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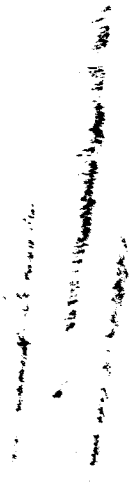
SOCIO-ECONOMIC IMPLICATIONS OF HIGH YIELDING VARIETIES: EVIDENCE FROM PRIMARY DATA

by

Mahar Mangahas
Aida R. Librero



SOCIO-ECONOMIC IMPLICATIONS OF HIGH YIELDING VARIETIES: EVIDENCE FROM PRIMARY DATA[1]

Aida R. Librero and Mahar Mangahas[2]

1.0 Introduction

This paper presents the results of a survey of 567 rice farmers from three major rice producing provinces in the Philippines. The survey was conducted in May-June 1972. Information for both the pre-HYV and HYV periods were collected. The pre-HYV referred to the period before the farmer adopted HYV if he was an adopter and to 1967 if he was planting traditional varieties while the HYV period referred to the wet and dry seasons of 1971. Information for both the pre-HYV and HYV periods were obtained through one personal interview of the farmer, hence the reliability of the data especially for the pre-HYV period depends on how accurately the farmer could recall production, expenditures, consumption, and other activities some five years ago.

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[2] Assistant Professor of Agricultural Economics, University of the Philippines at Los Baños and Assistant Professor of Economics, University of the Philippines.

2.0 The Study Areas

Three provinces distributed among the three major island groups of the Philippines were selected for the study. These provinces are Camarines Sur in the Bicol-region (Luzon), Iloilo from the Visayas, and South Cotabato from Mindanao. A brief description of each of these provinces follows.

2.1. Camarines Sur

Located in the southern part of Luzon, the province of Camarines Sur has a total land area of 526,282 hectares comprising 35 municipalities and 2 cities. Naga City, the provincial capital, is the center of commercial activities and is accessible to all towns except Lupi, Ragay, and Del Gallego.

The climate condition in the province is of the second and fourth types.[1] The western and southern portion is of the fourth type where rainfall is approximately evenly distributed throughout the year. The eastern and northern portion is of the second type and is characterized by the absence of a dry season but with a pronounced wet season from November to January. The average annual temperature is 81°F. Camarines Sur has been

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[1] Types of climate in the Philippines

Type I - has two pronounced wet seasons: one dry from November to April, the other wet during the rest of the year. The localities of this type are shielded from the trade winds by mountain ranges.

Type II - has no dry season: it has a very pronounced maximum rain period from November to January.

Type III- seasons are not very pronounced; it is relatively dry from November to April and wet during the rest of the year. The maximum rain periods are not very pronounced, with short dry season lasting from one to three months.

Type IV - the rainfall is more or less evenly distributed throughout the year.

subjected to severe tropical storms and typhoons causing extensive flood damange problems especially in areas adjacent to rivers and streams. Storms and typhoons usually occur in May, September and November.

In 1970 the Bureau of Census and Statistics reported a population of 947,367 for Camarines Sur, an increase of almost 128 thousand or 16 per cent from 1960 but a rate lower than the national population growth rate of 35 per cent for the same period. The province had a population density of 1.54 persons to a hectare in 1960 and 1.78 persons in 1970.

The rate of literacy in the province had increased from 77 per cent in 1960 to 87 per cent in 1970, an improvement of 10 per cent. This literacy rate was higher than that for the nation as a whole.

Camarines Sur is basically agricultural with almost two-thirds of the population engaged in agriculture, hunting, forestry and fishing in 1970. (During the same year, 11 per cent was classified as craftsmen, production process workers, and laborers and 6 per cent in services, sports, and related types of job.) The principal crop is palay (rough rice) so that Camarines Sur is often called the rice granary of the Bicol region. Traditionally it produces a rice surplus which is exported to different areas of the region and to metropolitan Manila. Camarines Sur leads all provinces in the country in the adoption of high yielding varieties of rice. The total irrigated rice land is 90 per cent planted to

HYVs, rainfed lowland rice areas, 85 per cent, and upland rice areas, 40 per cent.[1] Two leading tungro resistant varieties, IR-20 and C4 - 63, are now commonly used. For crop year 1971/72, approximately 41,000 hectares of rice land were irrigated during the wet season and 25,000 during the dry season.

Four types of irrigation systems are available in Camarines Sur: (1) gravity, (2) communal, (3) pump, and (4) private irrigation. The National Irrigation Administration operates three gravity irrigation systems which can irrigate an area of 6,835 hectares.[2] There are 21 government financed farmer-controlled, small scale, communal irrigation systems which can potentially serve 10,683 hectares. Irrigation pumps sold by the Irrigation Service Unit number 826 and serve roughly an area of 15,150 hectares. In addition, there are privately developed systems either gravity or pump which are owned by big landowners or irrigators' association.

Transportation and road networks are crucial in disseminating information about new technology as well as in marketing any surplus that may be brought about by this

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[1] Camarines Sur Interagency Survey Team. A Report on the Province of Camarines Sur and the lower Bicol River Basin.

[2] However, during the 1970/71 wet season, only 5,118 hectares were actually irrigated mainly due to (1) the fluctuating flows of water from the rivers, and (2) inadequate terminal facilities in the distribution networks. Ibid.

technology. From Manila, Naga City can be reached either by plane, train, or bus. The province has one airport located at Pili, 15 kilometers from Naga. The national highway linking the province with the Manila market is still unfinished although passable. Only 10 per cent of goods imported from Manila is transported by truck; 90 per cent by train. Within the province itself is less than 2,000 (1,973.65) kilometers of road giving a road density of .37 kilometer per square kilometer of area.

Existing electrical facilities are confined only to more populous and industrialized sections of the province. Out of 35 municipalities only 17 towns are presently provided with electricity. Present electrification plans include the servicing of a five-town area by a rural cooperative.

2.2. Iloilo

Located in the middle part of the Philippines, the province of Iloilo is bounded on the north and west by the provinces of Capiz and Antique. On the southeastern portion, it is bounded by Panay Gulf, Guimaras and Iloilo Straits. Iloilo has a total area of 530,450 hectares and is composed of 42 municipalities with Iloilo City as capital.

The population of Iloilo in 1970 was 1.2 million against the 1960 population of 966 thousand indicating an increase of 20% over the ten-year period. The population density as of 1960 was 1.83 persons to a hectare of land while that of 1970 was 2.19 persons, a greater density compared with that of

Camarines Sur and South Cotabato. About 25% of the 1960 population was urban. This proportion was increased to 28% in 1970.

More than three-fourths of the total population in 1960 can read and write while in 1970, 86 per cent was considered literate. Literacy rate for the province was a little higher than that for the whole country.

A total of around 819,153 belong to the economically active and non-economically active group of household population 10 years of age and over. Around 361,122 are employed while 49,590 were unemployed. As of 1970, 1,479 employees were engaged in mining and quarrying, 49,548 in manufacturing, 17,092 in construction and 31,422 in commerce. Like Camarines Sur and South Cotabato, agriculture, hunting, forestry and fishing is one of the leading industries in the provinces with a total employment of 198,495 persons.

The road network of Iloilo consists of 121.52 kilometers of city roads, 560.17 kilometers of national roads, 831.36 kilometers of provincial roads and 290.45 kilometers of municipal roads. These give a total of around 1,803.50 kilometers of total road areas. The province can be reached either by land, water or air transportation. The province has 2 airports: Iloilo airport and a privately owned airport known as Central-Santos Lopez Airport.

