

Figure 8. Average Labor Inputs for Rice Production per Hectare (Man-Days) for Modesto Antiporda Households, 1982

even if the family labor income comes from rice production on their farm it is reduced because of the amount paid to neighbors, the reduction would be more than compensated for by the family's wage earning from the neighbors (Hayami). This type of system can be called as "labor exchange with wage payments" or "share economy"

Harvesting was traditionally performed as a kind of community activity. In M. Antiporda, the usual sharing arrangement between the tenant farmer and the harvester is one-fifth for the cutting, threshing and winnowing practices. In this system, any villager can participate in harvesting and threshing, and the harvesters are entitled to receive one-fifth of the output at the rainfed area. At the low level of yield under traditional technology, one-fifth of the output would have been close to a market wage rate, which could approximate the marginal product of labor for crop harvesting. However, as land productivity increased, one-fifth of the harvest should have become substantially larger than the prevailing market wage rate. In such a situation, farmer employers could increase their incomes by reducing harvester's share to lower than one-fifth.

Through our survey at M. Antiporda, a distinct difference on harvester's share between LEA and OLEA farmers was recognized. The LEA farmers pointed out that harvesters' share was changed from one-fifth to one-sixth within 10 years. On the contrary, majority of the OLEA farmers who own or as tenants at the rainfed area inside the village answered that harvesters' share is still maintained at one-fifth of the output (Table 12).

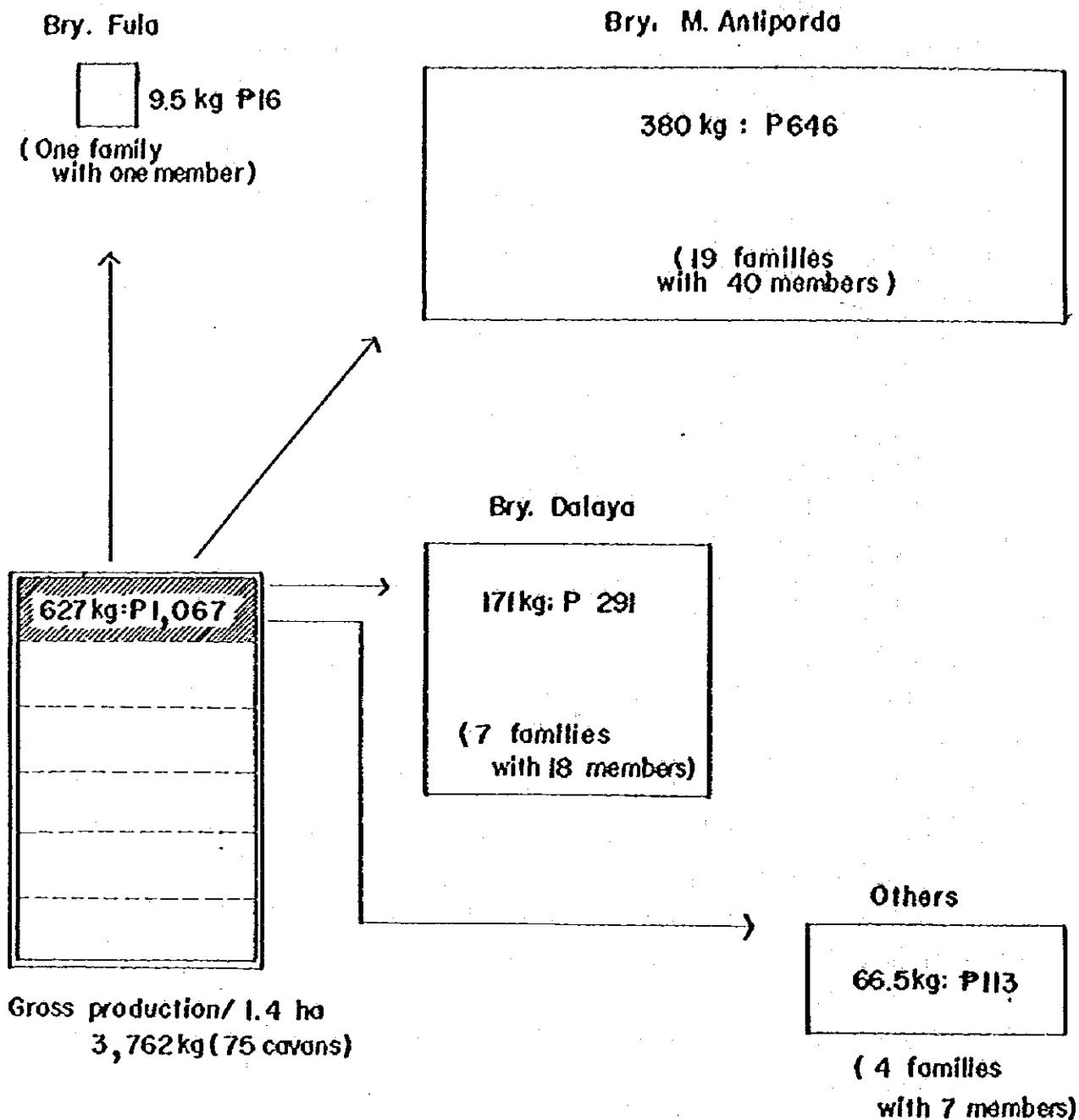
Table 12. Changes of Harvesting Share During 10 Years,
M, Antiporda, Buguey, Cagayan, 1982

ITEMS	LEA	OLEA	Total	%
Is your present harvesting share the same as ten years ago?				
Yes ^{a)}	6	41	47	59
No	5	9	14	17
n.a.	2	17	19	24
Total	13	67	80	100
If no, specify the share				
1/3 - 1/5	-	1		
1/4 - 1/5	-	6		
1/5 - 1/6	5	1		
n.a.	-	1		
Total	5	9		

a) The harvesting share was 1/5

Differences of harvesters' share between LEA and OLEA farms prove that land productivity has been increased at the irrigated area where the APC pilot farm is located than that of the other non-irrigated area. As mentioned above, the APC pilot farm was established only one year ago. In addition, area covered is still limited at the small portion (42 hectares). However, prior to the APC project, irrigation facilities at the whole neighboring land in Buguey has been continuously improved by the CIAOP-IC. Under a better possible situation for rural development, rice land surrounding the APC pilot farm is certainly increasing in land productivity.

Figure 9 shows an example on the distribution of palay harvested. During our survey, one LEA farmer harvested 1.4 hectare of rice land inside the pilot farm. Cutting practices started at seven o'clock in the morning with 31



Notice: 1 kg of palay is equivalent to P1.70 as of September 1982

Figure 9. Distribution of Palay with 1/6 Share at the Pilot Farm (1.4 hectares) to Harvesters by Village on September 15, 1982.

families of 66 persons participating in the operation. After cutting, threshing was done by means of hand-beating (hampasan) and winnowing was performed in the afternoon. Harvester from different barangays came to Dalaya where the pilot farm is located. The total yield of 75 cavans or 3,762 kilograms was harvested in one day. Harvesters shared one-sixth or 627 kilograms of palay, which is equivalent to P1,142.00 at the prevailing market price. The remaining portion went to the farmer employer.

This shows why so much importance is given to the harvesting practice not only in irrigated village but in rainfed one as well. Most have found out that the land productivity has an upward tendency in the LEA. Incidentally, normal market price for harvesting was estimated at P14.00 in the case of M. Antiporda (Table 13).

Table 13. Standard Wage Rates Used for Imputting Family Labor Costs (Peso/Day)

Rice Production Activities	Antiporda Cagayan, 1982	Tubuan, Laguna 1975-76 ^{a)}
Preparation of seeds	9	5
Plowing	26	12
Harrowing	26	12
Cleaning dikes	10	11
Transplanting	9	8
Fertilizing	10	11
Spraying	10	11
Irrigating	10	5
Weeding	10	12
Harvesting	14	11
Hauling	9	5

a) Hayami, Y. Anatomy of a Peasant Economy: A Rice Village in the Philippines, International Rice Research Institute, 1978.

However, each harvester gained about 9.5 kilograms of palay or about P16.00 as a daily wage in spite of the fact that harvester's share is lower (1/6) than that of the rainfed area (1/5). We can point out that establishment of irrigation and drainage facilities and the diffusion of new rice technology are providing somewhat strong impact on traditional job opportunity among small farmers.

Cost Return of Rice Farming

At the prevailing price of P1.70 per kilogram of palay, the OLEA sample farmers had gross returns of P5,100 per hectare from rice production (Table 14). The results indicate that their farm income was P2,100 per hectare per year, including a return of P240.00 for imputed family labor. Return to capital and management imputed labor cost subtracted from farm income was P1,850 per hectare per year.

Value added from the rice production system, calculated by subtracting current intermediate inputs (seeds, fertilizer, chemicals, irrigation fee and fuel/oil) from input value, was 92% of the total output value. For example, this ratio was higher than that of rice farmers derived from results of a survey in Laguna province for 1975-1976 crop year. On the average, factor shares in total value added from rice farming were 34% for labor, 27% of land and 39% for capital.

In general, yield of palay at the well irrigated area is substantially higher than that of the non-irrigated area. This is partly correct. Eventually, land productivity is depended on farmer and his technology. For example, yields of palay were not always high among the LEA farmers. Farmer A produced only 28 cavans or 1.4 tons per hectare for the first crop, and 47 cavans or 2.4 tons per hectare for the second crop although he cultivated a well irriga-

Table 14. Cost Return Analysis of OLEA Farmers (Tenants)
Who Cultivated 1.5 Hectare of Rice Land - One
Crop per year-(P)

ITEMS	1.5 Ha.	1 Ha.	REMARKS
Gross Returns			
OLEA farm	5,100	-	60 cav. x 50 kg x P1.70
Total	5,100	3,400	
Variable costs			
Seed	119	-	1.4 cav. x 50kg x P1.70
Fertilizer	-	-	
Insecticide	-	-	
Others	-	-	
Total	119	79	
Fixed Costs			
Depreciation	272	-	
Repair	-	-	
Irrigation fee	-	-	
Total	272	181	
User's Cost	391	261	
Value added	4,709	3,139	
Hired labor	1,338	892	Hired labor
Land rent	1,275	850	Seedbed 5 days/ha. Plowing 6 days/ha. Transplanting 6 days/ha. Harvesting (1/5)
Farm income	2,096	1,397	
Imputed family labor	243	162	
Return to Capital, Management	1,853	1,235	Family labor Seedbed 7 days/ha. Harrowing 2 days/ha. Cleaning 1 day/ha. Transplanting 1 day/ha. Harvesting 1 day/ha.
Shares (%)			
Farm income/gross return	41		
Value added (VA)/gross return	92		
Labor share in VA	34		Land rent 15 cav.
Land share in VA	27		
Residual share in VA	39		

ted field inside the APC pilot farm (Table 15). He also applied two bags of urea for two crops. This amount of fertilizer which is equivalent to 23 kilograms of nitrogen per hectare for one crop seems to be inadequate for growing modern varieties. However, he is still in the progress of learning how to intensify his farming as a cultivator at the LEA pilot farm.

