

# **SOCIO-ECONOMIC ASPECTS OF TECHNOLOGICAL CHANGE IN COCONUT FARMING: THE CASE OF THE NATIONAL COCONUT PLANTING/REPLANTING PROGRAM**

Myrna M. Avila, Buenaventura B. Dargantes and Alana M. Abarca

Assistant Professor, Science Research Specialist and Research Assistant, Center for Social Research in Small Farmer Development, Visayas State College of Agriculture, Baybay, Leyte, Philippines.

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## **ABSTRACT**

The beneficiaries of the National Coconut Planting/Replanting Program (NCP/RP) had been recipients of the program for 5 to 6 years. Their average project farm size was 1.05 hectares mostly located on flat terrain about 3 kilometers from the recipients' residence. Majority of these farms were still unproductive at the time of the interview. However, those with productive farms were able to harvest an average of 172 kilograms per hectare of copra in 1986. Technical support services were sought from the technicians of the Philippine Coconut Authority (PCA) and the Department of Agriculture (DA).

Staking and layouting were found to have an average adoption score of 96 percent. With only 20 percent of the farms productive, the beneficiaries generally assessed the project as unable to help them improve their living conditions. The project even became an added burden, particularly to the tenants, because of the capital inputs required to maintain the farm.

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**KEY WORDS:** Coconut farming. Program recipients. Coconut production practices. Project farms.

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## **INTRODUCTION**

The Philippines enjoys a prominent position in the world's coconut production, but its coconut industry is afflicted with a number of major problems. For one, productivity per tree is among the lowest in the world



with an average yield of about 38 nuts per tree per year compared to a potential of 100 nuts. In Eastern Visayas alone, the average annual production per hectare is 3,968 nuts or an average annual copra production of 882 kilograms per hectare (COCOFED Report, 1984). Moreover, coconut oil's main competitors, like soybean and palm oil are fast improving their market shares resulting in the fluctuation of copra price. The poor domestic marketing system, low productivity because of inadequate production practices, limited technology, poor varieties grown and consequently, low income of coconut farmers all add up to the problems of the coconut industry.

Realizing all these, the government has geared its efforts to generate technologies that suit the needs of the coconut-based farmers. Hence, coconut-based programs like the coconut planting and replanting program with packaged technologies were conceived.

Recommended technological innovations in coconut farming such as triangular and square planting methods, layouting, spacing, thinning, replanting of missing hills, weeding, covercropping, grazing, cultivation, fertilization, mechanical and chemical pest control were introduced to coconut farmers to improve their farming.

Technologies, however promising, need further studies especially in terms of adaptability and accessibility to the farmers. It carries with it the question of appropriateness, i.e., the development of economically viable and socially acceptable innovations. Here lies the importance of the present socio-economic assessment study.

The study aimed to describe the demographic characteristics of the beneficiaries of the National Coconut Planting/Replanting Program (NCP/RP); identify existing recommended coconut production practices; identify existing resources and services used by the beneficiaries of the program; determine the extent of adoption of the recommended technologies in the NCP/RP; and determine the consequences of the recommended NCP/RP technologies.

## **METHODOLOGY**

Two-stage sampling was used in the selection of respondents. A complete list of beneficiaries of the NCP/RP in Leyte was taken from the PCA in Tacloban City. From this, municipalities with more than 5 beneficiaries of the NCP/RP were identified. Ten municipalities were randomly selected followed by the random selection of 5 NCP/RP beneficiaries for each. Out of the 50 sample NCP/RP beneficiaries, only 27 were actually interviewed



due to the following reasons: critical peace and order situation of the area; migration of the farmers to other towns and cities and wrong information about the beneficiaries.

Two sets of instruments in English, one for owner-cultivators and tenants and another for landowners, were made. These were then translated into *Cebuano* and *Waray* dialects. The interview schedule for landowners did not have questions pertaining to the background of the project and the adoption of coconut production practices. The instruments were field tested in Baybay, Leyte and revisions were incorporated before actual use.