Overland bus transportation network operates in the province from all directions. Among the overland transportation companies in Iloilo are the Saravia Transportation

and D. B. Barriceta Transportation in Iloilo City and F. R. Castro Transportation of Janiuay.

The major sources of irrigation are gravity, communal, pump and private systems. There are about 8 gravity systems with a total irrigable area of 22,330 hectares and about 141 pump unit systems with a total irrigable area of 3,756 hectares. No data as of the number of communal and private system was available.

2.3. South Cotabato

In 1967 the province of Cotabato was divided into two: North Cotabato and South Cotabato. The latter composed of 208 barrios, 12 municipalities and one chartered city. General Santos is the only chartered city and is the center of all commercial activities.

Located in Mindanao at the southern part of the Philippines, South Cotabato is bounded by Davao in the East, North Cotabato in the northern and eastern portion, and part of Celebes Sea on the South. The province has an area of approximately 749,309 hectares.

Rainfall is evenly distributed throughout the year with a total annual rainfall averaging to 36.76 inches. The average temperature is 26.9°C. The hottest months are from March to June and the coolest from December to January.

Aside from the Allah river which is the most distinguishing river in South Cotabato, the province is traversed by many rivers among which are Palion, Kipalbig and Taplan.

In 1960 the population of the province was 282,115. Ten years later the population grew to 466,110, an increase of 65 per cent for the period 1960 to 1970. But the province is still sparsely populated having a density of only .38 person per hectare of land in 1960 and .62 in 1970. About 29 per cent of the population is urban and the literacy rate of persons 10 years of age and over is 81 per cent.

Of the estimated labor force of around 306,802 only 156,011 are considered economically active as farmers, fishermen and employees in different key establishments. Agriculture, forestry, hunting and fishing is the major industry with an employment of about 106 thousand people. Next is services with about 40 thousand. Basically agricultural, a total area of about 48,414 hectares are cultivated to rice, 12,329 of which are irrigated and the rest non-irrigated.

There are 5 major sources of irrigation in South Cotabato namely: Allah River, Lake Maugham; Lake Sebu, Lake Luhit and Lake Saluhan. About 3,000 hectares is irrigated by the Silway RIP which is operated by the National Irrigation Administration. Two other communal irrigation systems, Salaman CIP in Labak and another in Koronadal irrigates about 5.000 hectares. Small pump units supplied also some irrigation water in the province. A few private irrigation svatems are installed in some parts of the province, for instance The Standard Philippine Fruits which can irrigate 224 hectares of land. The towns of General Santos, Norale, Tupi, and Glen and Maitum are the municipalities that have a number of irrigation facilities.

South Cotabato has 1,104 kilometers of road of which about 5.67 kilometers are concrete, 22.89 kilometers asphalt, 432.15 kilometers gravel, 103 kilometers hard gravel, 385.09 gravel and 586.70 unsurfaced pavement.

Bus transportation is provided by a number of transportation companies operating a number of buses in the province. Three major ports with five shipping companies serve the provinces. In addition, the province has two national government airports.

Only four municipalities have electric power facilities. These are the towns of Koronadal, General Santos, Norala and Glan. Moreover, electricity is provided only in the cities and town propers.

3.0. Sampling Procedures

As has been discussed above three major rice producing provinces one each in Luzon, Visayas, and Mindanao were selected for the study. These are Camarines Sur, Iloilo and Cotabato. The primary sampling unit consisted of municipalities which were selected based on the area planted to rice. The same basis was used in selecting sample barrios. Twenty five barrios were studied in each province with about 8 farmers sampled from each barrio.

The procedure for sampling rice farmers in each sample barrio was as follows: First a list of all rice farmers was made. From this list farmers were selected systematically with a random start. For example, if there were 45 rice

farmers in the barrio and eight will be sampled, the every fifth farmer was taken into the sample with the first farmer selected at random.

The list of sample barrios and municipalities together with the corresponding number of sample farmers is found in Appendix A.

4.0. Adoption of HYV

4.1. Rate of Adoption

A high proportion, about 96 per cent, of farmers in the two sample provinces, Camarines Sur and South Cotabato, was planting HYV of rice in 1971 (Table 1). More than 85 per cent of farmers in Iloilo used HYV while 5 per cent had tried it previously and had reverted to traditional varieties. One out of ten farmers in Iloilo had never tried HYV. In Cotabato all farmers who tried HYV continued its use to the present. Farms which had never tried the high yielding varieties were mostly upland.

Table 1. Adoption of Rice HYV by Province

	Camarines Sur		Iloilo		South Cotabato	
	Number	Per cent	Number	Per cent	Number	Per cent
Presently planting HYV	190	96.0	145	18.8	191	95.5
Not planting HYV but tried	2	1.0	8	4.7	-	-
Never tried HYV	6	3.0	16	9.5	9	4.5
Total	198	100.0	169	100.0	200	100.0

Large scale production of HYV was introduced in 1967 but majority of the farmers adopted it in 1968 to 1970 than in any other year (Table 2). It would be noted that initially the rate of adoption in Iloilo was quite rapid relative to the other two provinces, however, there was also a greater reversion to traditional varieties later. None of the South Cotabato farmers tried HYV and then discontinued its use.

4.2. Source of HYV information.

Information on the new high yielding varieties had come primarily from agriculturists either from the Bureau of Agricultural Extension, Bureau of Plant Industry, or Agricultural Schools in the Provinces (Table 3). This however should not be interpreted as a sign of the overiding influence by the extension workers.[1] At the trial and adoption stages, the Filipino farmer normally finds himself on his own when IR 8 seeds were first distributed in the Bicol region.[2] Another important source of information, and in fact the major one for South Cotabato, was other farmers. The same observation was reported by Liao.[3]

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[1] G. T. Castillo, "Impact of Agricultural Innovation on Patterns of Rural Life (Focus on the Philippines)", Undated mimeo paper.

[2] [2] B. R. Sumayao, "The Bicolano Farmer's Response to an Improved Rice Variety - IR 8 - 288 - 3", U. P. College of Agriculture, College, Laguna, Philippines, 1969.

[3] D.H.S. Liao, "Studies on Adoption of New Rice Varieties," Paper presented at the IRRI Saturday Seminar, November 9, 1969.

Table 2. Proportion of Farmers Planting and not Planting HYV and Year Started by province.

YEAR	Presently Planting HYV			Not Planting HYV But Tried		
	Camarines Sur	Iloilo	South Cotabato	Camarines Sur	Iloilo	South Cotabato
	Per cent					
Before 1967	3.2	12.3	1.6	-	12.5	-
1967	13.9	6.1	18.9	-	-	-
1968	29.4	15.8	29.3	-	12.5	-
1969	15.0	35.9	29.3	-	37.5	-
1970	24.6	12.3	12.0	100.0	37.5	-
1971	13.9	17.6	8.9	-	-	-
Total	100.0	100.0	100.0	100.0	100.0	-

Table 3. Source of First Information on HYV

Sources	Camarines Sur	Iloilo	S. Cotabato
		Per cent	
Government Agriculturist	52.4	55.1	14.7
Other farmers	38.9	30.3	79.0
Mass Media	6.0	5.5	4.2
Landlord	1.1	7.3	0.5
Others	1.6	1.8	1.6
Total	100.0	100.0	100.0

Mass media and landlords accounted only for a small proportion as a source of first information about the new technology. Among the rice tenants studied, decision on the rice variety to grow was usually made by the tenant himself. In Camarines Sur, 80 per cent of the tenants made the decision; only in 5 out of 100 farms did the landlord decide on the variety. The rest was decided jointly by the operators and the landowner. In Iloilo and South Cotabato about two thirds of the tenants made the decision independently of the landlord's opinion.