Because of these reasons, Farmer A gained P6,400 as gross return from two crop seasons. User's cost in this case was estimated at about P1,400. Irrigation fee was not actually collected because it was the first trial of the APC project. However, farmers have to pay it in the near future. Therefore, the fee was incorporated into the fixed cost for the LEA farmer. In this connection, Farmer A generated P5,000 of value added from P1,400 of cash input. Value added to gross return was seventy eight (78) percent. This shows that the ratio of current inputs to total return was high for Farmer A. The ratio of farm income to total production was definitely lower than that of the OLEA sample farmers. Factor share analysis points out the fact that shares of labor, land and capital to value added were on the same proportions.

On the other hand, the LEA Farmer B produced 225 cavans or 11.3 tons of palay from 4.2 hectare of rice land (Table 16). On the hectare basis, yield at the pilot farm was 65 cavans or 3.3 tons while 52 cavans or 2.6 tons was obtained from the outside. This case shows that land productivity was slightly higher at the LEA farm than that of the OLEA farm. The total value added on his farm was 83% of the total output value. Labor's share of value added was 34% and the residual to family factors was 40%.

For the three cases, the ratio of farm income to total returns varied from 29% to 41%. The ratio of farm income to value added also changed between 38% to 47%. According

Table 15. Cost and Return Analysis of LEA Farmer A
(Tenant) who Cultivated 1.0 Hectare of
Rice Land (P)

ITEM	1.0 HA, (Two Crops)	REMARKS
Gross returns		
LEA Farm (1st)	2,380	28 cav. x 50kg x P1.70
LEA Farm (2nd)	3,995	47 cav. x 50kg x P1.70
Total	6,375	
Variable costs		
Seed	170	2 cav. x 50kg x P1.70
Fertilizer	264	Urea 2 bags x P132/bag
Insecticide	180	Bionex & Furadan P180
Others	-	Machete
Total	614	
Fixed costs		
Depreciation	283	
Repair	-	
Irrigation fee	510	6 cav. x 50kg x P1.70
Total	793	
User's cost	1,407	
Value added	4,968	
Hired labor	1,476	Hired labor (two crops)
Land rent	1,615	Seedbed 10 days/ha. Plowing 6 days/ha. Harrowing 3 days/ha. Transplanting 10 days/ha. Harvesting (1.6)
Farm income	1,877	
Imputed family labor	170	
Return to capital, management	1,707	Family labor Seedbed 2 days/ha. Plowing 1 day/ha. Harrowing 1 day/ha. Cleaning 7 days/ha. Others 2 days/ha.
Shares (%)		
Farm income/gross return	29	
Value added (VA)/gross return	78	Land rent 7 cav. (1st crop) 12 cav. (2nd crop)
Labor share in VA	33	
Land share in VA	33	
Residual share in VA	34	

to our estimated farm income as a percent of total return and as a percent of value added ranged from 20% to 40% for Laguna farmers (Morooka, et. al.). Compared with those results in other regions, ratios of our case farmers indicated slight difference.

The difference in the ratio of land rent among the three cases seems to be primarily due to the difference in tenure arrangements. A majority of small farmers are under share tenancy (e.g. OLEA sample farmers and LEA Farmer A). Also, most large farmers are under leasehold tenancy (e.g. LEA Farmer B). This suggests that large farmers are receiving the functional share of land in the form of residual farm profit than small farmers.

It is needless to say that rice farming is the most important income source among farmers. The next important source is the wage earnings from outside employment, but it is also primarily on farm work within the village. As mentioned above, harvesting and threshing represent major employment opportunity for small farmers whose income from farming are insufficient to meet their subsistence. For example, OLEA farmers paid hired laborers about P892 per hectare in kind. On hectare basis, LEA Farmer A and B paid P1,500 and P1,000 per year, respectively. No significant differences, in total hired labor cost, were observed among three cases because land productivity was not yet high at the LEA farm.

However, many hired laborers showed a preference for rice production at the LEA farm and adjacent area. At the place near the LEA, the time of planting varies among farmers depending on the availability of laborers, field condition and farmers' preferences, since water is available throughout the year. Double cropping system with different harvesting time is providing a stable job opportunity for small farmers and/or hired laborers. Therefore, the choice of technology and contractual arrangement with respect to the use of labor for rice harvesting are critical determinants of the income and the well-being of the rural poor.

Table 16. Cost Return Analysis of LEA Farmer B
(Part-owner) who Cultivated 4.2 Hectares
of Rice Land - One Crop Per Year (P)

ITEM	4.2 HA.	1.0 HA.	REMARKS
Gross returns			
LEA farm (0.4 ha)	2,210		26 cav. x 50kg x P1.70
OLEA farm (3.8 ha)	16,915		199 cav. x 50kg x P1.70
Total	19,125	4,554	
Variable costs			
Seed	1,020		12 cav. x 50kg x P1.70
Fertilizer	1,640		Urea 1 bag x P132 Complete 13 bags x P116
Insecticide	82		Gusathion 1 quart x P82
Others	-		
Total	2,742	653	
Fixed costs			
Depreciation	382		
Repair	-		
Irrigation fee	204		6 cav/ha/crop at LEA
total	586	140	
User's cost	3,328	792	
Value added	15,797	3,761	
Hired labor	4,332	1,031	Hired labor Seedbed 15 days/ha. Plowing 8 days/ha. Harrowing 5 days/ha. Transplanting 12 days/ha. Harvesting (1/6 & 1/5)
Land rent	4,118	980	
Farm income	7,347	1,749	
Imputed family labor	1,074	256	
Return to capital management	6,273	1,494	Family labor Seedbed 5 days/ha. Cleaning 3 days/ha. Spraying and Fertilizing 1 day/ha Others
Shares (%)			
Farm income/gross return	38		
Value added (VA)/gross return	83		Land rent 12.75 cav./ha.
Labor share in VA	34		
Land share in VA	26		
Residual share in VA	40		

VI. SOCIAL ASPECTS

Perspective of Village Agriculture

In addition to questions regarding economic aspects on rice farming, we inquired from 80 farm householders their feelings regarding new rice technology and village agriculture.

1) Acceptance of new rice technology

Appendix 1 indicates their adaptability to modern farming techniques. Out of 80 farm householders, 35% or 28 respondents answered that they already introduced some new rice production techniques into their farming. To the same question, however, 56% or 45 persons replied that they are still using the traditional method without any modern farming technology. Based on their responses, village agriculture is still at the stage of development where rice cultivation will change from the traditional system to the modernized one.

The 45 respondents who answered "No" were also asked to give their reasons. Majority of them are uncertain. However, some pointed out that they are willing to learn modern technology, but they have no chance to practice it. A few farm householders attributed the reason to the absence of a technician who can teach ways on how to adopt modern technology. On the whole, it seems that farmers are not enthusiastic enough and lack positive attitude in adopting modern rice farming technology.

Moreover, 28 farm householders who answered "Yes" were asked about the modern farming techniques. Most of them answered that both proper land preparation and use of high yield variety (HYV) are typical modern farming techniques. These responses show that land preparation by power tiller and IR varieties strongly affected the impact on traditional

farming. It is also noteworthy to point that they emphasize both importances of fertilizer application and planting distance.

On the other hand, 28 farm householders who were introduced to some new rice production techniques were asked on their sources of technical assistance. 60% gave technicians or co-farmers as their source of technical assistance. These sixteen farm householders reported that field visits from technicians were made by representatives of APC and IC (Irrigation Components) - CIADP and Bureau of Agricultural Extension. Also, OLEA farmers seldom meet with technicians compared with the LEA farmers. Activities by APC members play an important role in extending technical guidance and assistance to farmers in the LEA project area.

According to "Socio-economic Profile of Households in the Iguig LEA Barangay" in 1978, majority of the farmers, 70% said that there are extension technicians working in the area and 30% are not aware of any technician working. Under the situation, the largest proportion of the farmers were assisted by extension technicians. Comparing with the report, farm householders in M. Antiporda have a rare chance to meet with technicians.

2) Rice farming and credit system

In the Philippines, the "Masagana 99" was launched in 1973 as a program of survival by the government. Masagana means bountiful. The figures 99 refer to the number of cavans which the project aims to harvest from a hectare of irrigated rice land. The target of palay production is set up at 99 cavans or around 5 tons per hectare.

During our survey in this village, several farmers who are cultivating a well irrigated area produced more than 100 cavans or 5 tons per hectare. However, on the average basis, the yield of palay per hectare varied from 30 to

50 cavans or 1.5 to 2.5 tons. Since majority of farmers answered that land productivity is quite low, yield of palay varies depending on the farm conditions.

As to the question on their contentment or discontentment with farming, 67% replied "discontentment" (Appendix 2). With regards to mixed feeling, 20% said that they are contented with the situation of rice farming at present. It is also interesting to note that LEA farmers are not contented while OLEA farmers are satisfied with their yield of palay. Most of respondents who were "discontented" said they want to improve their poor technology to obtain high yield.

In a typical Philippine village, there are two types of credit system called hiram and utang. Hiram means short-term loans without interest, while utang usually indicates long-term loans with interest. Credit system plays major role in the village society in promoting rice farming and maintaining their daily life.

45 farmers or 57% of the total farm householders borrowed money from neighbors or relatives (Appendix 3). In addition, one fourth of the total farm householders failed to give any answers. Judging from their responses, it appears that village people resort to borrowing a small amount of money from neighbors or from relatives during emergencies. Also, some farmers who already learned new rice farming technology said they are still hesitant to secure a loan from the bank although they are in need of money, because of long processing of loan application. Under these credit conditions, 39% of the total farm householders answered that their home economy showed a deficit in this season because of low production.

Attitude/Feeling to Rural Community

Finally, 80 farm householders were asked about their consciousness to daily life (Appendix 4). Majority of respondents, 76%, agreed in the importance of cooperation in

a community project. In fact, they constructed a village road and a primary school in the middle of 1970's through their mutual cooperation. Therefore, most of farm householders agreed that one should sacrifice at present to get what one is striving for in the future. Though they practice bayanihan (mutual help) spirit, 60% of respondents said they need the help of government for improving village life. This means they need some guidance as well as funds to improve their village.

Most of village people (85%) put great emphasis on education of their children.

In general, farm practices such as transplanting and harvesting are performed by women workers. The men take charge of heavy work like land preparation (by carabao) and constructing dikes. Women are not for the home only hence, it should not be the lone duty of the husband to earn for the family. Appendix 5 shows that the owner-operator decides the time of planting and harvesting together with his family members. However, they seldom discuss about fertilizer application.

