

The Profitability and Competitiveness of Rice Farming in Polmas District, South Sulawesi, Indonesia¹⁾

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Key Words : rice farming, profitability, competitiveness, Indonesia

Abstract

Agriculture has consistently been a main and central focus of Indonesian government's development strategies and priorities. The sector has performed a major role in developing the Indonesian economy since New Order era. Agriculture has contributed in national economic development by providing employment, food, raw material for industries, and foreign exchange earnings. In addition, since the economic crisis, this sector has continued to show its important role as "buffer sector" in the economy. In 1984 and 1985, Indonesia achieved great success in rice production. In these two years Indonesia did not import any rice due to self-sufficiency reached. And than from 1969 to 1988, Indonesian rice production grew 4.5 percent annually. This led Indonesia move from being the world's largest importer of rice in the 1970s to self-sufficiency in 1985. Unfortunately, this success did not continue for long. Currently, the Indonesian government is importing rice and using a tariff to make itself less dependent on foreign markets. The PAM analysis shows that if tradable inputs and outputs are valued at international prices and domestic resources (land, labor, and capital) are at opportunity costs, rice producers would earn substantial profits. When commodities have positive social profits, the country has a comparative advantage in producing the profit and can compete to international rice market.

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1. Background and Research Objectives

Agriculture has consistently been a main and central focus of Indonesian government's development strategies and priorities. The sector has performed a major role in developing the Indonesian economy since New Order era. Agriculture has contributed in national economic development by providing employment, food, raw material for industries, and foreign exchange earnings. Since the economic crisis this sector has continued to show its important role as "buffer sector" in the economy.

Among agricultural products rice is one of the important commodities due to its role as staple food of Indonesia. In 1984 and 1985, for example, Indonesia achieved great success in rice production. In these two years Indonesia did not import any rice due to self-sufficiency reached (Pearson, Naylor, and Falcon, 1991 : 8-21). From 1969 to 1988, production grew at 4.5 percent annually. This led Indonesia moved from being the world's largest importer of rice in the 1970s to self-sufficiency in 1985 (Heytens, 1991 : 114-137). Unfortunately, this success did not continue for long. Currently, Indonesian government is importing rice and making some structural adjustment policies in response to high demand on food. For example, in 2000 Indonesia imported rice 0.5 million tons, corns 1.2 million tons, and wheat 3.5 million tons. In the last decade, agricultural development in the country was expanding rapidly on marginal agricultural lands—rainfed uplands, grasslands, tidal swamplands and forestland—to feed more than 200 million populations in the nationwide.

In South Sulawesi Province, the growth rate of rice production is relatively stable for a long time and is higher than national average. The province is well known as "buffer stock of rice" in the East Indonesia. In 2001 the total production of rice in the province was 3,610,669 tons. Wet land paddy (*padi sawah*)—irrigated and rainfed systems—contributed about 99% of the production (3,583,114 tons) and the rest, about 1% (27,600 tons), came from dryland rice farming (*padi ladang*) (BPS, 2000).

Based on the agricultural situation above, the most important question addressed in this study relate to the private and social profitability of rice production. Is rice sufficiently profitable to provide farmers with the incentive to continue or expand output? Does the rice that is being produced use resources efficiently, i.e., does Indonesia have a comparative advantage in growing rice? Answers to these questions are necessary to evaluate the current policy environment and to consider the desirability of various proposals, especially those that deal with improving the country's food security.

2. Literature Review

Rural communities of Indonesia, like most of the other Asian countries, heavily depend on agriculture for their livelihood (Stringer, 1997). According to Stringer, in Asia, debate on food security is much focused on three broad regional characteristics; they are a large population base with rising incomes, the quality of environmental degradation is due to rapid economic growth within the last two decades [before economic crisis], and how the world's food sector will cope with potentially massive food imports by China. The rapid economic growth of Asian countries and structural change is profoundly affecting food consumption (Stringer, 1997), for both its availability and its distribution. Food availability is measured in calories available per person per day in a certain level such as at household, district, province, country, and so on. And its distribution measured by their accessibility in appropriate time and places. These two basic components of the food security are very important for policy maker to consider.

Food security is always an emotional and a political issues. In Indonesian contexts, food security could become a "time bomb" if rice imports are not reduced and have raised fears for both populations in general and incumbent ruler. Understandably, politicians are seeking answers that will assure public while gaining support for their parties (IFPP, 2002).⁴⁾ Historically, Indonesia's food policy program has been based mainly on a policy of rice self-sufficiency. In maintaining food security system the government has various done strategies — trade controls, government stockpiling, price supports for producers, and subsidized rice sales during lean period — to assure supplies of rice and other essential foodstuffs while keeping consumer price affordable (Tabor & Sawit, 1999) as well as supporting agricultural inputs such as fertilizer and agro-chemical as incentives for farmers. According to Darmawan and Dawes (Tabor & Sawit, 1999), over the past 20 years, the Indonesian government has generally controlled to keep the domestic price for more stable than the world rice prices. But, Wiebe states that in recent years, food imports have ascended, unstable prices occurred, and the costs of interventions aimed at stabilizing prices have been rising (Tabor & Sawit, 1999). Therefore, "the current high level of rice prices in Indonesia makes the economic restructuring quite difficult. Even higher rice prices, with imports again under Bulog's⁵⁾ control, will make it

4) See Working Paper No. 12, June 2002 of Indonesian Food Policy Program, IFPP, (www.macrofoodpolicy.com) "Food Security and Rice Price Policy in Indonesia: Reviewing the Debate, published by BAPPENAS/DEPARTEMEN PERTANIAN/USAID/DAI FOOD POLICY ADVISORY TEAM