Variables used in this study were: 1) socio-demographic which described some selected traits of coconut farmer, e.g., age, educational attainment, number of years in coconut farming, number of household members, number of dependents, and monthly income; 2) farm variables which described the characteristics of the project farms, e.g., land area in hectares devoted to the project; number of coconut hybrids planted in the project farm, monthly income from the project including the income from intercrops; 3) technical support which determined the level of assistance in the dissemination of farm technology, e.g., frequency of visits of PCA technician to the project the year preceding the interview, beneficiary's evaluation on the PCA technician's adequacy of visits to the project, to solve technical problems related to the project, to teach the farmers modern practices in coconut farming, and the personal relations with the farmers and other beneficiaries of the program; 4) production practices which were adopted/not adopted by farmers, e.g., plowing, harrowing, recommended planting distance, planting seedlings on holes of recommended size, replanting, cutting down old trees, weeding, covercropping, grazing, fertilization and drainage.

Descriptive statistics such as frequency counts, averages, means and standard deviations were computed for the variables.

## RESULTS AND DISCUSSION

### *Demographic profile*

The average age of the beneficiaries was 59 years old. They had been in coconut farming for 22 years. Of the total respondents interviewed, 18 were owner-cultivators, 7 were landowners and 2 were tenants or caretakers. Education wise, majority of the owner-cultivators and landowners reached college level, i.e., 12 to 13 years of schooling, while the tenants reached high school only (Table 1).



Table 1. Demographic profile of the NCP/RP beneficiaries in Leyte.

Variable	Owner-Cultivator	Tenant/Caretaker	Land-owner	Combined
Age (yrs)	59	53	61	59
Length of coconut farming experience (yrs)	20	25	27	22
Educational attainment (yrs of formal schooling)	2	5	13	12
Household size	6	5	6	6
Number of dependents	4	4	3	4
Number of organizations participated	2	0	3	2
Area of parcels cultivated (ha)	13.15	1.31	27.63	17.88

Average family size was six which is similar to the national average. The family is usually composed of the husband, wife and children with instances of having a non-family member.

Participation in organizations, both indigenous and government were very minimal. On the average, the beneficiaries were members of at least two organizations with the tenants not affiliated with any organization at all.

### *Economic profile*

*Income.* The beneficiaries derived income from one or a combination of sources-crops, poultry and livestock and non-farm sources (Table 2). These provided their families with both cash and non-cash income.

Crop production was the major source of income of the beneficiaries. Majority of them had an average land holding of 5 - 10 hectares. Great



Table 2. Average monthly income of NCP/RP beneficiaries in Leyte from different sources.

Variable	Owner- Cultivator (P)*	Tenant/ Caretaker (P)*	Landowner (P)*	Combined (P)*
Crop production (outside the project)	3996	9	3968	3658
Coconut	1095	9	3014	1270
Rice	4534	-	1558	3741
Corn	166	-	500	277
Income from the project	52	-	42	50
Animal production	3954	16	363	2878
Other sources	1209	200	3467	1906
Income from all sources	15006	234	12912	13780

\*P20.48 = US \$1.00

disparity of landholding was obvious across types of beneficiaries. While the owner-cultivators and landowners owned several hectares of farmland (mean size of 13.15 and 27.63 hectares, respectively), their tenant counterparts cultivated an average of 1.31 hectares solely devoted to coconut production.

Most of the agricultural lands owned by the landowners and owner-cultivators were planted to rice and coconut. For crop production alone, they earned a monthly income close to P4,000, the bulk of which came from rice. Coconut which was the major cash crop of the respondents did not give good income as the trees had been greatly affected by the *El Niño* drought in 1985.

In terms of the project farms, too little had been realized since most of the trees were still unproductive and only a few nuts had been harvested. Besides, only two out of the total respondents planted intercrops in 1986.

On animal production, the most common animals raised were pigs and chickens. The owner-cultivators obtained the highest mean income from animal production, (P3,954) followed by the landowners (P363) and the tenants (P16).



A considerable number of beneficiaries derived income from employment, business rentals and remittances from children who were working outside the farm.

Summing up all the sources, the owner-cultivators had the highest mean monthly income (P15,006) followed by the landowners (P12,912) and the tenants (P234) (NEDA, 1987).