V. CONCLUSION

1) As stated earlier, this village has experienced a moderate population growth rate. Since labor absorption in the urban sector has been limited inspite of the fact that this village is located near Aparri, agricultural labor force has increased at a higher rate. To those pre-occupied with problems of man-land relations, available inference indicates that the critical issue is placed on the relationship between farmer-cultivator and farm-laborer. The problem is whether or not there will be adequate arable land to cultivate. The increase in the rural force would have increased the competition for establishing a right to cultivate or to carry out farm practices as hired

laborers within the limited land area under different land endowments.

2) Intensification of rice farming under the direction of the APC is an effective means to enlarge the size of farm business from available but limited farm resources in the area like M. Antiporda. However, there are many variations on how to intensify rice farming even in a rice-based farm. The appropriate technology is not a land-and-capital-saving but labor-intensive technology. This study suggests that the technology which cannot absorb labor force is not appropriate for rice farmers in the lower Cagayan.

3) The income of farmers have generally increased as a result of the changes that have taken place in rice production under well-irrigated conditions. There have, however, been important difference by farms in both the choice of inputs by farmers and the yield and profit responses. Farmers who cultivated rice in a relatively large area received higher surplus of the economic rent over the actual rent. The surplus would have also been higher with the increase in the productivity of land through the improvements of the irrigation system and agricultural technology. On the other hand there are many farmers who are struggling over difficult farming problems in terms of yield, input levels and farm income. For instance, they always face the risks of climatic variation which reduces or eliminates profit.

4) In accordance with the diffusion of modern technology along with the changes in intensify of land use, job opportunity for hired laborer will also be increasing gradually, particularly in the LEA farm. Further intensification of rice farming at the farm level seems to depend on a situation wherein a major part of farm practices are being done with a relatively low level of wages for hired laborers than that of other regions. In this case study, farmers, received a residual of about 40% of total value

added, while the factor share for hired labor was around 30%. The double cropping will provide additional job opportunity for small farmers and landless workers whose income from farming are insufficient to meet their subsistence.

5) Though the APC project started at the end of 1981 in Buguey area, technical guidance and improvement of the infrastructure at the LEA farm are affecting various impacts on traditional cultivation method, labor employment custom and the whole of rural society. In the APC pilot farm, the LEA farmers score more success than others mainly on the following reasons: 1) carefulness and experience of extension officers; 2) availability of good farmer leaders; 3) high degree of cooperation among farmers; 4) production incentives; and 5) political support by the government.

Appendix 1. Adoption of New Rice Technology

ITEMS	LEA FARMERS		OLEA FARMERS		Total	%
	IP-owner	Tenant	Owner	IP-owner		
"Are you presently practicing modern farming techniques?"						
Yes	5	4	6	3	10	28
No a)	-	-	13	9	23	45
n.a.	4	-	1	-	2	7
Total	9	4	20	12	35	80
"If no, why?"						
No facilities	-	-	-	-	4	4
Lack of finance	-	-	1	2	3	6
No technician	-	-	-	1	2	3
No modern techniques	-	-	5	-	6	11
n.a.	-	-	7	6	8	21
Total	-	-	13	9	23	45
"If yes, what are the modern farming techniques?"						
Proper land preparation	5	4	5	3	10	27
Use of HYV	5	4	6	3	8	26
Use of fertilizer	4	4	-	-	2	10
Plant distancing	3	3	-	1	2	9
Use of herbicides	4	2	-	1	2	9
Multiple cropping	-	-	-	1	2	3
Others	-	-	1	1	-	2
Total	5	4	6	3	10	28
"Who give the technical assistance needed in the practice of modern technology?"						
Technicians	5	4	1	2	4	16
Barangay Leader	1	1	1	1	1	5
Landowner	-	-	-	-	1	1
Farmer Leader	2	1	1	1	1	6
Co-farmer	2	-	2	2	3	9
Others	1	-	-	3	2	6
Total	5	4	6	3	10	28
"If technicians, what agencies do they represent?"						
APC-CIADP	4	3	-	2	1	10
CIADP-IC	3	3	-	2	1	9
BAExt	2	2	1	1	4	10
BAI	1	-	-	-	2	3
BPI	3	2	-	-	-	5
MAR	1	-	-	-	1	3
Others	2	-	-	1	-	3
Total	5	4	1	2	4	16

a) n.a. : No answer

Appendix 2. Perspective of Rice Farming

ITEMS	OLEA FARMERS		OLEA FARMERS			Total	%
	P-owner	Tenant	Owner	P-owner	Tenant		
"Do you consider your present production high or low?"							
High	-	-	1	1	-	2	3
Low	5	4	18	11	31	69	86
n.a.	4	-	1	-	4	9	11
Total	9	4	20	12	35	80	100
"What do you think of yourself as a rice farmer?"							
Contented	-	-	3	2	6	11	14
Discontented	5	2	13	10	24	54	67
Mixed feeling	-	2	2	-	3	7	9
n.a.	4	-	2	-	2	8	10
Total	9	4	20	12	35	80	100
"If discontented or mixed feeling, explain why?"							
Low production	5	3	8	8	18	42	52
No working animal	-	-	-	-	2	2	-
Insufficient water	-	-	3	-	2	5	-
Lack of technology	-	-	6	2	5	13	16
n.a.	4	1	3	2	8	18	23
Total	9	4	20	12	35	80	100

Appendix 3. Credit Situation Among Farmers by Tenure Status

Source of Credit	LEA FARMERS		OLEA FARMERS			Total	%
	P-owner	Tenant	Owner	P-owner	Tenant		
Banks	-	-	-	-	-	-	-
Businessman	1	2	6	-	-	9	11
Neighbor	-	-	7	6	14	27	34
Relative	3	2	3	5	5	18	23
Landowner	-	-	-	-	2	2	3
APC	1	-	-	1	1	3	4
n.a.	4	-	4	-	13	21	25
Total	9	4	20	12	35	80	100

"Do you have outstanding balance at present?"

Yes	2	4	7	4	14	31	39
No	3	-	13	8	19	43	54
n.a.	4	-	-	-	2	6	7
Total	9	4	20	12	35	80	100

"If yes, why were you not able to pay your accounts?"

Low production	2	2	5	3	9	21	68
No cash	-	2	1	1	5	9	29
n.a.	-	-	1	-	-	1	-
Total	2	4	7	4	14	31	100

Appendix 4. Attitudes of Each Farm Householder

ITEMS	LEA FARMERS		OLEA FARMERS		Total	%	
	P-owner	Tenant	Owner	P-owner			Tenant
"Most people can be trusted and depended on for cooperation in a community project."							
Agree	4	4	14	11	28	61	76
Disagree	-	-	3	1	6	10	13
n.a.	5	-	3	-	1	9	11
Total	9	4	20	12	35	80	100
"One should sacrifice at present to get what one is striving for in the future."							
Agree	5	4	13	11	21	54	68
Disagree	-	-	3	1	5	9	11
n.a.	4	-	4	-	9	17	21
Total	9	4	20	12	35	80	100
"The people in the barangay can do much even without the help of government."							
Agree	2	3	7	6	10	28	35
Disagree	3	1	12	6	25	47	59
n.a.	4	-	1	-	-	5	6
Total	9	4	20	12	35	80	100
"Education is very important for one to be successful in life."							
Agree	5	4	14	11	34	68	85
Disagree	-	-	2	1	1	4	5
n.a.	4	-	4	-	-	8	10
Total	9	4	20	12	35	80	100
"Women are for the home only thus it should be the duty of the husband alone to earn for the family."							
Agree	-	-	1	5	12	18	23
Disagree	5	4	18	7	23	57	71
n.a.	4	-	1	-	-	5	-
Total	9	4	20	12	35	80	100

Appendix 5. Decision for Matters Concerning Major Operation
in the Farms

ITEMS	LEA FARMERS		OLEA FARMERS			Total	%
	IP-owner	Tenant	Owner	IP-owner	Tenant		
Planting							
Landowner	2	-	8	-	2	12	15
Operator	1	4	6	6	28	45	56
Family members	3	-	4	5	5	17	21
Others	1	-	-	1	-	2	3
n.a.	2	-	2	-	-	4	5
Total	9	4	20	12	35	80	100
Fertilizing							
Landowner	1	-	3	-	1	5	6
Operator	-	3	-	3	11	17	21
Family members	2	-	2	-	3	7	9
Others	1	-	-	-	-	1	1
n.a.	5	1	15	9	20	50	63
Total	9	4	20	12	35	80	100
Harvesting							
Landowner	2	-	6	-	3	11	14
Operator	1	4	6	6	22	39	49
Family members	2	-	4	3	7	16	20
Others	2	-	-	2	-	4	5
n.a.	2	-	4	1	3	10	12
Total	9	4	20	12	35	80	100

COMPARISON OF TWO VILLAGES STUDY*

***Written by Yoshinori Horooka (TARC) & Yoshina Mizusawa (JICA)**

I. PRECONDITIONS FOR INTRODUCTION OF NEW TECHNOLOGY

As reported in the first two parts, the whole household survey was conducted at two villages where respondents were selected from both the upper and the lower areas in the province of Cagayan from September to October, 1982. Results of this survey reveal several points of consideration as to how improved rice growing technologies were introduced to these rainfed villages, and how these effect the society and economy of the villages. This report will discuss major problems found in the two surveys.

APC's project, whose principal aim is to spread improved rice cultivation techniques, was initiated in 1977 in consonance with two other components, irrigation and social development (electrification) projects. While irrigation facilities were taken care of by the National Irrigation Administration (NIA), electrification was assigned to the Cagayan Electric Cooperative (CAGELCO). These two projects had a direct relation with the basic infrastructure. Therefore improvement of these factors was a pre-requisite for an effective dissemination of improved technologies. The construction of irrigation facilities had to be delayed partly owing to natural disasters and other causes. On the other hand, the electrification project made progress roughly as planned. Electricity was extended to both the villages, Minanga Norte and Antiporda. In fact, majority of the residents in these villages have not had the basis of life sufficient for using electric power yet.

Improved technologies for growing rice twice-a-year were greatly affected by irrigation conditions. In this respect, APC's activities for agricultural extension were under many restrictions as a result of delayed irrigation project. Figure 1 shows the average yield of unhulled rice per hectare harvested by LEA farmers for the past

five years at four pilot farms. While the target yield (3.5 tons of unhulled rice per hectare) was attained at the two farms of Iguig and Lal-lo, Amulung and Buguey farms failed to do so. The four farms suffered an unstable supply of water, which was directly reflected on their rice production. The technical level of farmers and their experience and knowledge of rice growing by irrigation had a close relationship with their rice yield, too. However, shown by declining tendency of irrigated rice fields, the capacity of electric pumps, change in the water depth of the Cagayan River and natural disasters such as typhoons were major restrictive factors for twice-a-year rice cultivation.

