

THE SOCIOECONOMIC ASPECTS OF DEVELOPMENTAL INFRASTRUCTURE: TWO ASPECTS FROM A PROJECT IN THE SOUTHERN PHILIPPINES

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Introduction

This paper addresses itself to the items in a development "package." Given that a package of development inputs will be made in a particular locality, what items individually and in combination with other items, are likely to produce more important and more cost-effective benefits?

That is a complicated question. This paper attempts to contribute only to one modest aspect of this question. It asks only what are the effects of rural cooperative electrification service upon a rural community? It attempts to answer this question for rural electrification in isolation from other elements of a development package.

Again the data to be presented must be qualified. They are not for many rural cooperative electric services but for only one. Thus the present paper offers a very qualified response to the question of the place of rural cooperative electric service. Further, the results may well be place and time specific so that generalization of them may be unwarranted. Fortunately, other studies have been or are being made so that eventually it may be possible to put the pieces together to arrive at a more general conclusion than is warranted by the data available at present.

Research design

Background and design chosen. In late 1975, The Research Institute for Mindanao Culture (RIMCU) was approached to do evaluative research upon MORESCO I (The

Misamis Oriental Rural Electric Service Cooperative) by the USAID Mission to the Philippines. The request was urgent and results had to be presented by January of 1976. The consequence was an exploratory, fact-finding study fielded in October-November, and written up under the title: *An Evaluative Study of the Misamis Oriental Rural Electric Service Cooperative, Inc.* (Madigan, Herrin, Mulcahy, 1976). Fielded almost immediately afterwards was a second, year-long, exploratory study which had already been in preparation at the time RIMCU was approached by USAID. This study was financed by IDRC (International Development Research Centre, Canada), and was directed by Alejandro Herrin, although I was involved in it to some extent. Results of this study are reported in our publication: *Rural Electrification* (Herrin, et al. 1977). Further offshoots of these studies have been micro-studies on various topics such as fishing villages and an analysis of the incomes of a rice irrigation association (ALISA). In addition, Herrin has been directing large studies on rural electrification infrastructure in relation to the socioeconomic life of households in the MORESCO area.

The present study, directed by myself, grew out of these backgrounds. It is an attempt in a large survey context, to study certain more important aspects of the exploratory studies, to see if results remain unchanged in data from a large sample survey. If they do, research can later move into the stage of field studies controlling the

experimental variable in order to see if causality can be demonstrated.

Quasi-before and after design. The RIMCU studies began in late 1975, some four to five years after the MORESCO I Cooperative began supplying electric service to the western ten municipalities of Misamis Oriental Province. No RIMCU benchmark data are therefore available for comparison of present socio-economic levels with levels in 1969, when construction first began upon MORESCO I facilities (power stanchions, high tension, high voltage wires, transformers, buildings, local power lines, and so forth).

Instead, all eleven non-electrified municipalities east and northwards of Jasaan plus the barrios of Gingoog City (excluding the Gingoog City poblacion) were compared by means of the 1960 Census population and agricultural data to ascertain how different these two provincial segments were in 1959. Results showed great similarity in population density, age distribution, children ever born, language, religion, highest grade completed, and occupational distribution. Indicators of annual income showed substantial similarity with the northeast slightly favored over the west. Most women did not work outside the family, and most men were engaged in agriculture. Coconuts, corn, and rice were the three main crops. In general, both the western segment, and the northeastern segment of the Province were again found well very similar in agricultural makeup. The northeastern part had a small advantage in greater land ownership, less tenancy, higher levels of income, and higher median grade completed. (Cagayan de Oro City was omitted from the comparison, as were the three industrialized municipalities closest to Cagayan on the east-northeast: Jasaan, Tagoloan, and Villanueva).

The northeast municipalities plus Gingoog City barrios were therefore taken as a "quasi-before" population. The western ten municipalities, it was assumed, would be like

these northeastern municipalities today, if cooperative electrification had not begun to supply power and light to them in 1971. Thus they were taken as the "quasi-after" group. An interesting aspect of this design is the organization of a MORESCO II cooperative in this quasi-before area, which at interview time in 1978 (median date: September 11) had not yet started supplying electricity to sample households. Thus at a later date, RIMCU will be able to study the MORESCO II area in a true before and after study design.

Hypotheses

The study had three main hypotheses. These were:

1. Rural cooperative electrification is associated positively with income.
2. Rural cooperative electrification is associated positively with employment in non-farm enterprise.
3. Rural electrification is associated positively with the acceptance and use of family planning.