5) Bulog (*Badan Urusan Logistik*, National Food Logistics Agency of Indonesia).

impossible” (IFPP, 2002).⁶⁾

In response to the deteriorating food security in general and rice commodity in particular, the government has been intervened by imposing sweeping-controls on food prices and trade. In order to maintain domestic food prices at 50 to 60 percent of prevailing import parity prices, from mid-1997 to mid-1998, the government used trade and price controls as policy means (Tabor & Sawit, 1999). During this period, the large gap between domestic and international prices occurred, but narrowed between late 1998 and mid-2000, and then, it has widened again since 2000. Thus, the domestic prices of rice remain substantially above the international prices—in contrast to the long-run parity seen from the mid-1970s to the mid-1990s (IFPP, 2002). Another important thing at the beginning of economic crisis in the country was the amount of food price subsidies. For 1998 fiscal year, the subsidies for food prices were “initially budgeted at Rp4 trillion but eventually reached Rp12 trillion, the equivalent of 12.4 percent of government development outlays and just under 2 percent of GDP. The subsidies, however, enjoyed by middle and upper-income groups due to these groups consume more than three-quarters of all food staples and generally do not derive their income from food production” (Tabor & Sawit, 1999).

Regarding what we just explained, by August 1998 the Indonesian government ignored its general food price subsidy policy. Since then, a new subsidy program introduced so-called “the OPK program” (a targeted rice subsidy program) to protect the food security of low-income households. One month later, September 1998, the government proclaimed that Bulog would confine its agricultural market activities to rice and would dispose of its non-rice food stocks. Then, in November 1988, the government decided to liberalize trade in food crops, including rice (Tabor & Sawit, 1999).

3. Research Methods

In the previous section we have, at least, four key words—profitability, competitiveness, efficiency, and policy analysis—should be examined in the research. One of the most suitable research tools for examining those key words is Policy Analysis Matrix (PAM) approach. The main purpose of the method is to measure the impact of government policy on agricultural development, particularly on private profitability of agricultural systems, the competitiveness, and the efficiency of agricultural resource use. In addition to estimating the profitability of producing commodities at private and social

6) See the Working Paper No. 12., *ibid.*

prices, the matrix format also produces a breakdown of commodity budgets into revenues, tradable input costs, and domestic resource costs. When budget elements valued at social prices are subtracted from those valued at private prices, the PAM's matrix format makes it possible to pinpoint the location of government policies and market failures with a good deal of precision.⁷⁾

3.1. Research Sites

The research was carried out in Polmas District, South Sulawesi Province, Indonesia.⁸⁾ Polmas is one of the main rice growing districts in the province. Campurjo Village, at which data were collected, was randomly selected. The village is located in lowland zone that has good irrigation and water control. In data collection we did three stages ; (1) field orientation and preparation (secondary data collection, permission of survey from local government, pre-survey (pre-test of questionnaire), and community meeting ; (2) household survey, focus group discussion, and in-depth interview ; and (3) the communication of results to receive feedback from various groups. Data collection was carried out during October-December, 2002.

3.2. Data and Its Collection Method

In the research, both primary and secondary data including post-farm costs and returns were needed. Primary data-production input costs and output and their prices at farmgate level, land rent, etc —was collected by household survey during the dry season of 2002. Forty households were chosen randomly. Post-farm costs and returns data were obtained from World Bank publication provided by CASER (Center for Agro Socio Economic Research), CASER training materials, and related research reports. Secondary data, such as prices of tradable inputs and outputs were collected from government offices (BPS, Agricultural Service Office, Trade and Industry Office). Other prices, particularly transportation costs, were collected from local wholesaler in Polewali (capital city of Polmas District) and Makassar (capital city of South Sulawesi Province).

The household survey was the main tool for developing farm budget-revenue, costs, and profit (private and social prices)- structure of the rice farming. This quantitative method was complemented with a qualitative approach that used community meetings, in-depth interviews and focus group discussions, for gathering not obtained in the household

7) For a detailed discussion on PAM approach see Eric A. Monke and Scott R. Pearson, 1989. *The Policy Analysis Matrix for Agricultural Development*. Cornell University Press, USA.

8) Soon after we did the first field visit, Polmas district officially was divided into two government administrations, Polewali District and Mamasa District. In this report, however, we still use Polmas District because the secondary data is not available separately.

survey.

4. Brief Description of the Research Site

Polewali Mamasa (Polmas) District is one of the 23 districts in South Sulawesi Province. It is located in the northern part of the province, about 250 km from Makassar, the capital city of South Sulawesi. To reach the district, it takes about 5 hours by bus. Geographically, the district is situated between 2°40'00" and 3°32'00" south latitude, and 118°40'27" up to 119°32'27" east longitude. Polmas is bounded by Mamuju District in the north, Tana Toraja and Pinrang Districts in the east, Makassar Strait in the south and Majene District in the west.

In 1999, the total area of Polmas was 4,781.53 km², which was divided into 9 sub-districts and 201 villages; they were Sub-District of Tinambung, Tutallu, Campalagian, Wonomulyo, Polewali, Sumarorong, Pana, Mamasa, and Mambi. Among the sub-districts Mambi was the largest area or 25.23% of the total, while Tinambung was the smallest one (2.22%). This area lies between 3 m—1,100 m above sea level, where Mamasa Sub-district is highest area (1,110 m).