*Credit.* Credit was obtained to provide the needs of the family when cash was not available. More than 50 percent of the owner-cultivators and a few landowners obtained credit in 1986. Sources varied from banks, private money lenders and friends (Table 3). Majority had standing credit ranging from P500 to P5,000 while others borrowed more as much as P160,000. Others preferred not to resort to credit.

Table 3. Percent distribution of NCP/RP beneficiaries in Leyte by source of credit and amount borrowed.

Variable	Class Interval/ Response Category	Owner- Cultivator (n=18)	Tenant/ Caretaker (n=2)	Land- owner (n=7)	Combined (n=27)
Source/s of credit	No credit	44.44	100.00	42.86	40.75
	No answer	5.55	0	28.57	11.11
	Banks	33.35	0	29.67	35.64
	Private money lenders	11.11	0	0	8.33
	Friends	5.55	0	0	4.17
		(n=9)		(n=2)	(n=11)
Amount borrowed	1-5000	55.60		0	45.50
	5001-10000	0		50.00	9.10
	10001-20000	11.10		0	9.10
	20001-30000	11.10		0	9.10
	30001-40000	0		50.00	9.10
	40001-50000	11.10		0	9.10
	more than 50000	11.10		0	9.10
	Mean	30736.67		20500.00	28875.45
	Standard Deviation	56464.19		20506.10	51085.82

\*Multiple response



*Housing.* Generally, the beneficiaries lived in permanently built houses. They had galvanized iron sheets for roof, wood for wall and concrete for floor. The houses were usually owned by the beneficiaries and had an assessed mean value of P125,652. The estimated area of the land where these houses stood was at an average of 600 m<sup>2</sup> for landowner and 25 m<sup>2</sup> for tenants.

The most common possessions of the beneficiaries were cooking pans, bottles, tables and chairs, radios, cassette recorders and time pieces. After the implementation of the project, the beneficiaries' living condition have improved. This could be seen in the material possessions obtained by them. The beneficiaries, however, claimed that the project had nothing to do with the improvements they achieved.

#### *Perceptions on living condition*

With the poverty threshold for six persons placed at P2,016 per month (NEDA, 1987), the tenant beneficiaries were obviously below the poverty line. The tenant beneficiaries considered their meager income as barely adequate to provide them with good food, decent clothes, higher education for their children and recreation (Table 4). The few household possessions that they acquired were likewise considered barely adequate to provide the needs of their families. They, however, felt that their income could be more than adequate if spent only for food.

Majority of the landowners and the owner-cultivators, on the other hand, expressed the adequacy of their family possessions but felt that their income is barely enough to provide them with the basic necessities in life. However, there were those who felt that their income and possessions could very well provide the needs of their families. As a whole, majority of the landowners and owner-cultivator beneficiaries expressed fulfillment and satisfaction in life. The tenant beneficiaries felt unsure of themselves (Table 5).

The beneficiaries believed that obtaining higher education and possession of non-farming skills can provide their families financial security. Hence, they would prefer sending their children to school than letting them help in the farm. They likewise considered good nutrition necessary in maintaining the family's health and valued the importance of religion for spiritual upliftment.

Noteworthy is the attitude of the beneficiaries towards organizations. Despite their lack of interest in joining such groups, they believed that organizations and involvement in community matters are a big help to rural communities.



Table 4. Perception of the NCP/RP beneficiaries of their living condition.

Indicator of living condition	Owner-Cultivator (n=18)	Tenant/Caretaker (n=2)	Landowner (n=7)	Combined (n=27)
Ease in obtaining cash for farm use	barely difficult (3.11)	difficult (2.50)	barely difficult (2.83)	barely difficult (3.00)
Land area tilled	barely adequate (3.33)	barely adequate (3.00)	adequate (3.71)	barely adequate (3.41)
Space of the house for the family	adequate (4.00)	barely adequate (3.50)	adequate (4.00)	adequate (3.96)
Household possessions for the needs of the family	barely adequate (3.22)	barely adequate (3.00)	adequate (3.57)	barely adequate (3.30)
Income for food, clothing and education of the family	barely adequate (3.28)	barely adequate (3.00)	barely adequate (3.43)	barely adequate (3.30)
Income for food and clothing of the family	barely adequate (3.50)	barely adequate (3.50)	adequate (3.57)	adequate (3.56)
Income for food of the family	adequate (3.94)	adequate (4.00)	adequate (3.71)	adequate (3.89)
Present living condition compared to the years prior to NCP/RP implementation	the same (2.11)	the same (2.00)	the same (2.14)	the same (2.11)



Table 5. Attitude of the NCP/RP beneficiaries towards selected referent on living condition.