As a source of HYV seeds, other farmers and neighbors (who may also be farmers) played an important role (Table 4). Fifty per cent of Iloilo and 76 per cent of South Cotabato farmers obtained their first HYV seeds from these sources. The Bureau of Plant Industry (BPI) accounted for one third of the source in Camarines Sur. Other sources included landlords, merchants and two other government agencies, the Bureau of Agricultural

Extension (BAE) and the Agricultural Credit Administration (ACA) through the Farmers Cooperative Marketing Association (FACOMA).

Table 4. Source of First HYV Seeds by Province

Source	Camarines Sur	Iloilo	South Cotabato
		per cent	
Other farmers	33.0	26.6	40.2
Neighbors	3.1	13.6	35.9
Bureau of Plant Industry	34.6	5.8	4.9
Landlord	7.9	15.0	7.1
ACA/FACOMA	11.0	-	5.5
Bureau of Ag. Extension	3.1	7.8	0.5
Merchants	0.5	3.9	0.5
Others	5.8	3.9	1.6
Not specified	1.0	23.4	3.8
Total	100.0	100.0	100.0

4.3. Some Factors Affecting HYV Adoption.

From the discussion above it was apparent that contact with other farmers and agriculturists was an important force in the success of HYV dissemination in the areas studied. To this we must add the level of education of the farmer. Table 5 shows the relation between adoption of new technology and the educational attainment of the farmers. In Camarines Sur the non-adopters had a much lower education. None of those of never tried HYV had even reached the intermediate grades

and the highest grade obtained by those who tried but were not presently planting HYV was Grade Six. Among the adopters in Camarines Sur, 10 per cent had either finished highschool, or if not a college graduate had done some college work.

A similar observation was found in Iloilo and South Cotabato.

No relation seemed to exist between the age of the farmer operator and the rate of adoption. Likewise tenancy had not deterred farmers from taking advantage of the new technology.

5.0. Investment

The new varieties of rice would yield a higher output than the traditional varieties if they are accompanied by a package of new farm practices and inputs. One of these practices is the application of irrigation, consequently there was a continued effort from the government to help in constructing irrigation facilities. There was also an increased incentive for farmers to use irrigation, hence the noticeable number of farmers using irrigation for the first time each year (Table 6). In Camarines Sur a big leap occurred in 1968 when 40 per cent of the farmers availed themselves of irrigation for the first time compared with the 21 per cent for the ten year period 1951-1960. In Iloilo 71 per cent of the farmers already had irrigation before the introduction of HYVs. Whereas only 40 percent of the total rice area of all sample farms was irrigated during the pre-HYV period, the proportion rose to 53 per cent during the HYV period.

Table 5. Adoption of HYV and education of operator

Education	Adopter	Non-adopter		All Farmers
		Tried	Never	
	per cent			
Camarines Sur				
None	12.2	-	33.3	12.5
Some primary	33.5	33.3	66.7	34.7
Some intermediate	9.8	16.7	-	9.7
Finished grade school	26.2	50.0	-	26.1
Some high school	8.5	-	-	8.0
Finished high school	7.3	-	-	6.8
Some college work	1.2	-	-	1.1
Finished college	1.2	-	-	1.1
Iloilo				
None	9.0	-	31.3	10.6
Some primary	33.1	25.0	12.5	30.8
Some intermediate	10.3	12.5	6.2	10.1
Finished grade school	24.1	50.0	25.0	25.4
Some high school	11.9	-	25.0	12.4
Finished high school	6.9	12.5	-	6.5
Some college work	0.7	-	-	0.6
Finished college	4.1	-	-	3.6
South Cotabato				
None	11.7	-	14.3	11.3
Some primary	28.7	37.5	28.6	29.0
Some intermediate	17.5	37.5	14.3	18.3
Finished grade school	20.5	25.0	14.3	20.4
Some high school	9.9	-	28.6	10.2
Finished high school	7.6	-		7.0
Some college work	3.5	-		3.2
Finished college	0.6			0.5

Before the introduction of HYV an average of only an additional 2 per cent of farmers made irrigation available each year. However, during the HYV period the average increased to about 7.5 per cent per year.

Most of the facilities used were the gravity irrigation systems although there were also a number of surface and shallow water pumps. The National Irrigation Administration (NIA) operates government-owned gravity systems and assists in the design and construction of communal projects. Another government agency, the Irrigation Service Unit, provides pumps for installation by private owners.

Table 6. Year Irrigation was First Made Available

Year	Camarines Sur	Iloilo	South Cotabato
		per cent	
Before 1951	3.2	35.1	24.0
1951 - 1960	21.3	28.4	22.9
1961 - 1965	5.2	8.1	8.5
1966	-	-	11.5
1967	3.2	2.7	6.2
1968	40.4	6.8	16.7
1969	13.8	8.1	3.1
1970	9.6	9.5	3.1
1971	3.2	1.3	4.2
Total	100.0	100.0	100.0

For the whole province of Camarines Sur in 1972 there were 3 NIA-operated gravity systems serving an irrigable area of 6,835 hectares but with only 5,100 hectares estimated to receive full irrigation. During the same year 21 communal irrigation systems were being operated to serve 10,683 hectares out of which 6,000 hectares get fully irrigated. The Irrigation Service Unit had installed some 626 pumps which irrigate about 9,200 hectares. Private parties whether they be landlords or owner operators had irrigation pumps installed.[1]

The same sources of irrigation are available in Iloilo, that is, gravity, communal, pump, and private systems. Some 8 gravity systems are operated by the National Irrigation Administration irrigating an area of about 22 thousand hectares, Rough estimates indicate that there are about 199,260 hectares of rice land in Iloilo out of which 34,500 is irrigated.[2]

The introduction of irrigation increases the productivity of the land and enables farmers to plant two crops of rice within one year. At present there are government plans to develop irrigation systems in all of the above study provinces as well as in other places.

These improvements on land are expected to increase land values which varied among the three provinces. The average value of rice farm increased from P2,471 per hectare

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[1] Bicol River Basin Development Program (February, 1973)

[2] Regional Office, Bureau of Agricultural Economics.

to P4,193 in Camarines Sur, a rise of almost 70 per cent[1] from 1967 to 1972. As high as 90 per cent of the farmers indicated that plan to buy some rice lands at present.

In Iloilo only 13 per cent showed some indication of planning to buy rice farm land. Despite this hesitancy, however, land values increased from P6,428 to P9,405 per hectare, an increase of 46 per cent.

There was a dramatic increase in land values by almost 200 per cent in South Cotabato. Whereas in 1967 rice farm would sell at P2,076 per hectare in 1972 it cost almost P6,215 per hectare. Only 12.5 per cent indicated a desire to buy some rice farm land, 69.5 per cent did not want to, and 18 per cent did not know.

6.0. Changes in Farm Practices

The new technology has implications on farm practices followed by farmers in rice growing. We looked at five practices most of them but not all are labor saving. For instance, tractor land preparation is labor saving but straight row planting is labor using.