The research was conducted at Campurjo Village. The village is located in Wonomulyo Sub-district, 18 km north of Polewali. According to 2001 census data, physical area of Campurjo is 293.26 hectares with a population of 2,001. The population consists of 1,051 men and 1,041 women in 498 households. The man-land ratio in the village is 7.14 per hectare, the rice field ratio is 0.9 hectare per person. All rice fields (180.74 hectares), in the village are serviced by an irrigation network. The village can be reached by any kinds of vehicles. The closest local market is in Wonomulyo. It is the major local market in Wonomulyo area. Farmers can easily find any agricultural inputs in the market. Some farmers, however, prefer buying their daily food needs or their agricultural inputs in the Polewali town market.

5. Profitability and Competitiveness : Computing Private Budget

5.1. Input-Output

The data collected from rice farm survey, focus group discussion, and in-depth interview were used to construct an input-output table. Data were crosschecked with local expert to ensure their validity and reliability. The input-output data for rice farming are shown in Table 1.

Table 1. Physical Input-Output

INPUT-OUTPUT	QUANTITIES	Amount
Tradable inputs	a. Fertilizer (kg/ha)	
	Urea	222.56
	KCl	14.95
	SP-36	11.93
	ZA	50.47
	b. Chemical (kg/ha)	
	Ally 20 WDG	0.06
	Thiodan	-
	Bassa	-
	Furadan	0.10
	Drusban	0.13
	c. Seed (kg/ha)	36.00
Domestic Inputs	d. Fuel (liters/ha)	
	Tractor	30.00
	Tresher	6.00
	Labor (man days/ha)	
	a. Seedbed preparation	4.04
	b. Land preparation	-
	c. Planting	
	Seed Extraction	6.00
	Planting	11.50
	d. Crop care	
	Weeding	9.62
	Fertilizer Application	3.02
	Chemical Application	8.02
	e. Harvesting	45.00
	Capital	
	a. Working Capital (Rp./ha)	1,353,298.79
	b. Tractor services (hours/ha)	16.00
	c. Thresher services (hours/ha)	6.00
	Land rent (ha)	1.00
	Other inputs	
	Org. fee (P3A) (ha)	1.00
Output	Rice production (kg/ha)	5,798.55

In the Table 1, rice (*gabah kering panen*, GKP or dry paddy) production was 5,798.55 kg per hectare in average at the site. In the same table we also present all inputs used. We divide them into two categories, tradable inputs and domestic inputs. Tradable inputs are inputs that are actually imported to certain country, Indonesia. In the rice farm the tradable inputs are fertilizers, chemicals, seed, and fuels. And all the other inputs are domestic one ; they are labor, capital, land rent, and others (organization fee).

5.2. Analysis of Private Profitability

5.2.1. Determining Private Price

Private price is defined as the price of all inputs used at the research sites. These prices were derived from farm-survey, focus group discussion and in-depth interview (Table 2). In the Table 2 the private prices for the tradable inputs are easy to understand. We collected them during interview with the farmers and we did crosscheck at nearest *Toko Tani* (retail shop for agricultural inputs), transport service providers, and PT. Pertani. In this session, therefore, we pay attention on selected domestic input prices (labor costs, capital, land rent, and others).

Land Preparation

In the Table 3 the cell for land preparation is blank. This does not mean that no cost for it. The land preparation in the area done by a third party; in this case is tractor services provider. Therefore the actual cost for it is the cost for tractor services, the UPJA (*Usaha Pelayanan Jasa Alsintan*, Services Provider for Agricultural Machinery), Rp. 378,500.00 per hectare (including the lunch for the operators).

Family Labor

In the research site seedbed preparation, crop cares (weeding, fertilizer application, and chemical application) generally done by the farmers themselves. Few cases, however, hired other farmers to do the works. The information collected from the case as follow:

In the site, the wage varies based on the type of the works. The wage for the seedbed preparation and weeding is Rp.10,000.00 per man day, while for fertilizer and chemical application is Rp.15,000.00 (Table 2).

Hired Labor

The calculation of the hired labor is a little more complicated than family labor. All respondents hire labor in two activities, planting and harvesting. In planting, *bayaran* or *borongan* system is labor institution in the site. Each labor group has a variety in number of member; it is usually about 10–20 farmers per group. Regarding the payment method there are two ways available. The first is *cabut-tanam* system. The system means the hired cost for seed extraction (*cabut-bibit*) and planting (*tanam-padi*) as a package. In the system farmers generally pay about Rp. 360,000.00 per hectare in average. The amount comes to seed extraction and planting costs, about Rp. 123,432.00 and Rp. 236,578.00 per hectare, respectively (Table 3).

Table 2. Private Prices

PRIVATE-PRICES	QUANTITIES	Amount
Tradable inputs	a. Fertilizer (Rp/kg)	
	Urea	1,199
	KCl	1,895
	SP-36	1,700
	ZA	1,230
	b. Chemical (Rp/kg)	
	Ally 20 WDG	50,000
	Thiodan	70,000
	Bassa	48,000
	Furadan	9,000
	Drusban	58,000
	c. Seed (Rp/kg)	2,363
Domestic Inputs	d. Fuel (Rp/liter)	
	Tractor	1,550
	Tresher	1,550
	Labor (Rp/man days)	
	a. Seedbed preparation	10,000
	b. Land preparation	0
	c. Planting	
	Seed Extraction	20,572
	Planting	20,572
	d. Crop care	
	Weeding	10,000
	Fertilizer Application	15,000
	Chemical Application	15,000
	e. Harvesting	15,139
	Capital	
	a. Working Capital (%)	0.04
	b. Tractor services (Rp/hours)	23,656
	c. Thresher services (Rp/hours)	28,385
	Land rent (Rp/ha)	1,000,000
	Other inputs	
	Org. fee (P3A) (Rp/ha)	27,500
Output	Rice production (Rp/kg)	1,028