The present paper reports only upon the first two of these three hypotheses.

Sampling aspects

The study is a stratified two-stage PPS sample survey as regards the household level data. Fifty clusters were selected from the northeastern segment and fifty from the western segment. Clusters were drawn from the listing of barangays and poblacions given in the 1975 Census for Misamis Oriental for the northeastern and western segments without exclusions, by systematic sampling after a random start in each of the two explicit strata: the northeast and the west. The sample variance had thus the benefit of both explicit and implicit stratification (due to systematic selection), and in addition of equal probability of selection for each household within explicit stratum.

In the second stage sampling, ideally 24 households were selected for interview in the northeastern segment clusters and 40 households in the western segment. If the census total and the actual count of households coincided, ideal numbers were actual numbers interviewed. If the actual number exceeded the census total, more households were interviewed in order to preserve the second stage sampling fraction as per customary PPS procedure. But if the census total exceeded the actual count at time of field work then less were interviewed as per the same procedure. In the Northeast, 1,224 households were interviewed (median date: September 11, 1978) and in the west 2,245 (median date of interview: June 5, 1979). Probability of selection of each household was approximately 7.1×10^{-4} in the northeast and was approximately 1.9×10^{-3} in the west. The sample included approximately 2.9 percent of all northeastern households and approximately 9.6 percent of all western households. The populations were estimated at 200,500 persons in the northeast on median date of interview and at 132,595 persons in the west on median date. Estimated annual rate of growth 1975 to median date of interview was 2.8 percent in the west, and 0.6 in the northeast — revealing net out-migration in the northeast.

Altogether, seven different interview schedules were used. These gathered household level and community level data and were: (a) household schedule, northeast, (b) poblacion-level schedule, northeast, (c) barrio-level schedule, northeast, (d) household schedule: husband, west, (e) household schedule: wife, west, (f) poblacion-level schedule, west, (g) barrio-level schedule, west. Household respondents were defined in the east as the male head (depending upon actual household arrangement), or in the absence of a male head, the actual female head of household and in the west as (a) male head of household, if any, and if otherwise, actual head of household, and (b) wife, mother of male head, or if no male head, the actual

female head. Respondents for the poblacion-level questionnaire were the mayor, a municipal councilor, the development officer, or any knowledgeable municipal officer, and for the barrio-level schedule were the barrio captain, a vice-barrio captain, or any responsible and knowledgeable adult barrio official or resident.

Electrification and income

The first hypothesis inquired whether after nine years of electrification, income in the quasi-after population was greater than in the quasi-before population.

Two sets of three indicators were used. Income was measured by these three indicators: (a) income from main occupation of household head, (b) total cash income of household from all sources, and (c) total household real income (cash and kind). Each of these indicators was used to measure: (1) segment-level income (northeastern households compared to western households), and (2) household-level income (households in electrified compared to non-electrified dwelling units).

Results for the first set of indicators are given in terms of September 1978 pesos. (Projection backwards from June 1979, was done at a compound interest rate of 1,482 on the basis of the BCS Consumer's Price Index, Region X, October 1979: Table 1). Median incomes appear in Sets 1 and 2 figures (next page).

These results show positive association between electrification and income, in view of the 1960 Census data which indicated higher income at that time in the northeastern segment.

Do they show causality? Not directly, because these survey results can of themselves indicate only association. Indirectly, a moderately strong but not conclusive probabilistic argument can be made from the

Set 1. *Northeast and Western households (HH)*

<u>Type of annual income</u>	<u>Northeast</u>	<u>West</u>	<u>Percent Difference^a</u>
	(Incomes in Constant Sept. 1979 Pesos)		
1. Cash Income from HH's Main Occup.	P1,626	P1,822 (P2,021) ^b	12.1
2. Total Cash HH Income	P2,287	P2,678 (P2,970)	17.1
3. Real HH Income	P3,310	P4,502 (P4,994)	36.0
Total HH income (est.)	P34,325	P23,280	—

$$^a[(W/E - 1)] \times 100$$

^bFigures in parentheses are actual 1979 incomes as reported.