The number of farmers using certified seeds definitely increased, however, note the small proportion of yes answers in South Cotabato (Table 7). From 5 per cent during the pre-HYV period, certified seed users in Camarines Sur increased to 77 per cent; in Iloilo the increase was from 54 to 79 per cent; but in South Cotabato there was an increase of only 4 per cent

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[1] Land values were obtained by asking the following questions: (1) In your opinion, what is the highest price at which the rice farm land could be sold? and (2) In your opinion what was the value of the rice farm land you operate in 1967?

with only 5.8 per cent using certified seeds during the HYV period. This could probably be explained by the distance of farmers from seed certification offices (usually the Bureau of Plant Industry). The Mindanao Progress Corporation located in North Cotabato just a few kilometers from the North-South Cotabato boundary is a big rice dealer buying and selling around the area, however, its major activity for rice seeds is exports.

Between the pre-HYV and HYV periods, there was a tremendous increase in the number of farmers planting rice in straight rows in Camarines Sur and Iloilo. South Cotabato followed the same old traditional methods of planting.

Land preparation by tractor had also been practiced by more farmers; similarly with mechanical weeding. It is interesting to note that only South Cotabato had any significant increase in the number of mechanical threshers.

7.0. Area, Production and Yields

7.1. Changes in Farm Area

The rice farm area operated by farmers in the three study provinces ranged from less than one hectare to more than 6 hectares or an average of approximately 2 hectares (Table 8). South Cotabato had the smallest of 1.85 hectares per farm and Camarines Sur had the largest with 2.37 hectares. Compared with the pre-HYV period there was a slight decline in Camarines Sur and South Cotabato and a 0.1 increase in Iloilo. The increase could have come either from shifting cultivated land from other crops to rice or from new areas brought into cultivation.[1]

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[1] No data on land extension by province is available.

Table 7. Farm practices, present and pre-HYV.

Practice		Camarines Sur	Iloilo	South Cotabato	All
			per cent		
Use of certified seeds					
Present:	Yes	76.8	78.8	5.8	48.3
	No	23.2	21.2	94.2	51.7
Pre-HYV:	Yes	4.9	54.1	1.8	13.6
	No	95.1	45.9	98.2	86.4
Straight row planting					
Present:	Yes	92.7	69.0	1.8	50.9
	No	7.3	31.0	98.2	49.1
Pre-HYV:	Yes	8.5	48.3	1.2	13.7
	No	91.5	51.7	98.8	86.3
Tractor land preparation					
Present:	Yes	19.5	35.6	2.9	16.1
	No	80.5	64.4	97.1	83.9
Pre-HYV:	Yes	3.0	33.3	0.6	8.3
	No	97.0	66.7	99.4	91.7
Mechanical Weeding					
Present:	Yes	44.5	25.3	3.5	23.9
	No	55.5	74.7	96.5	76.1
Pre-HYV:	Yes	2.4	27.6	1.2	7.1
	No	97.6	72.4	98.8	92.9
Mechanical Threshing					
Present:	Yes		34.5	79.5	39.3
	No	100.0	65.5	20.5	60.7
Pre-HYV:	Yes	1.2	31.0	3.5	8.3
	No	98.8	69.0	96.5	91.7

By tenure, it seemed that in Camarines Sur share tenants had the lowest farm area, 2.14 hectares per farm, and part owners had the largest, 6.67 hectare. However, there were only 3 farmers with mixed tenancy in the province. The number of part-owners was also small in the other two provinces, 6 in Ilbilo and only one in South Cotabato. In Iloilo, part-owners and share tenants had the same average area per farm of 2 hectares while owners operators had 1.80 which was 0.15 hectare greater than the pre-HYV period. Lease tenants had the largest area in both Iloilo and South Cotabato.

The changes in the distribution of the two largest tenure groups: owners and share tenants, by farm sizes between the present and pre-HYV periods are shown in Table 9. Concentration of farmers will be noted in the 1 to 3 hectare ranges.

Table 8. Average Farm Size by Tenure and Province, Present and Pre-HYV

Tenure	CAMARINES SUR		ILOILO		SOUTH COTABATO	
	Number of farms	Farm area	Number of farms	Farm area	Number of farms	Farm area
		has.		has.		has.
Present						
Owner	47	2.61	52	1.80	72	1.94
Share tenant	135	2.14	84	2.00	119	1.71
Lease tenant	13	2.94	27	3.04	8	3.03
Part owner	3	6.67	6	2.00	1	2.50
Total/Average	198	2.37	169	2.11	200	1.85
Pre-HYV						
Owner	43	2.71	42	1.65	66	1.92
Share tenant	144	2.20	68	1.85	104	1.84
Lease tenant	1	5.25	17	2.96	7	3.04
Part owner	2	10.13	5	2.55	-	-
Total/Average	190	2.41	132	2.01	177	1.92

Table 9. Distribution of owners and share tenants by farm sizes, by province, present and pre pre-HYV

Farm Size	CAMARINES SUR				ILOILO				SOUTH COTABATO			
	Present		Pre-HYV		Present		Pre-HYV		Present		Pre-HYV	
	Owners	Share Tenants	Owners	Share Tenants	Owners	Share Tenants	Owners	Share Tenants	Owners	Share Tenants	Owners	Share Tenants
	per cent											
hectares per farm												
Less than 1	14	7	12	6	19	16	21	11	10	9	6	10
1 - 1.99	32	42	35	40	43	24	50	38	36	44	39	40
2 - 2.99	25	28	23	29	19	33	22	30	35	37	32	33
3 - 3.99	13	12	14	13	4	19	-	14	9	8	9	11
4 - 4.99	6	6	9	6	4	4	2	-	8	2	12	3
5 - 5.99	6	3	2	3		2	-	7	3	-	2	1
6 or more	4	2	5	3	6	2	5	-	-	-		2
Total	100	100	100	100	100	100	100	100	100	100	100	100

7.2. Changes in Production and Yields per Hectare

The last section above discussed the actual farm area devoted to rice by the farmers. If irrigation is available or if rainfall is evenly distributed in sufficient amounts, farmers could plant rice more than once in one year. Considering double cropping, the total area planted is measured by the effective crop area. Between the pre-HYV and HYV periods a slight increase in the effective crop area cultivated by each farmer indicating that farmers were able to double crop (Table 10).

Table 10. Rice Area and Production, Present and Pre-HYV

	Camarines Sur	Iloilo	South Cotabato
Present			
Effective crop area (has.)[a]	3.60	2.71	2.96
Production per farm (cavans)	179.7	158.4	181.3
Production per ha. (cavans)	49.9	59.3	61.2
Pre-HYV			
Effective crop area (has.)[a]	3.23	2.28	2.00
Production per farm (cavans)	109.7	123.6	92.4
Production per ha. (cavans)	47.9	54.1	46.0

[a] Total area planted during the year.

Production per farm increased by 30 cavans in Camarines Sur and 35 cavans in Iloilo. In South Cotabato where rate of HYV adoption was largest, production almost doubled between the two periods. In terms of land productivity per hectare a much greater increase occurred in South Cotabato than in the other two provinces.

The distribution of farms according to the rice yield per hectare is shown on Table 11. Whether wet or dry season there was still a large portion of farmers producing less than 21 cavans per hectare both during the pre-HYV and HYV periods. On the other hand, even before the introduction of the new rice varieties farmers could already produce more than a hundred cavans per hectare. However, there was a redistribution towards the higher yield ranges.

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Table 11. Distribution of Farms According to Rice Yield Per Hectare by Season, Present and Pre-HYV.