Working Capital, Services, Land Rent, and Others

Working Capital We define working capital as a cash used by farmers to run the rice farming ; for example cash for buying chemicals, fertilizer, hired-labor costs, etc. In actual situation the farmers in the research sites get their working capital by various sources such as capital accumulation from the previous season, borrowing from other farmers, neighbors, and relatives or borrowing fertilizer, for instance, from *Toko Tani*. Other forms of lending institution are government-supported credit and commercial

Table 3. Private Prices Budget

PRIVATE-BUDGET	QUANTITIES	Amount
Tradable inputs	a. Fertilizer (Rp/ha)	529,588.79
	Urea	266,849.44
	KCl	28,330.25
	SP-36	20,281.00
	ZA	62,078.10
	b. Chemical (Rp/ha)	
	Ally 20 WDG	3,050.00
	Thiodan	-
	Bassa	-
	Furadan	900.00
	Drusban	7,250.00
	c. Seed (Rp/ha)	85,050.00
Domestic Inputs	d. Fuel (Rp/ha)	
	Tractor	46,500.00
	Tresher	9,300.00
	Labor (Rp/ha)	1,343,465.00
	a. Seedbed preparation	40,400.00
	b. Land preparation	
	c. Planting	
	Seed Extraction	123,432.00
	Planting	236,578.00
	d. Crop care	
	Weeding	96,200.00
	Fertilizer Application	45,300.00
	Chemical Application	120,300.00
	e. Harvesting	681,255.00
	Capital (Rp/ha)	602,943.63
	a. Working Capital	54,131.95
	b. Tractor services	378,500.00
	c. Thresher services	170,311.68
	Land rent	1,000,000.00
	Other inputs	49,833.33
	Org. fee (P3A) (Rp/ha)	27,500
Output	Revenue (Rp/ha)	5,960,909.40
	Total Cost (excl. land rent) (Rp/ha)	2,503,497.42
	Profit (excluding land rent) (Rp/ha)	3,457,411.98
	Net Profit (incl. land rent) (Rp/ha)	2,457,411.98

credit issued by private and state banks. However, in the sites there are few farmers who are affordable for the last two credit schemes. Some reasons they provided were the uncertainty of agricultural business situation that could lead to inability paying back of the loan and the unfamiliarity in borrowing at official financial institution as well as complicated procedure of the bank system. Anyway, the way we calculate the working capital is based on the information provided by a farmer who have experience in getting

loan from BRI (*Bank Rakyat Indonesia, a state-owned bank*). The farmer got farm credit Rp. 800,000, for 0.5 hectare rice farming for one year in length, and should pay the interest rate 11.8% in total during one-year period. Based on it we set 4%, during four-month (a season rice-planting) for the interest rate of the working capital (Table 2). In practice we did summation on all cash-cost occurred. As a result we get the total cash-cost Rp. 1,353,298.79 (Table 1). Thus, these amounts multiplied by the four-month interest rate for getting actual working capital costs ; they are Rp. 54,131.95 per hectare (Table 3).

Land Rent, Tractor and Thresher Services According to an agricultural officer the land rental rate for the rice field was about Rp. 1,000,000.00. But the land rental case in the district is very rare case. Almost no land-owners let their farm to be rented. They prefer sharecropping system than land rental. We set, however, Rp. 1,000,000.00 for the private land rent. Next, we treat tractor and thresher service costs based on their direct costs paid by the farmers to UPJA provider. The cost for both services is Rp. 378,500.00 for the tractor and Rp. 170,311.68 for the thresher (Table 3).

Other costs (cost for P3A and land tax) P3A (*Perkumpulan Petani Pemakai Air*, farmer's organization on irrigation system) is one of farmer's organizations in the research site. As other organizations P3A's administration charge their members for irrigation-water fee annually. Each member should pay Rp. 82,500.00 for every hectare of paddy field he has in one-year basis. Therefore we put Rp. 27,500.00 per hectare as P3A fee for four-month (Table 3).

5.2.1. Private Budget and Profitability Analysis

The first question arises regarding this term is what are the aims of private profitability calculations ? According to Monke and Pearson the calculations of the private profitability "show the competitiveness of the agricultural system, given current technologies, output values, input costs, and policy transfers" (Monke and Pearson, 1989 : 20). Before calculating private profitability the most important thing should be done is how to define "the private profitability". The term private refers to actual costs and revenues that farmers spend and receive in agricultural system. Those costs and revenues reflect actual market prices paid and received by farmers, merchants, and processors in the system of agriculture. And profitability means the ability of a business, rice farm, yielding profit or financial gain. Thus, the market prices combine the underlying economic costs and valuation plus the effects of all policies and market failures (Monke and Pearson, 1989 : 20).

To calculate private profitability, we start to construct physical input-output table

(Table 1). The data in the table come from survey conducted at the research site of Polmas District. Table 1 shows that the main data components are tradable inputs (fertilizers, chemicals, seeds, and fuels), domestic inputs (labors, capital, land rent, and others), and output (revenue of the rice farm). The second stage is to construct private prices table (Table 2). The private price means, as described above, the price in the research site that called farmgate prices. The third stage is to construct private price budget (Table 3). The table is the result of multiplication of all physical input-output and their related prices components in Table 1 and Table 2 consecutively.

