, be terminated because the institutions involved in extension, input distribution, credit facilities, and rice marketing are already offered through the KUD's and BULOG. Besides that, the rice farmers have improved their skills and applied the five components of the rice intensification programs better. The result has been an increase in rice production and farm income. With the increase in income, the rice farmers can finance the purchase of inputs from their sale of rice, which means that they are capable to shift to the INMAS program, that is the rice intensification program, without the credit component.

With the termination of the BIMAS program in rice production as suggested above, the funds could be used to apply the BIMAS program to the production of other food crops whose production is not well developed.

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AN ANALYSIS OF SELECTED GOVERNMENT PROGRAMS TO INCREASE RICE PRODUCTION IN INDONESIA

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Abstract

Rice is by far the most important food crop in Indonesia. Rice production occupies more than half of Indonesia's cropland devoted to food production. It is also the single most important food source for all income groups in Indonesia, accounting for over half of all calories consumed. So predominant has been this grain in the peoples' diet that the domestic production has not been sufficient to meet the increasing consumption. During 1977-1980, Indonesia has to import about two million tons of rice yearly, equal to ten percent of total consumption.

With regard to the *important* role of rice in the Indonesian economy, the government starting in 1969 with the First Five Year Development Plan (REPELITA I) has ranked rice self-sufficiency as a top priority objective. The government has signaled its intention by launching ambitious programs of rice development, known as the Rice Intensification Programs, consisting of: (1) the BIMAS program; (2) the INMAS program; and (3) the INSUS program. The main goals of these programs are to increase rice production through new cultivation technologies, pricing policies, and improved water control. Institutional changes have also been made. With all these efforts *Indonesia* has experienced a substantial increase in rice production in the recent years.

This study has focused on the rice intensification programs implemented by the government. It investigated all the efforts undertaken by the government to increase rice production. It also investigated the government rice pricing policies. Also, it evaluates the rice intensification programs in terms of induced development model.

Throughout the study, it was found that the Rice Intensification Programs can be viewed as an application of the "high-pay-off input model," since the government has made high productivity investments to stimulate rice production increases. Also, the Rice Intensification Programs can be viewed as institutional innovations designed to centralize the mobilization of resources to meet rice production goals. The reason for this is that in order to carry out successfully the intensification programs the government has made several major institutional changes.

With the experience of substantial increases in rice production in the recent years, the government needs to make prompt preparation so quick action will be possible to meet the different set of problems, particularly in marketing, that arise as rice self-sufficiency is approached.

Also, the government must provide an attractive technology package to the farmers growing other food crops whose production is not well developed.