YIELD PER HECTARE	CAMARINES SUR		ILOILO		SOUTH COTABATO	
	Present	Pre-HYV	Present	Pre-HYV	Present	Pre-HYV
cavans			per cent			
Wet season						
Below 21	8.2	16.3	2.4	1.6	5.6	5.1
21 - 40	25.5	52.7	25.2	24.6	13.8	30.5
41 - 60	33.2	21.2	28.7	36.9	31.6	42.4
61 - 80	20.9	6.5	23.9	30.0	25.0	16.9
81 - 100	10.7	3.3	12.6	5.4	17.9	4.0
Above 100	1.5	-	7.2	1.6	6.1	1.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Dry Season						
Below 21	9.3	11.0	7.3	9.1	4.6	12.5
21 - 40	23.2	53.8	21.7	39.4	14.6	25.0
41 - 60	39.1	24.2	27.5	42.4	32.5	25.0
61 - 80	14.6	7.7	29.0	3.0	27.2	25.0
81 - 100	11.2	1.1	8.7	6.1	13.2	12.5
Above 100	2.6	2.2	5.8	-	7.9	-
Total	100.0	100.0	100.0	100.0	100.0	100.0

Owner operators and share and leasehold tenants shared in the new technology through increases in yield per hectare (Table 12). Camarines Sur owner operators registered the highest increase of 68 per cent (increasing from 31 to 52 cavans per hectare) while share tenants increased their yield by 40 per cent. South Cotabato HYV yield of 60 cavans was 3 cavans less than that of Iloilo but the pre-HYV yield of the farmer was 44

compared to 51 of the latter. For all tenure groups Iloilo had the smallest increase in yield per hectare, 12 cavans for owners, 3 cavans for leasehold tenants, and no change for share tenants.

Among the various groups of farmers, leasehold tenants operated the largest rice area, 5.47 in yield per hectares per farm. Coupled with a 37 per cent per unit improvement in yield per hectare total production on the average increased from 137 to 391 cavans per hectare. However, as mentioned earlier, this average was based on only 2 small number of farms.

Table 12. - Area and production by tenure, present and pre-HYV

	CAMARINES SUR		ILOILO		SOUTH COTABATO	
	Present	Pre-HYV	Present	Pre-HYV	Present	Pre-HYV
Owner						
Effective crop area (has.)	3.67	3.68	2.44	1.85	2.78	1.98
Production (cavans)						
Per farm	189	113	134	93	166	86
Per hectare	52	31	63	51	60	44
Share tenant						
Effective crop area (has.)	3.51	3.11	2.54	2.16	2.89	1.98
Production (cavans)						
Per farm	174	110	147	125	177	93
Per hectare	49	35	58	58	61	47
Leasehold tenant						
Effective crop area (has.)	3.44	3.25	4.00	3.32	5.47	2.57
Production (cavans)						
Per farm	177	171	208	164	391	137
Per hectare	51	32	52	49	71	52

The disposal of rice output among the three groups is presented on Table 13. Here, one would note that the new technology has brought about increases in the share of three groups: the farmers, the landlord and the laborers as represented by the harvesters and threshers.

Table 13. Rice production and Disposal by Tenure Status and Province, Present and Pre-HYV.

Province and Tenure	Number of farms	Total Production	Operator's share	Landlord's share	Harvesters's & threshers's share	Seeds
			cavans per farm			
CAMARINES SUR						
Present						
Owner	47	189	165	-	20	3.92
Share tenant	135	174	101	49	21	2.89
Lease tenant	13	177	119	37	19	2.48
Pre-HYV						
Owner	43	113	97	-	13	3.77
Share tenant	144	110	58	34	15	2.80
Lease tenant	1	170	124	30	12	4.50
ILOILO						
Present						
Owner	52	154	126	-	25	3.28
Share tenant	84	147	65	55	24	3.16
Lease tenant	27	208	123	48	32	5.10
Pre-HYV						
Owner	42	95	76	-	17	2.11
Share tenant	68	125	55	47	21	2.27
Lease tenant	17	164	95	40	25	4.18
SOUTH COTABATO						
Present						
Owner	72	166	134	-	26	5.83
Share tenant	119	178	89	57	26	5.56
Lease tenant	8	391	303	15	62	11.06
Pre-HYV						
Owner	66	86	70	-	14	2.26
Share tenant	104	93	46	31	14	2.33
Lease tenant	7	137	98	14	22	3.00

For all tenure groups the operator's share constituted 59 to 67 per cent of total production, landlords share about 19 to 23 per cent, harvester's and threshers' share, 12 to 16 per cent , and seeds, 2 to 3 per cent.

Harvesters and threshers may either be paid in kind or in cash. The more common practice in the Philippines is to pay them in kind usually a proportion of the gross harvest. The share of the harvesters and threshers is usually deducted from the gross quantity harvested before division of shares between landlords and tenants. In effect this means that for share tenanted farms thre payment for harvesters and threshers is shared equally by the landlord and the tenant.

As will be discussed in a later section (Tenancy, Implications of High Yielding Varieties) the sharing arrangements between tenants and landlords vary within and among the provinces studied. The sharing of output depends greatly on the cost sharing system. The predominant output sharing arrangement in Iloilo was 50:50 and on the average it was found that the landlord's share consituted 46 per cent of gross output minus seeds and harvesters and threshers' share (Table 13).

A large number of share tenants in South Cotabato practiced the 50:50, 67:33, and 70:30 output sharing arrangement, Based on the actual sharing of the 119 share tenants in the province, the average proportion was 39 and 61 per cent for landlords and tenants respectively.

A more variable arrangement was found in Camarines Sur with more tenants getting share of greater than 50 per cent.

8.0. Costs and Returns

The costs of production and the net returns derived by farmers from rice before and after the adoption of high yielding varieties are shown in Tables 14, 15, 16 for the three provinces studied. Let us start with Camarines Sur. Here, the value of total production had increased tremendously for all tenure groups with the largest increase occurring among the owner operators. Of course part of the increase was due to increase in prices. However, the rate of inflation has moved faster than that of the price of rice. Prices of fertilizers had also moved upwards faster than rice prices.

The new rice varieties would give high yields only if accompanied with a package of farm practices such as fertilizing, weeding, protection from pests and diseases, irrigation, etc. This implies that the adoption of the HYVs would mean an increase in the expenditures of farmers. This is shown on Table 14. Expenses for all items increased. Inspite of the use of herbicides, hired-labor expenditures went up by about three times compared with the pre-HYV which may imply that HYVs had generated additional employment for laborers in the villages. The high rate of fertilizer and chemical use would also be noted.

Non-cash expenditures represented by seeds from own production and the share of harvesters and threshers had also gone up.

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[1] Working Paper No. 4 of the project on Agricultural Diversification and Markets in the Philippines reported that fertilizer prices in constant terms declined from 1961 to 1969 except for ammonium sulphate which was nearly constant during the whole period. The paper also stated that "the profitability of the use of fertilizer is indicated by the fertilizer-product price ratio."