In the Table 3 the total revenue of the rice farming is Rp. 5,960,909.40 per hectare and its total costs is Rp. 2,503,497.42 excluding land rent. If land rent considered as a production cost, the total cost becomes Rp. 3,457,411.98 and the net profit is Rp. 2,457,411.98 per hectare. In Table 3 it is clear that net profit for rice production, as an import substitution that measured relative to a c.i.f. Indonesia world price, is positive Rp. 2,457,411.98 per hectare. Therefore we conclude that rice farming in Polmas District were privately very profitable particularly in the 2002 dry season. The net profit thus reflects the financial or private return to rice farm management and the competitiveness of the system. We can also interpret the result that Polmas farmer can produce “supernormal return” from their rice farming. The situation could lead to future expansion of the system, unless the rice system area can not be expanded or other crops could replace it with more privately profitable.⁹⁾ But the next question should be addressed is ; “*were the high profits coming from the rice farming productivity or coming from government transfer or market distortion ?*”

The question above is not an easy task to answer. Up to this point it is very hard to claim that the high profit is due to the productivity of the rice farming. We need further data of government policy on output and input prices.

6. Efficiency and Comparative Advantage : Computing Social Budgets

6.1. Analysis of Social Prices and Competitiveness

The next task must be done in order to construct PAM Table to compile a social budget table (Table 10). For doing this, the first task we did was calculating social prices for tradable and non-tradable inputs and output (Table 9). And then we multiplied them with related physical input-output in the Table 1.

9) See Monke and Pearson (1989 : 19-20) for the interpretation of private profitability.

6.1.1. Tradable Output-Inputs

Output Price

In calculating social budget the output (rice) should be counted first in social price, international price. This is very important step, and needs macro-data as well as analytic experience of the inquirer, in making rice competition analysis against international market of the commodity. In the research we set world rice price, as a comparison, based on Thai, Bangkok, price during July 2002. The Free on Board (FOB) price of the commodity was US\$ 170 per ton with 35% broken. In the same time, the insurance and freight costs to Jakarta, the capital of Indonesia, was US\$ 17.50 per ton lead to CIF price become US\$ 187.5 per ton. Thus we apply Rp. 8,800¹⁰⁾ per US\$ for the exchange rate. This amount is a little bit lower than the official rate, Rp. 9,000, of Indonesia's APBN (*Anggaran Pendapatan Belanja Negara*, state budget) for 2002 fiscal year. Thus, we apply 0% for exchange rate premium since the overvaluation of Indonesian rupiah currently does not exist. And the equilibrium exchange rate and CIF price of the rice in Indonesian currency become Rp. 8,800 per US\$ and Rp 1,650,000.00 per ton or Rp. 1,650.00 per kg (Table 4).

For distribution cost there are two transportation costs ; shipping costs, from port of Jakarta to wholesaler at Makassar, and truck costs, from wholesaler in Makassar to retailer at Polewali, for reaching farm. In the Table 4 the shipping cost is Rp. 105.0 per kg and the transportation cost from Makassar to Polewali is Rp. 100.0 per kg.

Input Prices

Basically we treat the same procedure of output's social price in compiling social prices for inputs. The differences, however, occur in insurance and freight for fertilizers and chemicals and their distribution costs. Below are the assumptions for all the inputs.

- FOB Price : 1) For the FOB prices of seed (\$170/ton), fuel (\$0.2/liter), chemical (\$3750/ton).¹¹⁾ For the fertilizer we apply TSP price at US Gulf (US\$ 127.4/ton on July 2002) for KCl, SP-36 and ZA. And we set FOB price at Eastern Europe (US\$ 96.6/ton on July 2002) for urea.

10) The reason beyond the value is due to rupiah was contracting between about Rp. 8,700-8,900 during the period. Since Megawati has been in power the exchange rate of rupiah against US dollar is relatively stable, fluctuates in small deviation. It should be noted, however, choosing appropriate exchange rate is very important, but it is not an easy task for the country like Indonesia, because the decision on it will affect the social prices of tradable output and inputs of a commodity and, of course, will affect PAM performance.

11) We follow the price set by Pearson and Gotsch in "The Policy Analysis Matrix : A Computer Tutorial (2001) that delivered at Manado Workshop) as we have difficulty to access their world prices.

- Official exchange rate : 1 US\$=Rp. 8,800.0
- Foreign exchange premium=0%
- Conversion for weight : 1 ton=1,000 kg
- Transportation costs from port of Jakarta to wholesaler at Makassar ; Seed and chemicals (Rp. 105.0/kg), fertilizers (Rp. 70.0/kg), fuel (Rp. 30.0/liter).
- Transportation cost from wholesaler at Makassar to retailer at Polewali is Rp. 100/kg.

6.1.2. Domestic Inputs

To meet the final stage for getting social price of tradable output and inputs of the commodity the domestic inputs used should be recalculated based on their opportunity costs. The way to calculate them, however, is not as easy as a textbook say. They need expertise of a researcher not only his field experience but also his analytic sophistication. In this session we will discuss how we treated domestic inputs in sense of social price accounting.

Labor Valuation

Social price of labor is one of the much more important and complicated components among domestic factors. Hence, a proper procedure in estimating labor value is important for social budget construction. In the research sites labor is not homogeneous in terms of their skill. The farmers in the site are categorized as semi-skilled labor and mobile factor because all respondents are Javanese immigrants. We realize, as other immigrants in the province, that Javanese generally have many and high skills than local population ; not only in agricultural sector but also in other sectors. So they tend to have high mobility and high opportunity of getting jobs. In estimating social price, therefore, for the labor in the research site we consider the social price of labor equals its private price in every activity (Table 9).

Capital Valuation

As indicated in the previous section most farmers did not use subsidized and commercial credits schemes. So we set the social price for the capital exactly the same as the private price, 11.8% per year. By doing this, therefore, during the rice production cycle the social interest rate would be 4% for 4 months (Table 9).