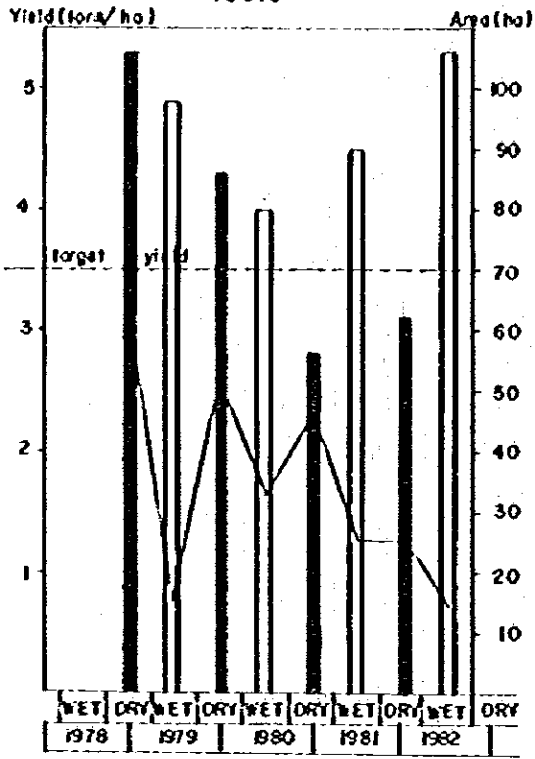
This part attempts to review the effect of the introduction of improved rice growing technologies undertaken by APC under the situation outlined above. In many cases, when major modernization effort is made in a traditional farming village, its initial effects have a high impact on the area. Thus, it was necessary to make a detailed research as to the continuity of these effects to both the social and economic problems they are posing. Infrastructure was not yet sufficient when the double crop technologies were introduced to Minanga Norte and Antiporda villages. Because of this, their situation and social background made it difficult for the researcher to observe the effects of new technologies in a short period of time. While these points were taken into consideration, the change observed in these villages were assumed to happen in other villages.

II. PROCESS OF RURAL DEVELOPMENT

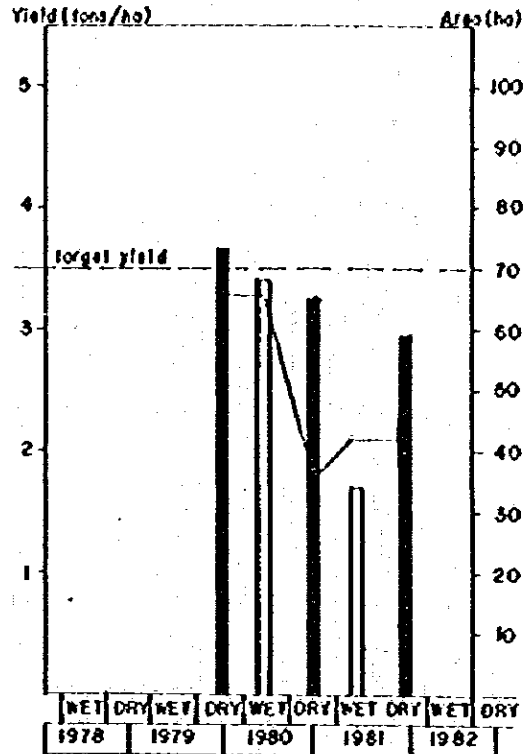
When an advanced rice cultivation technology is introduced into a traditional society, how will the technique spread in the society, and in the process what sort of progress will it give to farmers and the society? The

UPPER CAGAYAN

IGUIG

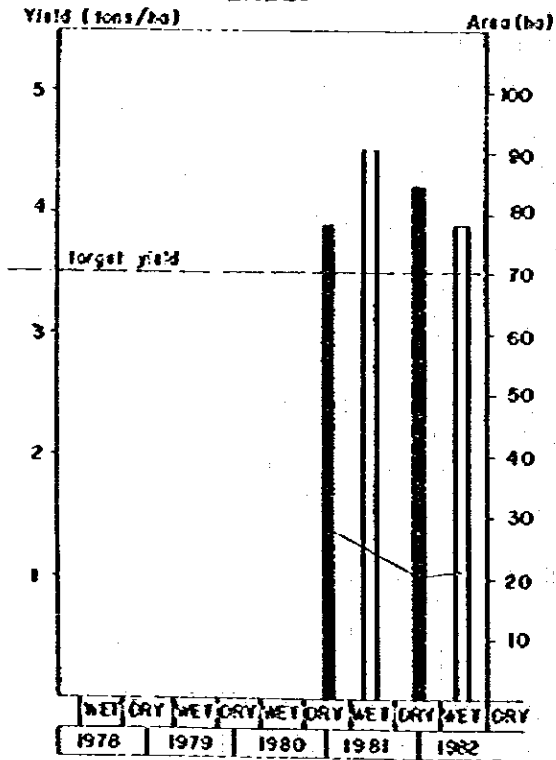


ALCALA-AMULUNG

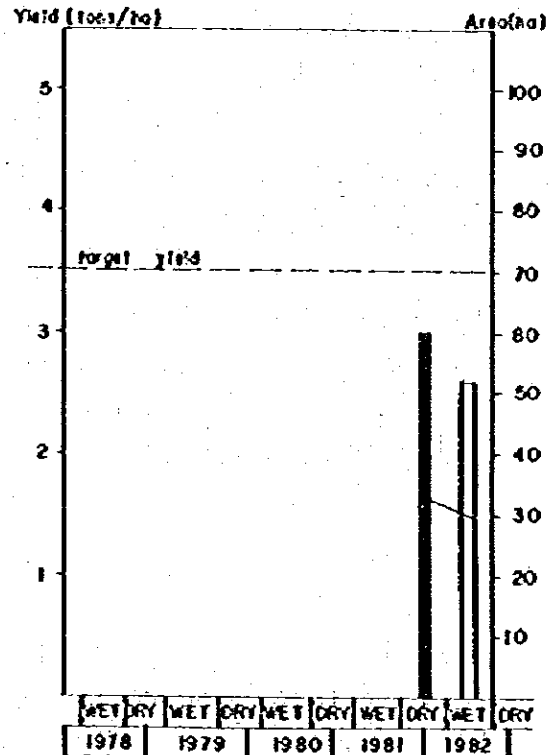


LOWER CAGAYAN

LALLO



BUGUEY



LEGEND: ■ YIELD (Dry Season) □ YIELD (Wet Season) — Area

Figure 1. Changes of yields and area irrigated at the four APC pilot farms, Cagayan, 1978-82.

outcome of the two surveys are the following:

1. In the villages of Minanga Norte and Antiporda, rain-water was traditionally used to grow rice. Because of poor water supply conditions and low technical levels, rice production of these villages were very low. The yield of rice in Minanga Norte was around 30 cavans (1.5 tons of unhulled rice per hectare) for traditional varieties and 40 cavans (2 tons per hectare) for improved ones. The construction of irrigation facilities and other infrastructure projects resulted in the possibility of growing rice crops twice-a-year. As improved technologies spread among farmers, the yield of rice per unit area began to increase. During the survey, the output of LEA farmers in Minanga Norte exceeded 70 cavans (3.5 tons per hectare). In Antiporda where pilot farms were just established, there was a difference of over 20 cavans (1 ton per hectare) in the yield of unhulled rice between LEA and OLEA farmers.

Production capacity in a rainfed village is raised when infrastructure is improved and an appropriate technique is introduced. The completion of Magat Dam (See photos 1-15) as a source of electric power will transform the APC pilot farms and all over CIAOP area and flood plain of the Cagayan River into a rice granary. The surveys show the possibility that this can be realized.

The Magat River, a tributary of the Cagayan River and located at Isabela province is the source of power generated by the Magat Dam.

2. As the yield of unhulled rice will rise, the capacity of these villages to support population will increase at a faster pace than in other traditional villages. The present rate of population growth in the entire Philippines is 2.64% while the province of Cagayan stands at 2.03%; the rate for Minanga Norte was estimated at 2.5%.

The figure for Antiporda was only 1.6%. The low rate seems to reflect poorer living conditions in the village compared with other villages where rainfed rice farming is conducted.

3. Population growth does not always prompt increase in households directly. Unless increase in population is supported by necessary living conditions, outflows of people will result and those of households are likely to rise. If conditions are favorable, the capacity to support population is great and inflow of households will push up the total number of households together with their natural increase.

In Minanga Norte, households increased from 136 in 1977 to 170 in 1982, which represents a gain of 1.25 times. In Antiporda, there was an increase in households from 101 to 108 from 1975 to 1982.

4. The existence of employment opportunities within the scope of commutation is necessary for the maintenance, formation and support of these villages. The town of Iguig is about 20 km. from Tuguegarao. The provincial capital is 20 minutes ride by jeepney costing 2.5 pesos. However, the members of 34 non-farming families in Minanga Norte were all employed within the town's boundaries.

Farming households in Minanga Norte increased from 101 in 1977 to 109 in 1982. As the increase of the total households was faster, the ratio of farming families declined from 74% to 64% during the previous years. On the other hand, landless agricultural worker households showed an increase from 10 to 29 and their share grew from 7% to 17%. These workers make a living by helping neighboring farmers, thus they may be included in the category of farming households. When these families are added, the percentage of farming households remain 80% these years. The share of farmers' families

in Antiporda, including the landless workers is 88%.

5. As population increases and the number of households relying on agriculture grows, cultivated land is geared toward expansion. As noted earlier, the total area of rainfed and upland cultivated by Minanga Norte farmers was about 160 hectare and remained virtually the same. Thus, it was considered that population pressure upon land rose rapidly.

The study of cultivated land in Minanga Norte also revealed that farmers in the village own a similar acreage of upland to rainfed rice fields in which corn is the main crop. For these farmers, upland farming is a source of income during the dry season.

The dry season is the off season for rice farmers and also a means of hedging the risk of fluctuations in the yield of rice. Antiporda depends only on rainfed rice farming.

6. When cultivated land does not expand in spite of increase in the numbers of farm households dependent upon agriculture, competitions for obtaining the right of cultivation among these families become gradually serious. In a village where rainfed rice farming prevailed, land price was generally low due to low productivity. In addition, farm land was divided into small lots because of the equal inheritance system. However, in recent years, the basis of production has been improved and the possibility of a higher productivity has emerged. Consequently, there has been an increasingly strong tendency toward social competitions which were completely different phenomena from land situation in the past characterized by mere selling and buying and equal lot inheritance.

As previously discussed in the section that deals with changes in land tenure system in Minanga Norte, there

were great changes observed among LEA and OLEA farmers in classes and their composition. For instance, the numbers of LEA farmers increased from 5 in 1977 to 7 in 1982. Of the five farmers in 1977, four remained to be owner cultivator, while the other one left the village. A part-owner became an owner cultivator and this farmer probably assigned his tenancy rights to another farmer for some reasons. Two of the seven owner cultivators in 1982 came from other villages. These cases were noteworthy examples of many similar instances.

7. What happened to those farming households which were defeated in competitions for the right to cultivations? Their fate was evidently shown by the example of Minanga Norte where the households of landless agricultural workers increased from 10 in 1977 to 29 in 1982. These households which failed to obtain the right to cultivation (or tenancy rights) work with other farmers' rice land to earn their daily wage. These families they worked with reside in the areas where irrigation conditions were good and rice was harvested twice-a-year. It was reported that in some villages, these workers account for as much as 40% of the total population.