Table 14. Cost and returns from Rice Production by Tenure and Province, Present and Pre-HYV, Camarines Sur (pesos per farm)

	PRESENT				PRE-HYV			
			Share-tenant				Share-tenant	
	Owner	Lease Tenant	Opera-tor	Land-lord	Owner	Lease tenant	Opera-tor	Land-lord
Value of total production	5,339	4,536	2,919	1,576	2,183	2,302	1,035	645
Value of rice/by operator	2,167	810	864	-	1,236	675	183	-
Cash costs:								
Hired labor	909	1,558	788	30	321	1,000	260	42
Fertilizer	527	212	68	6	1	-	4	1
Pesticides	236	81	58	3	3	-	6	a
Herbicides	121	41	29	2	a	-	2	a
Seeds	65	32	51	4	57	-	28	6
Irrigation fee	85	361	138	51		54	96	35
Total	1,943	2,285	1,133	96	382	1,054	396	85
Non-cash costs:								
Land rental		937				405		
Harvester's and thresher's share	561	483	280	279	217	162	117	117
Seeds	110	64	57	19	71	61	29	16
Total	671	1,484	337	298	288	628	146	133
Total cash and non-cash costs	2,614	3,769	1,570	394	670	1,682	542	218
Net Income	2,725	1,766	1,349	1,172	1,413	620	493	427

a Less than 0.50

Table 15. Costs and Returns from Rice Production by Tenure and Province, Present and Pre-HYV, Iloilo (pesos per farm)

	PRESENT				PRE-HYV			
			Share-tenant				Share-tenant	
	Owner	Lease Tenant	Opera-tor	Land-lord	Owner	Lease Tenant	Opera-tor	Land-lord
Value of total production	4,023	5,886	2,205	1,842	2,321	4,149	1,570	1,203
Value of rice sold by operator	625	933	318		415	437	174	-
Cash-costs								
Hired labor	807	1,069	439	96	376	574	253	60
Fertilizer	169	320	123	25	59	117	30	23
Pesticides	27	76	23	10	16	23	10	5
Herbicides	19	14	13	9	3	19	5	3
Seeds	35	97	19	8	21	24	10	4
Irrigation	63	91	29	5	39	77	24	2
Total	1,121	1,637	647	153	515	835	331	98
Non-cash costs								
Land rental		1,401				1,067		
Harvesters and thresher's share	656	885	375	298	427	660	318	170
Seeds	79	144	59	29	51	107	30	21
Total	735	2,430	434	327	478	1,834	348	191
Total cash and non-cash costs	1,856	4,067	1,081	480	993	2,669	679	289
Net income	2,167	2,666	1,124	1,362	1,328	1,480	891	914

Table 16. Costs and Returns from Rice Production by Tenure and Province, Present and Pre-HYV, South Cotabato (pesos per farm)

	PRESENT				PRE-HYV			
			Share Tenant				Share Tenant	
	Owner	Lease Tenant	Opera-tor	Land-lord	Owner	Lease Tenant	Opera tor	Land-lord
Value of total production	3,341	7,309	2,389	1,387	1,075	1,756	770	414
Value of rice sold by operator	1,264	2,555	668	-	343	437	187	-
Cash Costs:								
Hired labor	332	872	189	59	113	170	62	16
Fertilizer	43	248	45	17	1	2	3	a
Pesticides	53	255	38	13	6	8	7	1
Herbicides	13	246	8	2	2	1	3	a
Seeds	100	-	30	6	8	-	6 6	1 1
Irrigation fee	7	-	5	-	4	-	3	a
Total	549	1,660	315	97	134	180	84	18
Non-cash costs:								
Land Rental		293				191		
Harvester's and thresher's share	524	292	421	137	176	271	161	39
Seeds	117	212	98	22	28	38	27	6
Total	641	1,628	520	159	204	500	188	45
Total cash and non-cash costs	1,190	3,287	835	257	339	681	273	63
Net Income	2,151	4,621	1,554	1,130	737	1,075	497	341

a/ Less than 0.50.

Net income was obtained by subtracting the sum of the cash and non-cash costs from the total value of rice production. All farmers regardless of their tenure status benefited from the high yielding varieties that is, owners and tenants whether, they be leaseholders or sharecroppers had increased their net income from rice. Landlords, too, shared in the new technology. Net income rose by 93 per cent for owners and 67 per cent for leasehold tenants. The share tenants had the lowest net income among the three groups, however the change between the pre-HYV and HYV periods was quite noticeable for both share tenants and their landlords with the former experiencing an increase of 185 per cent and the latter, 129 per cent.

In Iloilo, the rise in the value of total production was less than that in Camarines Sur (Table 15). In this province, fertiliser and chemical use had been practiced by farmers before the introduction of HYVs. The development of the road network between the barrios and Naga City (the provincial capital) and the availability of more suppliers in the area may have probably contributed to the widespread use of fertilizers and chemicals in Camarines Sur. The adoption of HYVs brought about a more intensive use of these inputs. Again hired labor which represented the largest item of expenditure had increased.

Among the various categories considered leaseholders had the largest increase in net income of 80 per cent and share tenants had the least, 26 per cent. In absolute terms leaseholders had a net income of P2,666 per year compared with the

P2,167 of owner operators. Between the share tenant and the landlord, it seems that the greater part of the additional expenses was borne by the tenant. While the landlord's net income from rice had risen by 49 per cent that of the tenant had increased only by 37 per cent.

South Cotabato is an interesting case. Only a handful of farmers were applying fertilizer and chemicals before the development of HYVs (Table 16). Despite the high rate of adoption, still only a few farmers used these inputs. It was claimed by many farmers that soils in the province were rich in nutrients and that there was no need for them to apply fertilizer. South Cotabato farmers had the least amount of expenditures but the largest percentage increase in net income: owners, 419 per cent and leasehold tenants, 274 per cent. As in the case of Iloilo the increase in the net income of landlords of 231 per cent was higher than that of the share tenants which was 212 per cent.

Another cost item which was not included in the cost and returns analysis is the interest paid for borrowed capital by farmers. In the next section of this paper (Credit,; Requirements and Sources) it is reported that for the pre-HYV and HYV periods 30 to 43 per cent respectively of Camarines Sur farmers borrowed some capital. In Iloilo the proportion was 29 to 72 per cent and in South Cotabato 21 to 45 per cent. Money was borrowed for various interest rates and loans matured at different periods ranging from 4 months to one year. Among the borrowers on the average the amount of interest charges paid were as

follows: for Camarines Sur, P9.82 per borrower during the pre-HYV and P2.60 during the HYV period; for Iloilo, P7.56 and P7.35 for the pre-HYV and HYV periods: and for South Cotabato, P2.66 and P4.70 per borrower. The interest charges paid per farm were low that including them as part of the cost would not have modified the net income very much.

In all three provinces, whether it be before or after the adoption of HYV the cash sales from rice were oftentimes not sufficient to cover the cash costs. This implies the need for other sources of income - both farm and non-farm.

Without asking directly for the magnitude of their income opinion of farmers were obtained regarding their present level of income compared with the pre-HYV period. Majority of the farmers in Camarines Sur thought that their present income was higher, 13 per cent said lower, and 17 per cent said the same. More than one-half of the Iloilo farmers thought that they have the same income now and before the introduction of HYV. Note that only 86 per cent of the Iloilo farmers was planting HYV in 1971. Almost 40 per cent said they have higher income and 8 per cent said lower. In South Cotabato, 55 per cent said higher, 7 per cent lower, and 38 per cent the same. The common explanation given for having a higher income are (1) use of hyv, (2) higher production, and (3) improved farm practices which are interrelated. Lower income was attributed to:

(1) insufficient irrigation, (2) lower production, (3) weather conditions, and (4) pests and diseases.

9.0. Credit: Requirements and Sources

Farmers borrowed either in cash or in kind and repaid these loans also either in cash or kind. For all provinces studied, there was a definite increase in the number of borrowers between the pre-HYV and HYV periods. The proportion of farmer borrowers increased from 30 to 43 per cent in Camarines Sur, 29 to 72 per cent in Iloilo, and 21 to 45 per cent in South Cotabato. There was also an increase in the amount borrowed per farmer, the increase ranging from 23 to 57 per cent in the three provinces (Table 17).