Land Valuation

Like other factors of production, land use has social value (economic cost) and this

cost “should” be estimated by what it could produce in its next best alternative use. In the research site, few farmers produce soybean in the dry season as a substituted commodity for rice. Hence, in estimating social prices for land, we use the average net income, Rp. 2,000,000.00, of soybean.¹²⁾ This figure reflects the net benefit of the commodity in average per season and set it for the net benefits foregone as a result of taking out the land for rice cultivation (Table 9).

Others

For tractor, thresher, and rice miller services we assumed that their social prices are the same of their private price as the value of the services determined by the owner. The same case occurs on organization fee (Table 9).

6.1.3. Social Prices

Based on the assumptions given in the previous sections (tradable output-input and domestic inputs) and calculation for domestic inputs the social prices at the farmgate for output and all inputs their social prices are summarized below (See Table 4, 5, 6, 7 and 8 for detail procedures).

Table 4. Import Parity Prices for Output

	Rice, 35% broken
<i>Beras</i> (F.o.b in Bangkok (\$/ton))	170
Freight & Insurance (\$/ton)	17.5
C.i.f. Indonesia (\$/unit)	187.5
Exchange rate (Rp/\$)	8,800
Exchange rate premium (%)	0%
Equilibrium exchange rate	8,800
C.i.f. in Indonesia Currency (Rp/ton)	1,650,000.0
Weight conversion factor (kg/ton)	1000
C.i.f. in Indonesia Currency (Rp/kg)	1,650.00
Distribution costs (Jakarta-Makassar) (Rp/kg)	105
Import parity value at Makassar (Rp/kg)	1,755.00
Distribution costs (Makassar-Polmas) (Rp/kg)	100
Import parity value at Farm Gate/Polmas-research site (Rp/kg)	1,855.00
Conversion factor (55%) (<i>Beras</i> to GKP at the research site)	1,020.25

12) This figure is based on the estimation of farmers who had had experience in cultivating soybean. However, they did not consider land rental rate of Rp. 1,000,000.00 as one of farm-cost components. In this case we consider the net profit of Rp. 2,000,000 of soybean (excl. land rental rate) as the opportunity cost of the land.

Table 5. Import Parity Prices for Input

	Seed
F.o.b (\$/ton)	170
Freight & Insurance (\$/ton)	17.5
C.i.f. Indonesia (\$/unit)	204.5
Exchange rate (Rp/\$)	8,800
Exchange rate premium (%)	0%
Equilibrium exchange rate	8,800
C.i.f. in Indonesia Currency (Rp/ton)	1,650,000.0
Weight conversion factor (kg/ton)	1000
C.i.f. in Indonesia Currency (Rp/kg)	1,650.0
Distribution costs (Jakarta-Makassar) (Rp/kg)	105
Import parity value at Makassar (Rp/kg)	1,755.0
Distribution costs (Makassar-Polmas) (Rp/kg)	100
Import parity value at Farm Gate/Polmas-research site (Rp/kg)	1,855

Table 6. Import Parity Prices for Input

	Fuel
F.o.b in Bangkok (\$/liter)	0.2
Freight & Insurance (\$/liter)	0.04
C.i.f. Indonesia (\$/liter)	0.24
Exchange rate (Rp/\$)	8,800
Exchange rate premium (%)	0%
Equilibrium exchange rate	8,800
C.i.f. in Indonesia Currency (Rp/liter)	2,112.00
Transport cost (Jakarta-Makassar) (Rp/liter)	55
Import parity value at Makassar (Rp/liter)	2,167.00
Distribution costs (Makassar-Polmas) (Rp/liter)	25
Import parity value at Farm Gate/Polmas- the research site) (Rp/liter)	2,192.00

- Rice is Rp. 1,020.25 per kg GKP.
- Seed is Rp. 1,855/kg.
- Fuel is Rp. 2,192/liter.
- Fertilizers (KCl, SP-36 and ZA) are Rp. 1,360.80/kg and for Urea alone is Rp. 1,089.76/kg.
- Chemical is Rp. 34,739.40/kg for each.

Table 7. Import Parity Prices for Input

	Fertilizer			
	Urea	KCl	SP-36	ZA
F.o.b (\$/ton)	96.6	127.4	127.4	127.4
Freight & Insurance (\$/ton)	13.6	13.6	13.6	13.6
C.i.f. Indonesia (\$/unit)	110.2	141	141	141
Exchange rate (Rp/\$)	8,800	8,800	8,800	8,800
Exchange rate premium (%)	0%	0%	0%	0%
Equilibrium exchange rate	8,800	8,800	8,800	8,800
C.i.f. in Indonesia Currency (Rp/ton)	969,760.0	1,240,800.0	1,240,800.0	1,240,800.0
Weight conversion factor (kg/ton)	1000	1000	1000	1000
C.i.f. in Indonesia Currency (Rp/kg)	969.76	1,240.80	1,240.80	1,240.80
Distribution costs (Jakarta to Makassar port) (Rp/kg)	70	70	70	70
Import parity value at Makassar (Rp/kg)	1,039.76	1,310.80	1,310.80	1,310.80
Distribution costs (Makassar to Polmas) (Rp/kg)	50	50	50	50
Import parity value at Farm Gate/Polmas-research site (Rp/kg)	1,089.76	1,360.80	1,360.80	1,360.80