In Antiporda, it was confirmed that as of 1982, fifteen households (14% of the total households) were without farm lands. But this village has somewhat different situation from that of Minanga Norte. There were cases where the former owner-cultivators became landless workers because their children left the village and they had no heir as a cultivator, or because of the death of the head of a family.

8. As clearly indicated by the difference in the yield of unhulled rice between LEA and OLEA farmers, income gaps between the two were expected to widen gradually. But the whole village society has built a customary mechanism of economy which functions to minimize sudden expansion in income gaps and resultant frictions.

Farming villages in the Philippines has 60% to 80% of the total working hours (about 100 work days per hectare) is covered by employed workers. There is a great difference from rice cultivation in Japan where family workers provide principal labor. Several reasons can be considered for the establishment of such social custom in Philippine villages dependent upon hired labor force

First, the natural conditions of the country allow farmers to plant rice at any time of the year if water is sufficient. Secondly, there is an economic condition such as great difference in yield among individual farmers and farmers need to help one another in rice growing to disperse risks involved. And the third, is a social reason which is the traditional share tenancy system. It means that an increase in yield is not always reflected on the income of tenant. These and other factors were combined to create a social custom based on "share economy".

An example in which a farmer who is helped by another farmer in harvesting. The other farmer helps in return the other farmer in harvesting work. Both of these workers are given their share of the harvest as an payment in kind.

The surveys confirmed the fact that the above custom still prevail even in rainfed villages.

9. As noted above, differences in the yield of unhulled rice between LEA and OLEA farmers became greater. But the gross return of LEA farmers involves more expensive irrigation costs (3 cavans of unhulled rice per hectare for gravity irrigation vs. 6 cavans per hectare for pump irrigation). There is a need to use higher farm inputs such as fertilizer and agricultural chemicals which result to bigger expenses. For this reason, the traditional share of harvests give too much burden to the employer-farmer. Reduction in the share of harvests for workers will help lighten these burden. As in the case of Misanga Norte,

the ratio of share for LEA was gradually reduced to 1:7 compared to the ratio of 1:6 for OLEA. In Antiporda too, measures were taken to decrease the ratio from the current 1:5 to 1:6.

Reduction in the share of harvests is gradually introduced in consideration with the level of yield, costs involved, the number of employed workers for harvesting practice and other factors. These surveys have not verified however the process of establishing such reduction.

10. These surveys verified the above-mentioned developments process following the introduction of improved technologies for growing rice.

As previously discussed, infrastructure have not been completed on a sufficient level. However, 62 farmers were having a total land of 52 ha. in the town of Iguig and 20 farmers with a combined land of 42 ha. in the town of Buguey were settled by APC. They have learned and mastered improved techniques, which suggest that the introduction of these new farming technology has given a great impact to these traditional villages.

Land Reform and introduction of improved rice technology represent two big factors for developing village society in the Philippines. In view of the present situation of villages in the Province of Cagayan, more time is needed for land reform, improvement of irrigation facilities and dissemination of improved technology play an important role for the time being. Continuous surveys and observations are required for future developments. In the succeeding portions, the social viewpoint of farmers in the two villages on APC's activities will be discussed.

III. SOCIAL IMPACT OF TECHNOLOGY DIFFUSION

The survey conducted in the village of Hinanga Norte has obtained detailed data concerning the composition of households, the situation of farmers' learning activities,

etc. It was beyond doubt that these factors have a close relation with the trend toward higher productivity in agriculture since the survey period involved only five years from 1977. It was difficult to find some meaningful link between these elements and the extension activities by APC.

In this connection, the strategy has been changed by asking farmers their views and attitudes as to APC's extension activities. Although answers to this type of questions has been changed according to the presentation of questions to the respondents, a rough sketch of the situation was obtained.

First of all, the researchers presented each of the farming households with the question: "Do you think that APC's activities contributed to improvement in your family"? (Table 1). Sixty percent (60%) of the residents replied, "They contributed". Forty-eight (48) of the 97 households answered, "Our productivity was raised," followed by those which responded, "Our irrigation conditions were improved" and "Measures were taken to introduce new techniques". An overwhelmingly greater part of these answers were from LEA farmers who were directly affected by APC's activities.

On the other hand, 31 households replied, "Our employment opportunities increased". These opportunities include direct employment by APC and increase in employment for farm practices as a result of the introduction of double cropping technology. This answer was heard more from households other than LEA. It is considered that while the former replied valued direct effects of APC's activities, the latter appreciated their indirect impacts.

A quarter of the total households answered, "It does not seem to us that APC's activities were especially helpful to our family". The fact that 30 of the 108 farm households expressed this type of view suggests a sense of opposition generated between LEA farmers who received the top

Table 1. APC Projects Contribution to the Improvement of the Conditions of Households at Minanga Norte

Items	LEA ^{a)}	OLEA ^{b)}	LAW ^{c)}	NF ^{d)}	Total	%
1. Have any of the APC projects contributed to the improvement of the conditions of your:						
a) Household?						
<u>Yes</u>						
1. Increase production	24	12	5	7	48	-
2. Job opportunity	1	14	5	11	31	-
3. Irrigation	8	-	-	-	8	-
4. Modern techniques	5	-	-	-	5	-
5. Others	-	-	5	-	5	-
Sub-total	38	26	15	18	97	57
<u>No</u>						
1. Not affected	-	14	-	2	16	-
2. No irrigation water	-	16	-	2	18	-
3. No beneficiary	-	-	6	-	6	-
4. Others	-	-	-	2	2	-
Sub-total	-	30	6	6	42	25
n.a.	-	15	8	8	31	18
Total	38	71	29	32	170	100

a) Leading Extension Area farmers

b) Outside Leading Extension Area farmers

c) Landless Agricultural Workers

d) Non-farmers

n.a. No answer

benefits of APC's activities and other farmers. This is a problem to be considered in future activities. However, one-fifth of the entire households surveyed reserved their reply.

On the question, "Do you think that APC's activities contributed to improvement in your village"? Half of the households replied, "We think they contributed to our village". (Table 2). Majority of these respondents emphasized growth in production and increase in employment opportunities. Ten percent (10%) of those surveyed responded that they don't think APC's activities contributed to their village. The remaining 40% avoided answering directly. Based on these replies, views on APC's activities differed greatly between LEA farmers and other households.

More concrete questions were asked like, "In what respect do you think did APC's activities have meaning"? Most households pointed out, "increase in employment opportunities". A fairly clear difference was observed between LEA farmers and other families who replied, "increase in production". This tendency was also seen as to the meaning of APC's activities to the entire village. Sixty percent (60%) of the total respondents valued "increase in employment, improvement in living conditions, and rise in production". About 40% did not answer.

This question was probably confusing with the first one by some respondents, but their answer expressed the frank opinions of farmers and residents. In short, the villagers showed earnest desire for irrigation water and employment opportunities. For residents in a rainfed village, it was a matter of life or death to secure agricultural water. This question for instance, "What happened to the yield of unhulled rice as a result of introduction of irrigation water in your opinion"? Sixty percent (60%) of the total households surveyed answered, "We think the yield increased" (Table 3).

Table 2. APC Projects Contribution to the Improvement of the Conditions of the Community of Minanga Norte

Items	LEA	OLEA	LAW	NP	Total	%
b) Community?						
<u>Yes</u>						
1. Increase production	17	3	10	-	30	-
2. Employment opportunity	6	8	5	6	25	-
3. Improvement of road	2	8	-	1	11	-
4. Uplift of living condition	3	2	2	3	10	-
5. Others	2	7	-	-	9	-
Sub-total	30	28	17	10	85	50
<u>No</u>						
1. Not aware	-	6	9	-	15	-
2. Not affected	-	2	-	-	2	-
3. Others	-	1	-	-	1	-
Sub-total	-	9	9	-	18	11
n.a.	8	34	3	22	67	39
Total	38	71	29	32	170	100

n.a. no answer

Table 3. Assessment of Rice Production with the Introduction of Irrigation Water and Income of Minanga Norte Farmer in Pilot Farm since its Establishment in 1978

Items	LEA	OLEA	LAW	NF	Total	%
2. How do you assess rice production in the farm with the introduction of irrigation water?						
Increase	26	23	29	21	99	58
Why?						
1. Improvement of irrigation facility	13	9	13	6	41	-
2. Introduction of modern farm techniques	4	11	9	8	32	-
3. Plant rice twice a year	4	3	7	7	21	-
4. Others	5	-	-	-	5	-
Sub-total	26	23	29	21	99	58
n.a.	12	48	-	11	71	42
Total	38	71	29	32	170	100
3. How would you assess the income of the farmer within pilot farm since it was established in 1978?						
Increase	31	26	29	28	114	67
Why?						
1. Better production	6	16	-	11	33	-
2. Sufficient water	7	6	15	1	29	-
3. Modern technology	5	-	14	3	22	-
4. Double cropping	7	2	-	9	18	-
5. Others	6	2	-	4	12	-
Sub-total	31	26	-	28	114	67
n.a.	7	45	-	4	56	33
Total	38	71	29	32	170	100

n.a. no answer

Most respondents said that the principal factor in the increase of production is "improvement of irrigation facilities", followed by those who replied, "introduction of improved techniques" and "double crops". The introduction of techniques seemed to have been dwarfed by that of irrigation, but this fact indicated great expectations among farmers.

Finally, when farmers were asked, "How do you assess your income change as a result of establishment of the pilot farms"? Seventy percent (70%) of the respondents stated that they think their income increased. Even though there were changes in economic situation behind their income growth, it cannot be concluded that their income gains were entirely the effect of establishment of APC. However, majority of respondents attribute their increased income through stable water supply and double cropping technology.

As mentioned earlier, responses to these sorts of questions were subjected to change according to the way the questions were presented. But on the whole it can be considered that the establishment of APC and its activities gave a strong impact to the development of these villages.

On the other hand, it was not long since the pilot farms were built in Antiporda, Buguey. Because of this, reaction of villagers regarding these projects has not been known yet. For example, one-third of the 80 farm households answered, "We have adopted improved technologies". Many of these households mentioned that they can carry out land preparation work on their rice fields using power tillers. Their use of improved varieties and fertilizers were basis of their previous answer. They also stated that they learned their techniques from extension staff mainly those from APC. These answers mean that farmers in Antiporda have taken a step toward agricultural development. With these, APC's pilot farms and technical guidance play a great role.

IV. FUTURE PROBLEMS

As previously discussed, the establishment of APC and its extension activities have given a variety of socio-economic effects to rice farmers in the sample villages. However, there were a lot of unsolved problems and matters left to future measures. In the following section, questions considered to be more important will be dealt with:

1. As shown in Figure 1 the yield of unhulled rice of LEA farmers for five years since the initiation of APC was changed. This figure indicates clearly that even LEA farmers find it difficult to ensure a stable yield of rice. Take the pilot farm of Iguig, it was found out that the target of 3.5 tons per hectare has been almost attained in the farm. The crop of rice during the dry season in 1981 and 1982 was 3 tons per hectare (60 cavans). Incidentally, the target of the Masagana 99 food production program is 99 cavans per hectare.