Referent of living condition	Owner-Cultivator (n=18)	Tenant/Caretaker (n=2)	Landowner (n=7)	Combined (n=27)
Attainment of higher education	favorable (4.39)	neutral (3.50)	highly favorable (4.57)	favorable (4.37)
Possessions of skills other than farming	favorable (4.33)	neutral (3.50)	favorable (4.43)	favorable (4.30)
Consumption of nutritious foods	favorable (4.39)	favorable (4.00)	highly favorable (4.57)	favorable (4.41)
Involvement of people in community matters	favorable (4.17)	neutral (3.50)	favorable (4.43)	favorable (4.18)
Formation of barangay organizations	favorable (3.94)	favorable (4.00)	favorable (4.43)	favorable (4.00)
Religious affiliation	favorable (4.39)	favorable (4.00)	highly favorable (4.57)	favorable (4.41)
Participation in recreational activities	neutral (3.22)	neutral (3.50)	favorable (4.00)	neutral (3.44)
Satisfaction/fulfillment in life	favorable (4.06)	neutral (3.00)	favorable (3.57)	favorable (3.92)

### *Project farm profile*

The respondents had been recipients of the program for 5 to 6 years per reference period. The mean project farm size was 1.05 hectares and planted to an average of 135 coconut trees per hectare. Generally, the project farms



were situated 3 kilometers from the residence of the beneficiaries and located along farm to market all weather dirt roads regularly serviced by motorcycles and jeepneys.

Among the 25 sample project farms only 5 (20%) were considered productive (Table 6).

Table 6. Project farm characteristics.

Variable	Owner-Cultivator	Tenant/Landowner	Combined (n=25)
	Managed (n=18)	Managed (n=7)	
Duration of project (yrs)	5.67	5.29	5.56
Land area of project farm (ha)	1.00	1.28	1.05
Number of coconut trees planted per hectare	128	155	135
Topographic condition of project farm	flat (1.40)	rolling (1.85)	rolling (1.52)
Soil type of project farm	clay loam (2.00)	clay (1.42)	clay loam (1.60)
Number of productive project farms	4 (22%)	1 (14%)	5 (20%)
Production per hectare in 1986 (kg)	184	125	172
Distance of project farm to beneficiaries' residence (km)	2.85	3.06	2.91
Distance of project farm to farm-to-market road (km)	0.50	0.91	0.59



### *Technical support services*

The PCA technicians' services dwindled over the years. One-half of the beneficiaries reported that they were never visited by them in 1986. Their visits were regular only during the initial stages of the project implementation. Visits then became irregular and finally stopped towards the later years. For those visited (28%) in 1986, once a month was the normal frequency (Table 7a). Those less frequently visited by PCA technicians sought technical help from DA technicians.

Despite the irregularity of the visits, the production technicians were rated positively by the beneficiaries (Table 7b). To the beneficiaries the technicians possessed technical skills and maintained good relationship with them.

### *Adoption of recommended coconut production practices*

Land preparation and planting, thinning and replanting, tillage and weed control, fertilization and control of pests and diseases were among the practices observed by the beneficiaries (Table 8).

Majority of the respondents followed the recommended number of plowing more than harrowing. In farm layouting, the square planting method was popular among the owner-cultivators but the triangular method was preferred by landowners and tenants. The recommended planting distance, however, was not strictly followed by the farmers. Almost half of the beneficiaries planted their coconut seedlings 5 - 8 m apart instead of the recommended 8.5 - 10 m planting distance. This enabled them to plant more seedlings which, to them means more production per area.