The amount borrowed for production purposes varied from less than P100 to more than P1,000 per farmer. About 4 per cent of Camarines Sur farmers borrowed less than P100 while 50 per cent borrowed in the P101 to P300 range during the pre-HYV. Only 40 per cent borrowed the same amount during the HYV period. Conversely, borrowers of more than P800 during the HYV period were almost three times as much as those in the pre-HYV.

In Iloilo, 97 per cent of the farmer borrower asked for loans amounting to less than P500 before the introduction of HYV compared to 83 per cent in the latter period. In contrast only 3 per cent borrowed more than P500 in the former and 18 per cent in the latter.

Table 17. Amount of Cash Borrowed per Farm and Annual Interest Rate by Source and Province, Present and Pre-HYV

SOURCE	PRESENT				PRE-HYV			
	Number of Farms	% of Farms	Amount Borrowed	Interest Rate	Number of Farms	% of Farms	Amount Borrowed	Interest Rate
			pesos	% per year			pesos	% per year
CAMARINES SUR								
Private Person	26	30.2	377	19.0	32	53.3	303	29.4
Landlord	17	19.8	265	29.3	10	16.7	102	2.0
Facoma	15	17.4	651	2.0	7	11.7	346	2.4
Relatives	6	7.0	250	-	3	5.0	500	180.0[a]
Rural Bank	22	25.6	667	110.0	8	13.3	856	8.4
Total/Average	86	100.0	479	-	60	100.0	389	-
ILOILO								
Private Person	42	34.4	217	93.3	13	26.5	250	59.3
Landlord	58	47.5	235	40.0	32	65.3	190	81.7
Facoma	5	4.1	459	79.2	-	-	-	-
Relatives	3	2.5	225	14.4	1	2.1	500	-
Rural Bank	14	11.5	555	12.5	3	6.1	500	12.0
Total/Average	122	100.0	298	-	49	100.0	240	-
SOUTH COTABATO								
Private Person	43	48.3	235	31.2	30	71.4	147	14.1
Landlord	37	41.6	171	131.7	9	21.4	101	84.0
Relatives	3	3.4	180	172.2[b]	3	7.2	160	40.0
Rural Bank	6	6.7	400	11.4	-	-	-	-
Total/Average	89	100.0	212	-	42	100.0	134	-

[a] Based on only one farmer who borrowed P500 and repaid P800 in 4 months. Interest rate was then 60 per cent for the period of the loan or 180 per cent per year. Information on the two other farmers borrowing from relatives was incomplete and interest rate could not be computed.

[b] Also based on only one farmer who borrowed P180 and repaid P283.33 in 4 months.

South Cotabato farmers are small borrowers: none borrowed more than P500 during the pre-HYV period and none borrowed more than P800 during the HYV period. However, the number of farmers borrowing within the range of P200 to P500 almost tripled.

On the average the amount borrowed per farmer increased from P389 to P479 in Camarines Sur; from P240 to P298 in Iloilo; and from P134 to P212 in South Cotabato.

Farmer borrowers reported only one source of credit although most of them borrowed from different sources during the two periods. Landlords and private money lenders dominated the sources of credit inspute of the high interest rate charged by these lenders. Other sources included relatives, Rural Banks and the FaCoMas (Farmers' Cooperative Marketing Association). Proportionally less borrowed from private lenders during the HYV period and more borrowed from Rural Banks. This may indicate an increasing awareness of farmers of the lower interest rate in the Rural Bank or perhaps a greater availability of small loans from the Rural Bank. In Camarines Sur there was a notable increase in the number of farmer obtaining loans from Rural Banks[1] and the FaCoMas.[2]

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[1] The rural banking system has provided production credit to the farmers of Camarines Sur since 1957 and since then 12 Rural Banks have been organized. They lend both agricultural and ordinary loans. In 1972 wet season they extended agricultural loans amounting to P3.8 million to 5,437 and ordinary loans amounting to P2.8 million. Most of these agricultural production loans went to rice farmers which constituted 83 per cent. Only 13 per cent went to coconut farmers and 4 per cent to others. (Bicol River Basin Development Program, Feb. 1973).

[2] A Camarines Sur Interagency Survey Team reported that in 1972 there were 7 active FaCoMas in the province. During the Crop Year 1971-72 approximately P1.5 million was lent for production to 2,150 farmers.

A number of lenders increased their interest rate between the pre-HYV and HYV periods. Particularly in South Cotabato a dramatic increase in the annual interest rates on loans occurred. Landlords raised their interest charges from 34 to 132 per cent per year, and private money lenders from 14 to 74 per cent. One probable explanation for the higher interest rates during the HYV period is the greater increase in the demand for credit compared with the supply. In Iloilo private lenders raised their interest rate by 34 per cent. Moreover, the rate varied with the method of repayment. Cash repayments usually had lower interest while those loans repaid in kind or a combination of cash and commodities were repaid higher interest rates.

Table 18. Change in Tenure Status, Present and Pre-HYV

TENURE	CAMARINES SUR		ILOILO		SOUTH COTABATO	
	Present	Pre-HYV	Present	Pre-HYV	Present	Pre-HYV
	number of farms					
Owner	47	43	52	42	72	66
Part-owner	3	2	6	5	1	-
Share tenant	135	144	84	68	119	104
Lease tenant	13	1	27	17	8	7
Total	1988	190	169	132	200	177
	per cent					
Owner	23.7	22.6	30.8	31.8	36.0	37.3
Part-owner	1.5	1.1	3.5	3.8	0.5	-
Share tenant	68.2	75.8	48.7	51.5	59.5	58.8
Lease tenant	6.6	0.5	16.0	12.9	4.0	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 19. Change in Sharing Arrangements Between Tenants and Landlords, Present and Pre-HYV

SHARING PROPORTION	CAMARINES SUR		ILOILO		SOUTH COTABATO	
	Present	Pre-HYV	Present	Pre-HYV	Present	Pre-HYV
			per cent			
ZT:LL						
30:70	0.7	0.7	2.4	1.4		-
33:67	3.7	4.8	-	-	-	-
50:50	3.0	3.5	79.8	87.4	41.2	40.4
60:40	15.6	38.2	-	-	5.9	1.9
65:35	1.[illegible]	3.5	-	-	1.7	1.9
67:33	23.[illegible]	26.4	-	-	29.4	35.6
70:30	29.1	17.0	-	16.2	30.1	20.2
75:25	11.1	2.1	-	-	1.7	-
Other	11.1	3.5	-	-	-	-

Many of the 37 farmers in South Cotabato who borrowed from landlords repaid their loans in palay (rough rice) in which case values were computed using prevailing market prices.

10.0. Tenancy Implications of High Yielding Varieties

Among the three provinces no definite pattern seemed to emerge with respect to a change in tenure status of the rice farmers. In Camarines Sur, there was a slight increase in the proportion of owner operators but a very slight decrease in the other two provinces (Table 18). The number of leasehold tenants increased, consequently share tenants decreased.

The adoption of the HYV could have affected the sharing of both output and input between tenants and landlords. Tables 19 and 20 were prepared to study this aspect. There seemed to have been a change toward a greater share of output for tenants in Camarines Sur whereas in South Cotabato, the tendency was toward a smaller share. In the former, there was a decline in the number of farmers with 30:70, 33:67, 50:50, 60:40, 65:35 and 67:33 sharing arrangement and an increase in the others. However, in South Cotabato, an increase occurred in the 50:50 and 60:40 sharing and a decrease in the 65:35, 67:33 and 70:30.