Such unstable yield of rice arises because of the inability of LEA farmers to ensure sufficient water supply. Another reason is the fact that farmers in Minanga Norte have a low technical level of irrigated rice farming. This is because they are traditionally engaged to both rainfed and upland cultivation.

Figure 1 shows changes in irrigated area indicating the decline in acreage for the reason that the pumps did not operate smoothly. This suggests that the pilot farms have not yet been completed as "show windows" of improved rice technology. The fact that the Iguig Pumping Station and other irrigation facilities were not yet completed posed a big problem. This should be considered before efforts to disseminate advanced techniques are made. Measures to solve this problem must be given a top priority.

2. It should be pointed out, too, that from the viewpoint of villages concerned, the problem of irrigation presents farmers with serious questions in a different sense related to agri-

cultural policies. This originates from the fluctuation in the supply and demand situation of rice in the Philippines that occurred between the 1970's and 1980's. The country's rice production has been approaching a balance between supply and demand and the yield of rice has been stabilized in the granaries in Central Luzon and Southern Tagalog regions. As a consequence, optimistic views about rice growing are gaining stronger ground. This is true at least on the village level. As rice production is being stabilized, the pace of improving irrigation facilities becomes slower especially in areas in which development has been delayed.

This fact gives considerable impact to the farmers in the province of Cagayan who have improved irrigation facilities and have begun to grasp a clue of development of their village. Large pumps consume a great deal of electricity, so investment benefits on irrigation are high and rice cultivation costs will become a controversy in the future. In a village where rainfed condition had long been in a bare state, it will take a long time that the effect of development is felt on the whole. In this case, it must be remembered that the primary theme is to increase the productivity of rice.

3. One major barrier in the development of these villages is land owner systems. As observed in the two villages surveyed, Land Reform has not been so effective. Majority of the farmers in these villages still stick to share tenancy. Farmers themselves hesitate to become an owner cultivator because of the character of "compromising farmers". Unless measures to shift farmers to leaseholders are taken, increase in income will not become an incentive to produce more rice.

The shift to the leasehold rental system is especially emphasized here because it will be more difficult to assess a fixed rental rate when irrigation facilities are completed and the yield of unhulled rice will increase. In Minanga

Norte, a fixed rental rate was determined in the second half of the 1970's. But this rate was based on rainfed rice fields. As there has been a possibility of higher rental rate in irrigated rice farming. Land Reform may place small farmers in a difficult position.

4. In the previous three paragraphs, principal problems involved in APC's activities in the two villages are considered. Here, matters which APC can deal with will be discussed.

As indicated by the cost return analysis, an evident difference began to emerge between the profitability of LEA farmers and that of OLEA farmers in Minanga Norte. Among LEA farmers, substantial differences in income appeared among owners, part-owners and tenants. The economic situation of OLEA farmers was almost as poor as that of farmers in Antipoda. In the past, these villages in which productivity had been low and stagnant created a balance state in accordance with their stage of development. Emergence from such traditional society is beginning now. If the pace of shift is too fast, social frictions will naturally be caused between the beneficiaries and non-beneficiaries of APC's projects.

To avoid these frictions, specific proposal should be made to accelerate expansion in irrigated areas as early as possible and include OLEA farmers in the dissemination of projects of techniques rather than limit it to farmer-beneficiaries in the pilot farms. OLEA farmers proposed this to their answers to the questionnaire. The majority of farmers in the villages are under the same cultivation conditions as those five years ago. As the role of APC becomes more important the more indispensable the above strategy is.

5. In the dissemination of improved cultivation techniques, the following matters should be considered:

First is the importance of drainage facilities. While irrigation is treated with much importance, drainage tends to be neglected.

Secondly, a higher yield of unhulled rice is not always guaranteed by irrigation. Improvement of fertilization techniques, land and soil conditions should become an important theme of study. Researches on these factors are not yet sufficient.

Thirdly, in connection with the second factor, there is the need to stimulate farmers' interest in the provision of organic substances to soil, in addition to efforts to improve fertilization techniques. The continuation of twice-a-year rice growing, the study of soil capacity is important.

Fourthly, farmers' interest should be stimulated in the techniques of controlling plant diseases and harmful insects. At present, rice fields of twice-a-year crops are not very great and stemborers is the only major harmful insect. When the same variety of rice is planted on a wider area all year round, plant diseases and harmful insects will become the primary problem. Considering this, there is a need to begin collecting data on this situation.

Finally, in connection with the improvement of agricultural tools, most farmers do not own even a rotary weeder even though they are highly interested in the use of herbicide. APC's technical guidance puts too much emphasis on saving of land and capital and on labor-intensive techniques. Considering this factor, the use of weeding by hand and hand-driven weeders should not be overlooked. Needless to say, this step-by-step effort to spread techniques has a very important meaning in the long run.

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あ と が き

2つの調査報告をとおして、1977年以降続けられた農業パイロット・センター(APC)による農業技術普及事業が、伝統的な天水田農家や農村にどのような社会経済効果を及ぼしているかについて、比較考察を進めてきた。調査結果は、「第1報告」の「要約」と「結論」に、また「第2報告」では「調査結果の比較考察」と「おわりに」の2章に、それぞれ今後の検討課題を含めて整理されているので、ここでは特に全体の要約には触れないこととする。

調査結果が示すように、地域開発あるいは農村振興計画から離れていたカガヤン州にAPCが設立され、日本からの普及指導や研究資機材供与がなされた効果は大きかった。最も端的な生産指標である初米収量1つをみても、水利条件が整備された指導普及地区(LEA)では、比較的早い段階に目標水準の3.5 t/haを達成している。こうした生産力増強の動きは、それだけをとっても天水田農業に大きな衝撃となった。その一連の波及効果については、既にみてきたとおりである。

しかし報告書で述べた普及効果は、CIADP(カガヤン総合農業開発プロジェクト)からみてごく限られた区域に起きた変化を捉えたものである。推計では、カガヤン州における2期作田として開発可能な天水田は、12,000とも14,000haともみられている。APCが4つのパイロット・ファームで稲作の近代技術を普及・教示した面積(LEA)は200ha余りで、全体の1.5%程度にあたる。初期の社会経済効果が近隣農村では大きかったとしても、今後より広域でこれがどう展開してゆくかについての見通しは、必ずしもはっきりしたものではない。国レベルでの米需給バランスの動向、農地改革の進捗状況、灌漑施設整備の進み具合というハードの面や、農家の技術水準をソフトの面で高める教育・研修に課された問題は、多様でありかつ多岐にわたる。

次に、APCの組織活動に目を移そう。APCは、83年8月に最新式の機材を備えた本格的な実験棟が完成し、北部ルソンを代表する試験・普及機関としての機能も強化されてきた。国際協力事業団から公刊された報告書を刊行順に拝読すると、関係者の方々が問題に直面されその解決に尽力された様子を伺うことができるが、創設当初の困難な事情からすれば格段の成長といってよいだろう。それだけに、今後期待される面もまた当然大きくなる。内部の拡充もその一つである。

特に技術協力という視点に立つと、例えば邦人専門家と共に試験研究に携わり専門領域を深めた人や、日本でも研修を受け視野を広げる機会を得た人が、その後APCにとどまり後進に技術や知識の伝達を図るというシステムが確立されていない点も、改善を要すポイントといえる。本報告の社会経済調査にも参加し、天水田農村の複雑な社会組織に知見を得た調査員の幾人かは、集計作業の最終結果を待たず転職を余儀なくされた。身分が不安定なために、実際に

応用試験や普及活動にあたる人の層が一向に厚くならないという問題は、技術協力に携わる者からみても惜しい問題である。技術協力がなかなか直接的な効果を持ちえない一因は、こうしたところにもあることを付言しておきたい。

最後になるが、技術協力に関与する例も、これから技術を受け入れようとする農家や農村に普遍的な価値観というものに、今後は一層強く深い関心を向けてゆかなければならないだろう。敬謙な宗教観、村社会に根付いた生活観は、経済力では低位としてもそれに相応した安定的な社会を形造っている。急速な技術浸透が、指導普及の受益者であるL E A農家と、そこからはずれたO L E A農家との経済的格差を浮きだたせ始めており、村内では新たな社会的摩擦要因となりつつある。

技術協力をとおしてなされる技術移転は、それを受け入れる社会のありようと密接に関連している。カガヤンに代表される農民の価値観は、マイノリティ(minority)と呼ばれるイバナグ、イタウェスの少数グループが、イロカノやバンパンガ系のグループと混住することから、同じフィリピンでも中部ルソンのそれとはさまざまな点で異なるといっている。この地で特に強く感じる「自分だけ得をすることへの恥じらい(hiya)」に裏打ちされた仲間意識は、他方で新しい生産基盤の上で格作の改善をし初米収量を伸ばそうとする気持ちと相半ばする。そうした農民の必理は、ごく限られた数のL E A農家に対しておだやかではないだろう。

こうした点も念頭に置いて、今後はL E A農家の経営改善だけにとどまらず、指導普及によって引き起こされる社会問題に、O L E A農家や土地なし労働者階層、非農家も含め広く目を配る必要がある。インフラストラクチャーと、それに依拠するスーパーストラクチャーの両者に介在する技術普及上の問題という視点から、CIADPやA P Cに提言できる点も少なくない。

報告書の「まえがき」と英文報告の「謝辞」で紹介した方々以外にも、本稿のとりまとめにあたって数多くの助力をあおいだ。現在も長期派遣専門家としてA P C駐在中の小林博則氏(農業機械担当)、堀越仁志氏(栽培担当)、既に帰国された越智博孝氏、堀端俊造氏には、カガヤンでの経験に基づき特に貴重な助言をいただいた。また、国際協力事業団農業開発協力部農業技術協力課および同事業団マニラ事務所の関係各位には、再度にわたる渡航で筆舌につくせぬお世話をいただいた。さらに、国内報告検討会等をおし有意義なご意見を寄せられた外務省経済協力局技術協力2課、国際農林業協力協会、農林水産省経済局国際部国際協力課、農林水産技術会議事務局総務課の関係者の方々へ厚くお礼申しあげる。

農 林 水 産 省

熱帯農業研究センター研究第1部

諸 岡 慶 昇

付. 調査村の景観 一写真一

第1部 イギッグ町ミナガ・ノルテ村

1-1 農業パイロット・センター (APC) と試験農場

国道沿いの試験農場からみたAPC全景。右後方白い屋根の建物が本館、左後方レンガ色の建物が83年8月に落成した実験棟。壁が厚く雨期が近いが、水利条件に恵まれているため試験農場ではIR-36の実験が進行中である。