Set 2. *Households with and without electrification*

<u>Type of income</u>	<u>With electrification</u>	<u>Without electrification</u>	<u>Percent difference^a</u>
1. Cash Income from H ³ 's Occup.	P4,308	P1,929	55.2
2. Total H ² Cash	P5,593	P1,943	65.3
3. Real H ² Income	P7,096	P4,050	42.9
	8,190 households	15,900 households	—

$$^a[1 - (WO/W)] \times 100.$$

quasi-before, quasi-after design. Before electrification on the west, as census data indicators show, the two segments were quite homogeneous in income. The only other major infrastructure put in place since 1959 has been the excellent concrete highway from Iligan City through the western sector to Cagayan and from Cagayan through the northeastern segment to the Agusan province border and thence to Butuan City. However, the opening of this road in late 1978 was much too recent to have had much effect upon incomes in either segment. Further, the

road has affected both segments about equally. Thus electrification appears to be the new element in the picture which has stimulated the differences between northeastern and western segment incomes.

Cooperative electrification is also credited with some of the differences between household income of households residing in electrified as contrasted with non-electrified dwelling units through such factors as increased farm production (electric pumps for irrigation), better animal husbandry (better

water and the use of illumination, e.g. egg production, etc.), from increased employment of household members in off-farm, non-family business, because homework and housework, etc., can be done at night, and also from night work of family members on income-producing occupations (e.g., shelling corn, making nipa roof squares, care of livestock, etc.). Altogether an estimated 8,200 households (35.2 percent of all households) have installed the necessary wiring and been connected to

MORESCO I power lines.

The association of income with electrification can hardly be attributed simply to the electrification of their residences by larger numbers of wealthy families. This does not explain income differences between northeastern and western segments. Further, the distribution of households which have installed electricity in their residences cuts across the whole income distribution.

Table 1. *Percentage distribution of total annual real household income by installation of electricity in the household dwelling unit, western ten municipalities, Misamis Oriental, 1979*

<i>Total annual household income</i>	<i>Electricity (percent)</i>	<i>Electricity not installed (percent)</i>	<i>Electrified as % of all households^a</i>	<i>Number of households</i>
Below P2,000	5.2	23.5	10.9	3,990
P2,000 – 3,999	14.1	25.9	22.8	5,050
P4,000 – 5,999	19.1	21.8	32.2	4,855
P6,000 – 7,999	17.5	11.1	46.0	3,110
P8,000 – 9,999	10.0	6.6	45.1	1,815
P10,000 or more	34.1	11.1	62.5	4,460
Total	100.0	100.0	35.2	23,280

^aWithin income group, percent of electrified dwelling units out of all dwelling units.

Thirty-eight (38.5) per cent of all installing households had annual total real household incomes of less than P6,000 a year, as Table 1 shows. This appears to be below the level of absolute poverty.¹ An additional set of households, those with incomes from P6,000 to P7,999 had installed electricity in their residences, an additional 17.5 percent of all installing households.

In fact, only 34.1 percent of all installations were made by households of middle and upper income, receiving P10,000 or more a month.

Thus 65.9 per cent of all installations were made in the homes of households belonging to

the lower middle and lower income groups with annual incomes of less than P10,000 a year.

Table 1 brings out several other points. While a larger percentage of households earning P10,000 a year or more installed electricity (62.6 percent), still quite substantial percentages of poorer households also installed electricity in their dwelling units. The table shows that 22.7 percent of all households with 1979 incomes below P6,000 a year had installed electricity. Further, 46 percent of all households with incomes of P6,000 to P7,999 had installed electricity in their residences, and 45.1 percent of all families earning P8,000 to P9,999.

On the basis of these data, one concludes that electrification has been broadly attractive across the entire income distribution. While a greater proportion of all households earning P10,000 or more have electrified their homes the greatest proportion of installations have been made in the homes of households earning less than P8,000 a year.

The first hypothesis of positive association between electrification and income appears to be supported by the data. In fact, the data seem to support in a moderate way the conclusion of a causal connection in MORESCO I between rural cooperative electrification and increased annual income. However, true demonstration of a causal connection would require a field study subjecting the experimental variable to tighter control.

Electrification and employment

The second hypothesis positively associated rural cooperative electrification with employment in non-farm enterprise. For this hypothesis to be supported, the data should indicate a larger number of businesses starting or in-migrating after January 1, 1970, than previously, and a greater number of employed persons. Secondly, they should indicate a

larger percentage of persons employed in the non-farm occupations in the western segment than in the northeast.