Although thinning or cutting of old and crowded trees was practiced by some beneficiaries, others did not. The farmers that did not practice thinning believed that they would be able to harvest a few nuts from the old trees while waiting for the new ones to bear nuts. The replanting of missing hills, likewise, was not followed especially if there was only one or two hills to be replanted. The main reason for this was the unavailability of hybrid seedlings to be used as replants. Hybrid seedlings were actually available in PCA nurseries, but the farmers had problems in obtaining them due to the far distance of the nursery from their farms. Some farmers who replanted used native varieties.

Weeds were controlled either by manual or ring weeding. Covercropping as a way to control weeds was practiced by some owner-cultivators (28%) but never by tenants/caretakers and landowners.

Table 8 showed that almost all of the respondents fertilized their coconut seedlings after planting. Many even exceeded the recommended frequency



Table 7a. Percent distribution of NCP/RP beneficiaries in Leyte by technical and communication support variables.

Variable	Class Interval/ Response Category	Owner- Cultivator (n=18)	Tenant/Caretaker and Landowner (n=7)	Combined (n=25)
Mode of contact with COCOFED officials as source of inform- ation on NCP/RP	no contact	33.30	11.11	25.90
	personally informed	50.00	66.67	55.60
	meeting	16.70	11.11	14.80
	letter	0	11.11	3.70
Mode of contact with PCA techni- cian as source of information on NCP/RP	no contact	66.70	88.89	74.10
	personally informed	22.20	11.11	18.50
	meeting	5.60	0	3.70
	seminar	5.60	0	3.70
Number of visits made by PCA technician in 1986	no visit	55.60	57.16	56.00
	1 - 5 times	11.10	0	8.00
	6 - 10 times	11.10	0	8.00
	more than 10 times	22.20	42.86	28.00
	Mean	3.89	5.14	3.84
	Standard deviation	5.26	6.41	5.42
Adequacy of visits	No technician	16.70	28.57	20.00
	very inadequate	5.60	0	4.00
	inadequate	11.10	28.57	12.00
	barely adequate	22.20	14.29	16.00
	adequate	38.90	28.27	36.00
	very adequate	5.60	0	4.00
Ability to solve technical problems	no technician	16.70	14.29	16.00
	very poor	0	0	0
	poor	5.60	0	4.00
	satisfactory/average	22.20	28.57	24.00
	good	50.00	57.14	52.00
	very good	5.60	0	4.00



Table 7b. Technical support to the NCP/RP.

Variable	Owner-Cultivator (n=18)	Tenant/Landowner (n=7)	Combined (n=25)
Number of visits made by PCA technician in 1986	3.89	4.15	3.84
Adequacy of visits	barely adequate	inadequate	inadequate
Ability to solve technical problems	satisfactory	poor	satisfactory
Teaching skills	satisfactory	satisfactory	satisfactory
Interpersonal relationship with beneficiaries	satisfactory	satisfactory	satisfactory
Support in the implementation of the project	satisfactory	satisfactory	satisfactory

of fertilizer application. However, more than 50% of the total respondents did not refertilize their coconuts at 6 months after planting. Some applied fertilizer a year after planting since the fertilizer supply ceased to arrive although PCA claimed that the beneficiaries were still entitled to fertilizer supply even after the termination of the project. As a result, only those who applied their fertilizers solely for coconut and those who purchased their own fertilizer were able to keep up with the recommended rate of fertilizer application.

#### *Changes brought about by the adoption of the coconut planting/replanting technology*

The study revealed that the adoption of recommended coconut production technologies had not been much of a problem to the beneficiaries especially in the early part of the project implementation. Problems, however, started to crop up with the suspension of the coconut levy causing the discontinuance of project support. The beneficiaries then started to feel the burden of maintaining the farm. The low-income tenants were affected most. With



Table 8. Percent distribution of NCP/RP recipients in Leyte adopting the recommended coconut production practices.