1-2 「カルバリーの丘」(1-3参照)よりミナガ・ノルテ村近郊を望む

左後方をカガヤン河が蛇行する。雨期作(天水田)の耕起作業が写されているが、緑色にはえる水田は、稲ではなく雑草である。

1-3 聖地カルバリーの丘

キリスト復活までの13シーンを等身大の像で再現した丘。中心街にあるドミニコ会系の教会に隣接し、憩いの場となっている。

1-4 毎週木曜日と日曜に開設される市場

早朝6時には開設され、日用品をとことろ狭しと並べた市場は、町や近くの村からでかけてきた人々で賑わう。

1-5 代表的な農家の全景(3戸)

高床式で壁に竹材を用いたニッパ・ハウス。日中は、強い日差しをさけ採光としている。

1-6 天水田敷地の耕起作業

カラバオと犁に注目。この農家はトウモロコシを播種したが、雨量が少なかつたため発芽後枯死した。

1-7 代かきと田植え作業

天水田の田植作業のシーンであるが、後方ではカラバオによる代かき作業がなされている。

1-8 トウモロコシとムング・ビーン(緑豆)の間作

多毛作の1つの試みとして畑作にとり入れられている間作。APCでも試験データの積み上げがなされており、農家でも比較的広範に採用されている。

1-9 村の交通手段「カレッサ」

馬車とトライシクル(オートバイ客車を取りつけたサイド・カー)は、村の2大交通手段である。

1-10 農家の庭先にあるハロハロ・ガーデン

農家の庭先には、副食用の野菜を栽培する自家菜園がある。さまざまな野菜が植えられることから「ハロハロ」と呼ばれる。

1-11 水ガメがすえられた天水田農家

天水田農家の住居には、生活用水を確保するため、軒先に水ガメがそなえつけられている。

1-12 魚網をつくろう村人

カガヤン河は魚貝類の漁場でもある。村内には漁業を主業とする世帯もあり、昼下がりのひとときとらしたシーンとでありことがある。

I-13 生活改善と婦人学級

農家の主婦が自主的に始めた婦人学級は、不定期でテーマもわもわもいであるが、この時は英語の学習を兼ねて「村の共同生活」の勉強会ももたれた。

I-14 結婚披露宴

新婦の実家の庭先で行なわれた結婚披露宴のダンス・パーティー。会場には新婦の友人(女性)が参席し、1曲ダンスを所望することに男性は献金する習わしになっている。ミナガ・スール村の小作農と結ばれた花嫁(中央髪飾りの女性)は、これを新婚生活にむける当面の資金とした。

I-15 イサベラ河に建設中のマガット・ダム

カガヤン河支流のマガット河に建設中の多目的ダム。このダムの発電が本格化すれば、APC各パイロット・ファームおよびCIADP全域に水稻2期作が普及すると期待されている。

第II部 ブゲイ町アンティボルダ村

II-1 NIAカマラニューガン支所

国道と、ブゲイ町へ向う州道の分岐点にあるカマラニューガン町の国家灌漑局(NIA)支所。ここには、APCのローア・カガヤン事務所もわかれており、水利および稲作技術指導の要所となっている。

II-2 ブゲイ町町役場

海に面したブゲイ町北端にある町役場。現在、ブゲイ町30村がこの統括下にある。なか、右端の1校は、農業省の普及事務所にあてられている。

II-3 カマラニューガン町の市場

ブゲイ町役場前にも魚貝類を中心とした市場があるが、アンティボルダ村の人々は、過半がこのカマラニューガン町の市場を利用する。市場は、毎日開設されている。

II-4 村を横切る州道

現在は拡張舗装工事が進められているが、82年の調査当時は砂埃がまみり道路であった。州道に沿って電線がひかれている。

II-5 OLEA農家の住まい

ミナガ・ノルテ村と同様、軒下に大小さまざまな水ガメがわかれている。

II-6 苗床の整地作業

天水田農家の苗床は、概ねこのようなやり方で作業が進められる。

II-7 苗代

雨期の到来を察知して育苗作業にかかるが、降雨量が充分でない場合は田植え作業が遅滞するため、育苗床はこのままの状態で放置されることが少なくない。

II-8 耕耘作業

田植え作業が近くなると、耕起した天水田の耕耘(または代かき)作業が始まる。OLEA農家。

II-9 天水田で生育中の稲

この村では、除草作業をみかけることができない。水田にはびこった雑草は、収穫作業までそのままの状態に放置される。手除草には余り関心を示さない。

II-10 収穫・脱穀道具

収穫労働で使用される道具一式。格子状の台は、収穫した稲を打ちつけて籾米を脱穀させる脱穀用具。折りたたみ式となっており、工夫がうかがえる。手前のひも付き棒は、脱穀の際、稲束を固定するもの。ざらば風選作業用で、数本の竹の棒は籾米の飛散を抑えるために設ける防護網の支柱に使用される。

II-11 脱穀作業風景

脱穀作業に精を出す土均なし農業労働者の若夫婦。この日、収穫量の5分の1を、日当として現物で持ち帰った。

II-12 土均なし労働者の住居

7人の子供とともに自宅の前に立った土均なし労働者の主婦と知人。この夫人は、不慮の事故で主人を亡くし、小作農からこの落着へ変わった。

II-13 ガンタ升

籾米秤量用の升。大升4回、小升25回で1カバン(50kg)となる。

II-14 糞肥法についての検討会

IBA農家の前で、作務が近づく、糞作者を集めAPC職員が中心となって糞肥量検討会が実施される。肥料を購入できない農民のため、多方面から対策が検討される。

II-15 小学校の教室

共同作業で建てられた小学生低学年用の教室。高学年は、フーラ村の学校へ通う。

Photograph for Part I

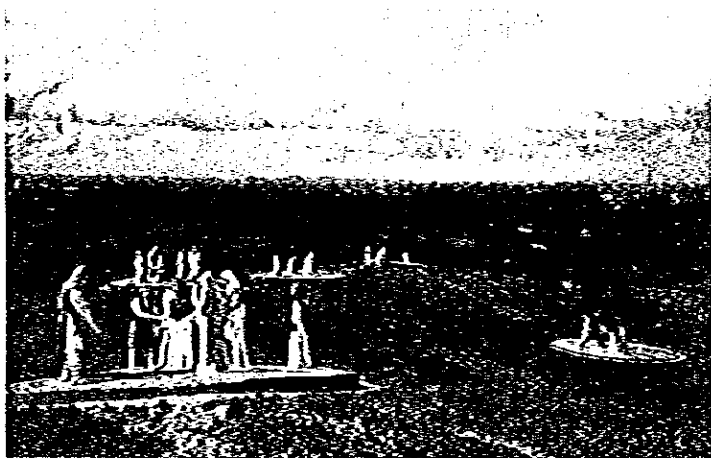
Minanga Norte, Iguig, Cagayan, 1982/83
(Photo by Y. Morooka)



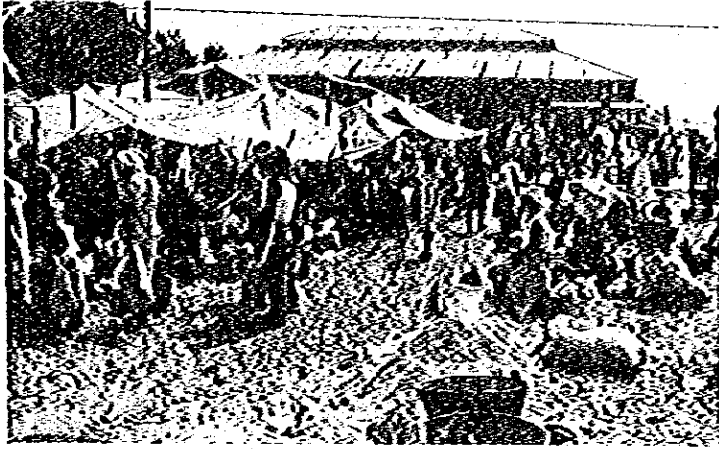
1 - 1 Agricultural Pilot Center (APC) and its experimental field



1 - 2 Rainfed area along Cagayan river traversing near Minanga norte



1 - 3 Calvary hill, a holy and symbolic place for villagers



1 - 4 Market Day is every Thursday and Sunday mornings at the town proper of Iguig



1 - 5 Farmers' houses with cogon and/or nipa roofs



1 - 6 Plowing practices with the use of carabao



1 - 7 Harrowing and transplanting practices in rainfed area



1 - 8 Corn with intercrop (mung bean) in upland area



1 - 9 Kolesa, a typical vehicle for commuting to and from outside village



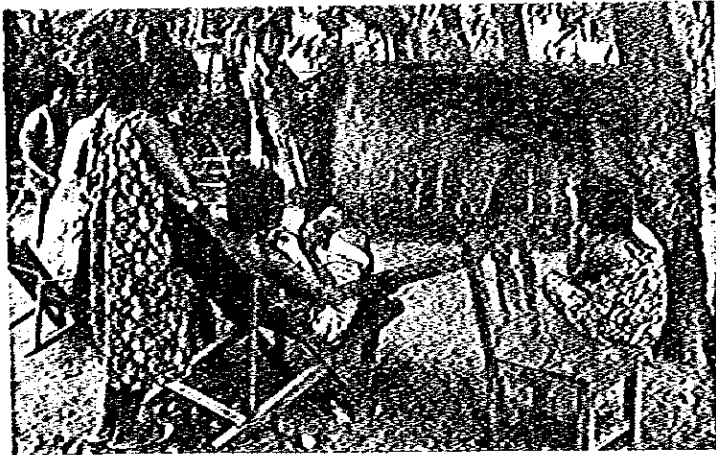
I - 10 Backyard (*halo-halo*) garden for growing various kinds of vegetable



I - 11 Residence with water tanks for stocking rainfall



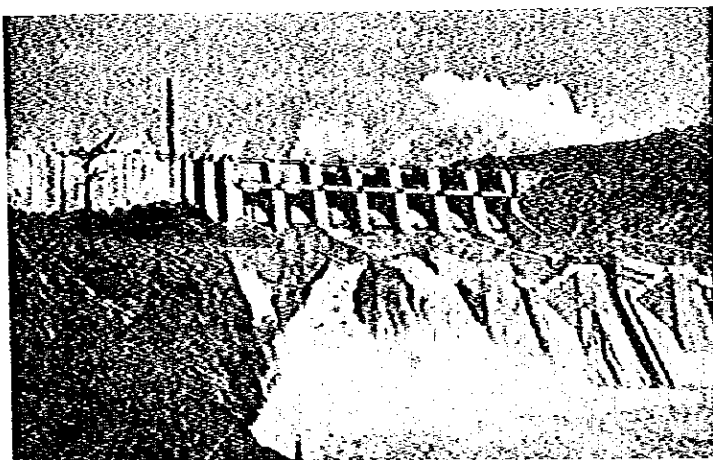
I - 12 Repairing fish net for catching fishes at Cagayan River