Table 8. Import Parity Prices for Input

	Chemicals				
	Alli	Thiodan	Bassa	Furadan	Drusban
F.o.b (\$/ton)	3750	3750	3750	3750	3750
Freight & Insurance (\$/ton)	163	163	163	163	163
C.i.f. Indonesia (\$/unit)	3913	3913	3913	3913	3913
Exchange rate (Rp/\$)	8,800	8,800	8,800	8,800	8,800
Exchange rate premium (%)	0%	0%	0%	0%	0%
Equilibrium exchange rate	8,800	8,800	8,800	8,800	8,800
C.i.f. in Indonesia Currency (Rp/ton)	34,434,400.0	34,434,400.0	34,434,400.0	34,434,400.0	34,434,400.0
Weight conversion factor (kg/ton)	1000	1000	1000	1000	1000
C.i.f. in Indonesia Currency (Rp/kg)	34,434.40	34,434.40	34,434.40	34,434.40	34,434.40
Distribution costs (Jakarta-Makassar) (Rp/kg)	105	105	105	105	105
Import parity value at Makassar (Rp/kg)	34,539.40	34,539.40	34,539.40	34,539.40	34,539.40
Distribution costs (Makassar-Polmas) (Rp/kg)	200	200	200	200	200
Import parity value at Farm Gate/Polmas-research site (Rp/kg)	34,739.40	34,739.40	34,739.40	34,739.40	34,739.40

6.2. Social Budget and Profitability Analysis

The principal aim of social profitability analysis is to find out whether production systems are efficient and thus contributing to rapid growth of national income. In this case, however, the aim of social budget and profitability analysis is to analyze whether or not the rice farming at Polmas District is profitable comparing to rice system at international market, for instance in Thai market. Thus, based on that we can make a competitive analysis by comparing the system. After all items, both tradable and non-tradable output-input, counted in social prices the next step is to compile its social budget

Table 9. Social Prices

SOCIAL-PRICES	QUANTITIES	Amount
Tradable inputs	a. Fertilizer (Rp/kg)	
	Urea	1,089.76
	KCl	1,360.80
	SP-36	1,360.80
	ZA	1,360.80
	b. Chemical (Rp/kg)	
	Ally 20 WDG	34,739.40
	Thiodan	34,739.40
	Bassa	34,739.40
	Furadan	34,739.40
	Drusban	34,739.40
	c. Seed (Rp/kg)	1,855.00
	d. Fuel (Rp/liter)	
	Tractor	2,192.00
	Tresher	2,192.00
Domestic Inputs	Labor (Rp/man days)	
	a. Seedbed preparation	10,000
	b. Land preparation	0
	c. Planting	
	Seed Extraction	20,572
	Planting	20,572
	d. Crop care	
	Weeding	10,000
	Fertilizer Application	15,000
	Chemical Application	15,000
	e. Harvesting	15,139
	Capital	
	a. Working Capital (%)	0.04
	b. Tractor services (Rp/man days)	23,656
	c. Thresher services (Rp/man days)	28,385
	Land rent (Rp/ha)	2,000,000.00
	Other inputs	
	Org. fee (P3A) (Rp/ha)	27,500
Output	Rice price (Rp/kg)	1,020.25

Table 10. Social Budget

SOCIAL-BUDGET	QUANTITIES	Amount
Tradable inputs	a. Fertilizer (Rp/ha)	503,422.33
	Urea	242,536.99
	KCl	20,343.96
	SP-36	16,234.34
	ZA	68,679.58
	b. Chemical (Rp/ha)	-
	Alli	2,119.10
	Thiodan	-
	Bassa	-
	Furadan	3,473.94
	Drusban	4,342.43
	c. Seed (Rp/ha)	66,780.00
	d. Fuel (Rp/ha)	-
Domestic Inputs	Tractor	65,760.00
	Tresher	13,152.00
	Labor (Rp/ha)	1,343,465.00
	a. Seedbed preparation	40,400.00
	b. Land preparation	-
	c. Planting	-
	Seed Extraction	123,432.00
	Planting	236,578.00
	d. Crop care	-
	Weeding	96,200.00
	Fertilizer Application	45,300.00
	Chemical Application	120,300.00
	e. Harvesting	681,255.00
	Capital (Rp/ha)	602,943.63
	a. Working Capital	54,131.95
	b. Tractor services	378,500.00
	c. Thresher services	170,311.68
	Land rent	2,000,000.00
	Other inputs	27,500.00
	Org. fee (P3A) (Rp/ha)	27,500.00
Output	Revenue (Rp/ha)	5,915,970.64
	Total Cost (excl. land rent) (Rp/ha)	2,477,330.97
	Profit (excluding land rent) (Rp/ha)	3,438,639.67
	Net Profit (incl. land rent) (Rp/ha)	1,438,639.67

(Table 10). The table is simply constructed by multiplication of input-output table (Table 1) and their related social price components in Table 9. It means that the revenue Rp. 5,915,970.64 per hectare is the result of multiplication of the output, 5,798.55 kg/ha times by its social prices, Rp 1,020.25/kg.

The next question is how we get the net profit socially? For getting the net profit in the research we simply deduct the revenue with the total cost as we did in private budget

analysis. While the total cost is the result of summation of all costs, both tradable and non-tradable inputs, excluding the land rent. In the research we found that the total cost for the rice system is (excluding land rent) Rp. 2,477,330.97 per hectare. As the result, the net profit of the rice system is Rp. 3,438,639.67 per hectare (Table 10). This amount reflects that the return to rice management is positive socially, based on the international rice price analysis. Since the net profit is positive we can make conclusion that the rice farming in the site is socially very profitable in the 2002 dry season.

7. Policy Analysis and Market failures : Computing the PAM

In this section we are going to discuss two things ; the Policy Analysis Matrix (PAM) and the Competitiveness of the Rice Farming System based on the farm-gate price at Polmas District. By comparing the analysis of private and social prices of the rice farming we can disclose the divergence each item presented on the table and to analyze the factors behind it.