Variable	Class Interval/ Response	Owner/ Cultivator Managed (n=18)	Tenant/ Landowner Managed (n=7)	Combined (n=25)
Average adoption rate of recommended land preparation practices	0	16.70	14.29	16.00
	1-25	0	0	0
	26-50	38.89	28.57	36.00
	51-75	5.55	0	4.00
	76-100	38.89	57.14	44.00
Mean		56.39	69.00	59.92
Standard Deviation		39.32	41.36	39.45
Layout Practices		100.00	85.70	96.00
Average adoption rate of recommended planting practices	0	16.67	14.29	16.00
	1-25	0	0	0
	26-50	11.11	28.57	16.00
	51-75	33.33	0	24.00
	76-100	38.89	57.14	44.00
Mean		85.44	58.57	77.92
Standard Deviation		18.28	37.83	27.31
Average adoption rate of recommended thinning and replanting practices	0	38.89	14.29	32.00
	1-25	11.11	42.86	20.00
	26-50	38.89	42.86	20.00
	51-75	0	0	0
	76-100	11.11	0	8.00
Mean		29.44	27.28	28.84
Standard Deviation		33.55	22.54	30.42
Adoption rate of recommended tillage and weed control practices	101-200	44.44	42.86	44.00
	201-300	27.78	42.86	32.00
	301-400	16.67	14.29	16.00
	401-500	11.11	0	8.00
Mean		282.50	271.43	279.40
Standard Deviation		107.73	75.59	96.04



Table 8. Continued ....

Variable	Class Interval/ Response	Owner/ Cultivator Managed (n=18)	Tenant/ Landowner Managed (n=7)	Combined (n=25)
Average adoption rate of inorganic fertilizer application	forgot type and amount of fertilizer used	22.22	28.57	24.00
	1-25	22.22	14.29	20.00
	26-50	27.78	14.29	24.00
	51-75	16.67	14.29	16.00
	76-100	5.55	14.29	8.00
	more than 100	5.55	14.29	8.00
Mean		44.43*	75.60**	52.63***
Standard Deviation		29.06*	69.50**	43.38***
Application of organic fertilizer	did not apply organic fertilizer	88.89	85.71	88.00
	20-100	11.11	14.29	12.00
Fertilizer application method	did not apply fertilizer	11.11	28.57	16.00
	100	88.89	71.43	84.00
Average adoption rate of recommended fertil- izer application practices	did not apply fertilizer/ forgot type and amount of fertilizer used	5.55	28.57	12.00
	1-25	5.55	0	4.00
	26-50	44.44	28.57	40.00
	51-75	22.22	28.57	24.00
	76-100	22.22	14.29	20.00
Mean		57.52*	60.00***	58.09***
Standard Deviation		21.03*	25.78***	21.56***



Table 8. Continued ....

Variable	Class Interval/ Response	Owner/ Cultivator Managed (n=18)	Tenant/ Landowner Managed (n=7)	Combined (n=25)
Mechanical pest control	no pest & diseases	66.67	42.86	60.00
	did not adopt	11.11	0	8.00
	adopted	22.22	57.14	32.00
Chemical pest control	no pest & diseases	66.67	42.86	60.00
	did not adopt	27.78	57.14	36.00
	adopted	5.55	0	4.00
Cleaning of crowns at harvest	100	100	100	100

\*The mean and standard deviation were computed based on 14 respondents who recalled the type and amount\* of fertilizer used.

\*\*The mean and standard deviation were computed based on 5 respondents who recalled the type and amount of fertilizer used.

\*\*\*The mean and standard deviation were computed based on 19 respondents who recalled the type and amount of fertilizer used.

too little to spend for basic necessities, none was left for project farm operation.

On the average, the project did not have a significant impact on the living conditions of the beneficiaries. A few claimed to have gotten worse than before the project started while some revealed to have gotten better. Acquisition of additional household possessions and better housing materials were not attributed to the implementation of the project.

## CONCLUSIONS AND RECOMMENDATIONS

The National Coconut Planting/Replanting Program as conceived should have been directed to the upliftment of social and economic conditions among its beneficiaries in Leyte. However, it was found that it did not have a significant impact on the living conditions of the beneficiaries.



After only 10 years of implementation, the project was crippled with the suspension of the coconut levy causing the discontinuance of project support. Although majority of the beneficiaries adopted the recommended coconut farming technologies, they generally assessed that the project was unable to help them improve their living conditions. They did not see changes in farming practices as a solution to their economic condition.

While NCP/RP may not have significant contribution to the living condition of its beneficiaries, it shows that there were other factors which may help explain its failure. These include politico-economic, socio-cultural, personal characters of field workers and even other environmental factors which could be looked into for further investigation.

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