1 - 13 Group studying of women on rural communication inside the village



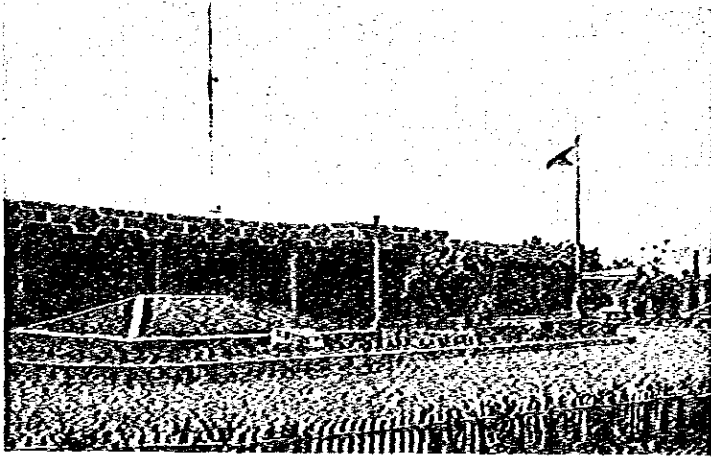
1 - 14 Wedding party at the bride's house garden



1 - 15 Construction of Magat dam, Isabela province

Photograph for Part II

Antiporda, Buguey, Cagayan, 1982/83
(Photo by Y. Morooka)



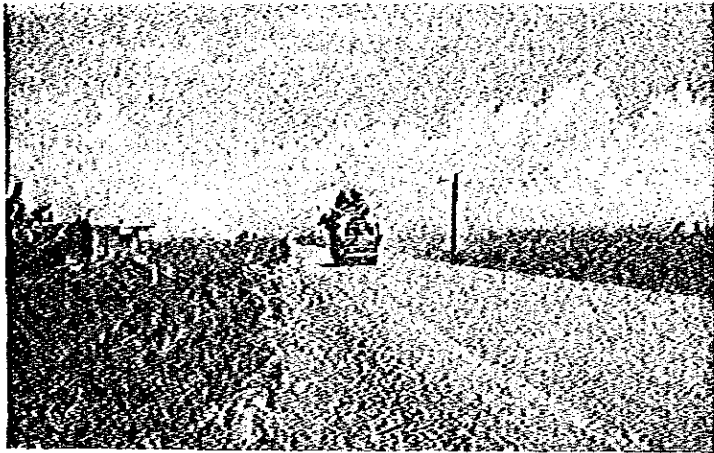
II - 1 National Irrigation Administration (NIA)
Camalaniugan Office



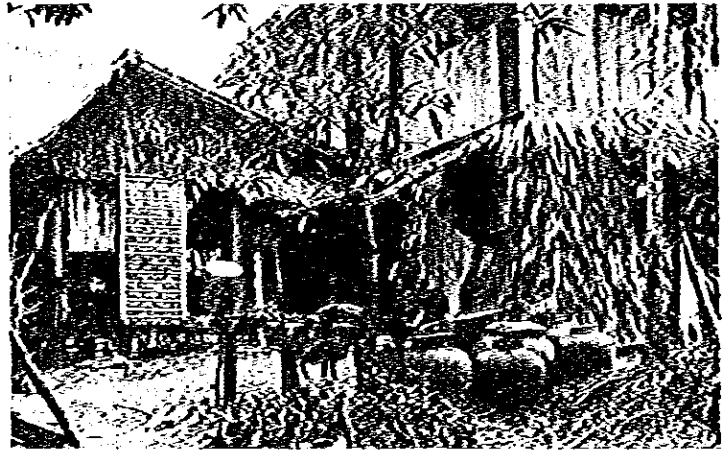
II - 2 Buguey Municipality Office



II - 3 Market at Camalaniugan



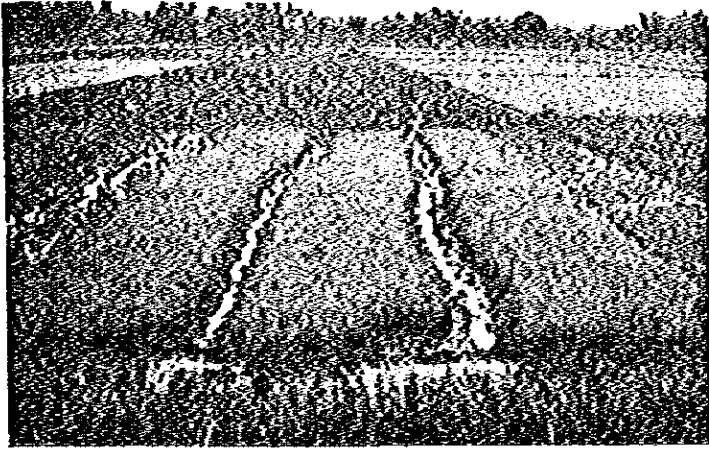
B - 4 Provincial road at the front of Antipoda village



B - 5 Farmer's house equipped with water tanks



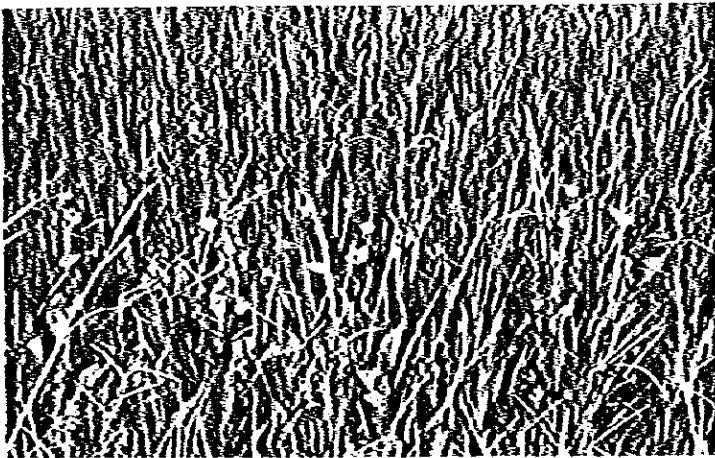
B - 6 Nursery bed preparation



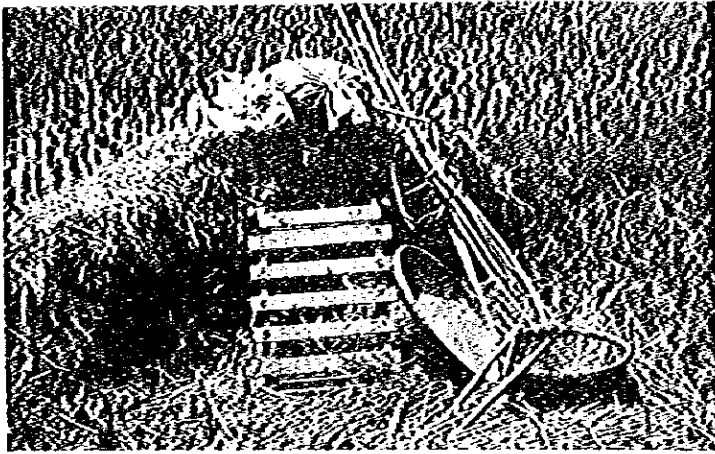
II - 7 Nursery bed



II - 8 Harrowing with *carabao*



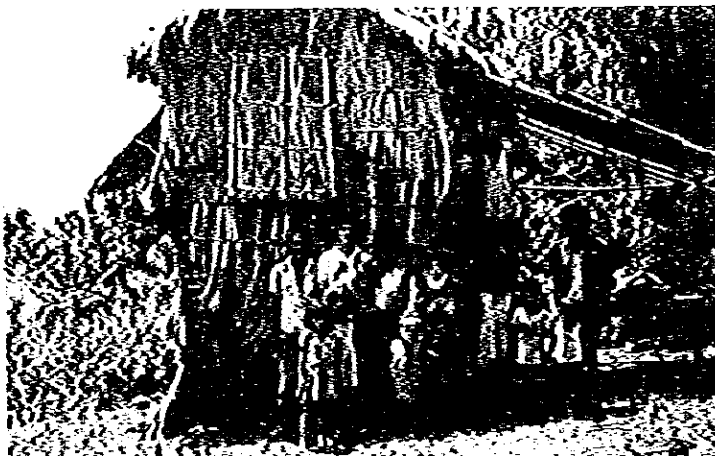
II - 9 Paddy field without weeding control



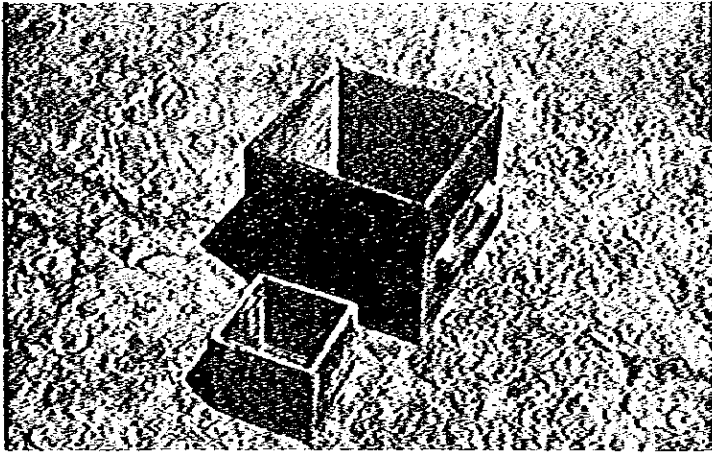
II - 10 Harvesting equipments (portable type *hampasan*, bamboo basket for winowing and others)



II - 11 Young couple who are threshing *palay* with *hampasan*



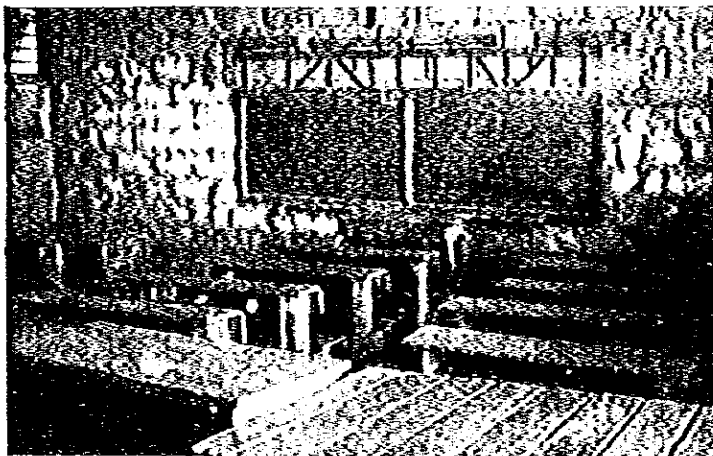
II - 12 Landless worker's family at the front of their *nipa* house



II - 13 Two types of *ganta* measure for measuring the amount of *paddy*



II - 14 Meeting with APC staffs on fertilizer recommendation at pilot farmer's house



II - 15 Class room inside the primary school constructed by villagers

JICA