The change in output sharing could have been brought about by changes in the sharing of input. For the most common output sharing arrangement from each province we examined the changes in the sharing of inputs such as tractor use for land preparation, fertilizers, pesticides and irrigation (Table 20). In Camarines

Table 20. Landlord Tenant Sharing of Input, Present and Pre-HYV

Input Sharing T; L	Output Sharing (T:LL)					
	CAMARINES SUR 70:30		ILOILO 50:50		SOUTH COTABATO 50:50	
	Present	Pre-HYV	Present	Pre-HYV	Present	Pre-HYV
	per cent					
Land preparation						
tractor						
100% by tenant	100	100	67	71	-	50
50:50	-	-	33	29	50	50
100% by landlord	-	-	-	-	50	-
Fertilizer						
100% by tenant	95	100	24	20	38	42
50:50	5	-	76	80	62	58
Pesticides						
100% by tenant	94	100	25	24	53	56
50:50	3	-	75	76	47	44
100% by landlord	3	-	-	-	-	-
Irrigation						
100% by tenant	100	100	12	21		50
50:50			42	50	67	50
100% by landlord	-	-	46	29	33	-

Sur payment for tractor and irrigation expenses was shouldered by the tenants in both the present and pre-HYV periods. Five per cent of the tenants was sharing fertilizer equally with the landlord during the HYV period.

In Iloilo and South Cotabato landlord participation in the farm operations seemed to increase in terms of greater sharing of tractor expenses, irrigation and pesticides.

Man and animal labor for land preparation had traditionally been a responsibility of the operator. These practices had continued even with the new technology. Harvesters and threshers are usually paid a certain proportion of the harvest which is deducted before the tenant and the landlord get their share of output.

For many tenants the landlord has been a major source of credit whether for production or consumption purposes. With respect to production credit it seemed that there was a slight reduction in the proportion of landlords guaranteeing production credit to tenants between the pre-HYV and HYV periods. In Camarines Sur, 42 per cent of the tenants were guaranteed credit by their landlords during the pre-HYV period, and 40 per cent during the HYV period. In Iloilo the proportion declined from 62.2 per cent to 57.5 per cent. However, in South Cotabato, almost the same proportion guaranteed credit to tenants before and during the HYV period. This decline could probably be explained by the increase in the number of leasehold tenants. With the land rental fixed, the role of the landlord as supplier

of capital is reduced hence the number who would guarantee credit to tenants would also drop.

When a tenant goes to his landlord either to ask for advice about farm practices, to ask for credit, to ask for payment for shared farm expenditures or even just to inform him about the harvesting schedule, sometimes he sees only a representative of the landlord. This is particularly true if he has an absentee landlord or if the landlord lives in a far place. We therefore asked the tenants the following question: "Who is the person representing the landlord whom you deal with most of the time?" If the landlord was not available the tenant saw either an overseer or farm manager or a close relative of the landlord. But more often he saw the landlord himself and between the pre-HYV and the HYV periods there appeared to be a greater contact between the tenants and the landlord.

The number of tenants per estate has not changed significantly, nor has the area cultivated by each tenant. The latter increased only very slightly due to some expansion of the area of the estate to which the tenant's farm belongs.

11.0. Changes on Some Aspects of Family Living

Development of agricultural technology has implications not only on the farm but also on family living. Incomes increase and due to a high income elasticity of demand for food we would expect a greater demand for certain types of food. Demand for clothing and services would also increase. For this study we

looked at changes in levels of consumption of food, clothing and durable goods be they household or capital investment for the farm.

In the study areas, consumption of beef, pork, and chicken remained the same before and after the introduction of high yielding varieties (Table 21). The level of consumption of these commodities may be considered low. However, note the increase in rice consumption for the whole family, 29 to 34 gantas per month in Camarines Sur, 42 to 44 in Iloilo, and 34 to 41 in South Cotabato. It should be emphasized that these are family consumption rates and did not take into account the changes in family size.

Table 21. Changes in Consumption, Present and Pre-HYV (per month except clothing which is per year)

COMMODITY	Camarines Sur		Iloilo		South Cotabato	
	Present	Pre-HYV	Present	Pre-HYV	Present	Pre-HYV
Rice (Gantas)	24	29	44	42	41	34
Chicken (Number)	3	3	4	4	4	4
Pork (kgs.)	2	2	2	2	2	3
Beef (kgs.)	1	1	3	3	3	3
Fish (kgs.)	25	21	18	18	11	10
Canned milk (No.)	17	14	20	20	20	17
Clothing (pesos)	296	180	304	221	316	231

Fish consumption remained the same in Iloilo increased by 1 and 4 kilos in South Cotabato and Camarines Sur, respectively. Canned milk consumption also increased in these two latter provinces.

Clothing expenditures went up about P100 which may partly be explained by the inflationary trend during the period but part of the increase could be real.

Farmers were asked if they were saving money in order to purchase some durable goods in the future. Varied responses were obtained. In Camarines Sur, almost four-fifths of the farmers said yes. In Cotabato almost everybody (97 per cent) answered no while only 30 per cent of Iloilo farmers were saving for some prospect of buying durable goods later.

It was noted that the degree of use of financial institutions for savings deposits of farmers was quite low in Iloilo and South Cotabato, 18 and 14 per cent, respectively, and a little higher in Camarines Sur, 48 per cent. That is, only 14 per cent of South Cotabato farmers deposited their savings in financial institutions such as banks and credit unions. Most of the farmers especially in Iloilo planned to spend their savings on household equipment and/or house improvement although some were also planning to buy land, livestock and farm equipment. Availability of electricity could have also affected the choice of goods to buy. Electrification facilities in the study areas were very scant, in fact nobody reported having electricity

among the South Cotabato farmers and in Camarines Sur and Iloilo a meager 8 and 4 per cent.

12.0. Summary and Conclusions

A total of 567 rice farmers were personally interviewed in three provinces, namely Camarines Sur in Luzon, Iloilo in the Visayas, and South Cotabato in Mindanao. A high rate of adoption of high yielding varieties of rice was found in all sample provinces. In these places, knowledge of farmers about the new technology had come mainly from agriculturists and other farmers.

Some of the social and economic implications of the new technology may be summarized as follows. First, land improvements in the form of better irrigation facilities and higher productivities could probably explain part of the increase in land values which was almost 200 per cent in South Cotabato. Second, more farmers used certified seeds and practiced straight row planting during the HYV and the pre-HYV period. There were some increases in the area planted to rice in each farm and total production per farm rose by 20 per cent in Iloilo to 95 per cent in South Cotabato.

Owner operators and share and lease tenants shared in the new technology through increases in yield per hectare. Landlords and laborers such as harvesters and threshers also received larger shares than before the introduction of high yielding varieties. Consequently all these various groups increased their income as a result of the adoption of new varieties. No income redistribution had been affected but the levels of income had risen.

The adoption of HYVs had meant an increase in expenditures for farm inputs. Inspite of the use of herbicides, hired labor expenditures went up by about three times compared with the pre-HYV which may imply that HYVs had generated additional employment for laborers in the villages.

The marketable surplus had grown, however in all these provinces, whether it be before or after the adoption of HYV, cash sales from rice were oftentimes not sufficient to cover cash expenditures, implying the need for other sources of income - both farm and non-farm.

The inadequacy of cash income from rice also indicates the need to supply credit to farmers. With the introduction of HYV more farmers borrowed creating a greater demand for credit and thus increasing the rate of interest. The major sources of credit were landlords and other private money lenders who usually charged a higher interest than banking institutions. Together with increasing the supply of credit it may be important to develop further the banking consciousness of farmers. Only a small portion of farmers borrowed from banks and put their savings in financial institutions.

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