7.1. Policy Analysis Matrix

To assess competitiveness and comparative advantage of rice production in certain place, its social profitability should be taken into account. For that purposes, PAM matrix was constructed (Table 11).

In Table 11 the divergence between private and social revenue is *positive* Rp. 45,338.76. This figure means that the Polmas farmers received revenue more than international farmers. The sign indicates that government transfer on rice output exists. We may also say that the Polmas rice is under the government protection. But unfortunately the divergence of Rp. 45,338.76 does not reflect the true value of government policy on imported rice. As we know the government have imposed tariff on imported rice of Rp. 430/kg *beras* or Rp. 236.5/kg GKP (Rp. 430.00×0.55)¹³⁾ since January 2000. That was the rate in 2002 and continues to be the current rate. The same case occurred on tradable inputs. In the same table, we found the positive sign of Rp. 26,1166.46 of the divergence. The figure indicates tax on the tradable factors as a whole. But within the factor there are also variations in the divergence (Comparing Table 3 and Table 10). In other words, not all tradable factors are taxed. Some of them get subsidy (e.g. the fuel price, ZA, and Furadan)¹⁴⁾. We think, particularly for the fuel price, that this is a reasonable result because

13) Rp. 430/kg is tariff on imported rice and 55% is a conversion factor from rice (*beras*) to GKP.

14) The subsidy for the ZA and the Furadan is confused result. As we know the government, under ↗

Table 11. The Policy Analysis Matrix for Lowland Rice

	Revenues	Costs					Profit
		Tradable Inputs	Domestic Factors				
			Labor	Capital	Land rent	Others	
Private	5,960,909.40	529,588.79	1,343,465.00	602,943.63	1,000,000	49,833	2,435,078.65
Social	5,915,570.64	503,422.33	1,343,465.00	602,943.63	2,000,000	49,833	1,415,906.35
Divergencies	45,338.76	26,166.46	0.00	0.00	−1,000,000	0	1,019,172.30

the Indonesian government put subsidy on it so far. And the government always makes effort to reduce it, but Indonesian people are against it. We need, however, further investigation on this matter to identify the amount of subsidy on fuel. Another divergence of domestic factor is land rent. Its divergence is negative Rp. -1,000,000.00. This figure is coming from the twice higher of the opportunity cost of land than its private price. This sign indicates market distortion on the land market in the area. The Table 11 shows us that there are the domestic factors that have no divergence between their private and social prices. This means that market mechanism on those factors occurred.

In the Table 11 we also found that the net profit is positive Rp. 1,019,172.30. The big divergence is mostly coming from the land rental factor. And another small amount is coming from divergence of revenue and tradable factor.

7.2. Competitiveness and Efficiency

In the research we operationally define competitiveness as the ability of the rice farming system at Campurjo Village of Polmas District, South Sulawesi Province to compete to other rice systems in the world at certain time (rice production during the dry season, March-July, 2002). Therefore we settle the private-farmgate and social-farmgate prices of the rice output in GKP. During the dry season of 2002, the private-farmgate price was Rp. 1,028/kg. At the same time, the comparable import price for rice that delivered to wholesale market at the village was estimated Rp. 1,020.25/kg, a little bit lower than the private one. The import price was based on the prevailing in FOB Bangkok price of US\$ 70 per ton with 35% broken (July 2002). The figure conveys message that 0.76% of the world rice price is a little bit lower than the private-farmgate price at the research site. In the same season we found also that the total private and social costs of the rice system were Rp. 3,457,411.98 and Rp 3,438,639.67 per hectare

the direction of IMF, has removed all subsidies on fertilizer and pesticide. The results are probably caused by the inaccurate data of international price that we apply. There is no specific data, on both the ZA and the Furadan, in the list of World Bank publication that we got.

(including the land rent), respectively (Table 3 and Table 10). Therefore, the net profit for the rice system was Rp. 2,457,411.98 per hectare privately and Rp. 1,438,639.67 per hectare socially. Since the competitiveness of a commodity is shown by its profitability so that we might say that the rice farming system in the season at Polmas District can compete to international rice market. Another thing that can be drawn from the figure is the efficiency of the system. The positive sign of the social profit indicates that the rice system is efficient under the assumptions above. It means that the Polmas rice system can survive without any assistance from the government. In other words, the government can let market mechanism lead the price, international rice cannot penetrate domestic market at Polmas District as producing Polmas rice is more cheaply than imported one.

8. Conclusions and Lessons Learned

The main questions will be addressed in the conclusion session are ; Is the rice farming system at Polmas District profitable, competitive at international price, and efficient in resource allocation ? And what kind of lessons learned of the research can be conveyed the targeted audiences ? Based on the previous section we make conclusions and lessons learned as follow :

The rice farming system of the district is privately and socially very profitable and can compete to international rice market in the dry season of 2002 under the main assumptions : exchange rate Rp. 8,800/US\$, premium for the exchange rate is 0%, and conversion factor of rice (*beras*) to GKP is 55%, and FOB Bangkok price is US\$ 170/ton. It means that the system could make much money for the farmers. Production system in the research site is also efficient in resource allocation. It means that the Polmas rice system can survive without any assistance from the government so that the government can let market mechanism leads the price.

The lessons learned from this research is that policy maker at national-level should make concern on relationship between world price of rice and the setting of domestic price level. For the local government, they should pay attention to how can we reduce input costs by introduction of new technology for farming through assistance of a researcher at university or research institute. This effort could lead efficiency in rice production system. The marriage between macro and micro levels policy on rice is hoped to lead the competitiveness of the system. For example "*tabela (tabur benih langsung*, sowing rice seed directly)" system could reduce planting costs.

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