As indicator of employment at the community level, a survey was made of all enterprises in each of the ten municipal poblacions, employing 3-9 persons, or 10 or more persons, and in the sample barrios of enterprises employing one or more persons. Year of organization of the business in the western segment was obtained as well as the present number of employees. Occupational data were obtained for household residents from the interviewed household heads.

Initiation of new enterprises. Of all enterprises operating in June 1979, 72.8 percent (94 of 129) had originated in, or had in-migrated to, the western segment of the province on or after January 1, 1971 (within the first calendar year of MORESCO I electrification). Of these, as Figure 1 shows, 82.4 percent of all enterprises employing 10 or more persons, (excluding proprietor and his family members), and, as Figure 2 shows, 69.5 percent of all 95 enterprises employing 3-9 persons (again excluding proprietor and family) had begun (in the western municipalities) after January 1, 1971.

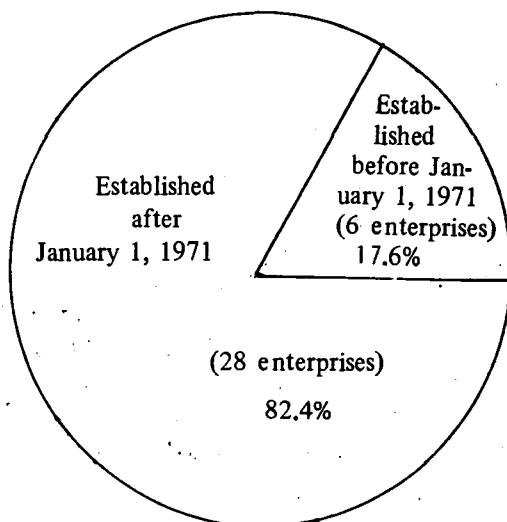


Figure 1. *Distribution of business or industrial enterprises employing 10 or more persons by year of establishment, all western municipalities, Misamis Oriental Province, 1979*

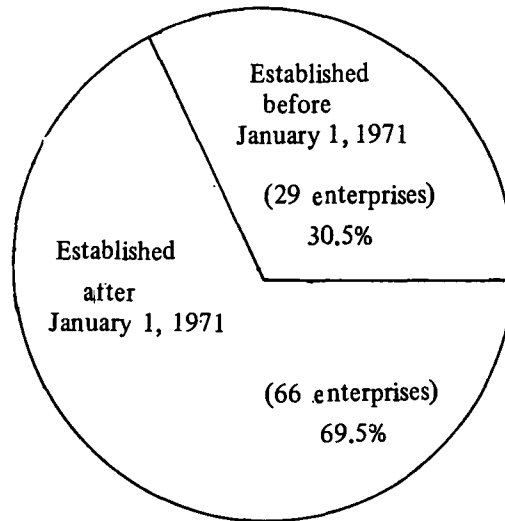


Figure 2. *Distribution of business or industrial enterprises employing 3-9 persons by year of establishment, all western municipalities, Misamis Oriental Province, 1979*

These data incorporate a bias because they relate to business operating in 1979. Businesses more recently established have greater survival to interview probabilities than businesses established a longer time ago. However, the nature of the areas under study strongly suggests that this bias is small, even negligible. Businesses originating before 1971 with few exceptions would have had to be small and relatively few. The absence of electrification and the undeveloped road system would have precluded all but a handful of businesses employing more than ten persons.

The data thus far indicate a rather large increase in business and industrial enterprise in the years 1971-1979, when electrification had actually begun and area coverage was growing. Growth increased sharply after January 1, 1970 as Figure 3 shows.

Table 2 presents data on 1,986 persons employed in June 1979, for whom data could be obtained on the year in which the enterprise which employs them had begun operations.

The table shows that only 14.5 per cent of persons employed at present worked in businesses that had begun before January 1970. The large increases per year that begun to occur as the electricity infrastructure was put in place and then began to operate are striking. For example, the number increased in the year 1970 alone, by 11.4 per cent. The numbers employed jumped by 592 per cent during 1970-1979, over the December 1969 figure. Presuming that these employees were paid cash wages and salaries, the data further strengthen the hypothesis that electrification had contributed to increase in income in the west as compared to the non-electrified northeast.

Coverage of political units. For business or other enterprises to have been attracted to originate in, or migrate to, the western segment of Misamis Oriental, electrification of the poblacions and barrios of the ten municipalities comprising this western segment must have been extensive.

In fact, each of the ten municipal poblacions has been electrified. Since

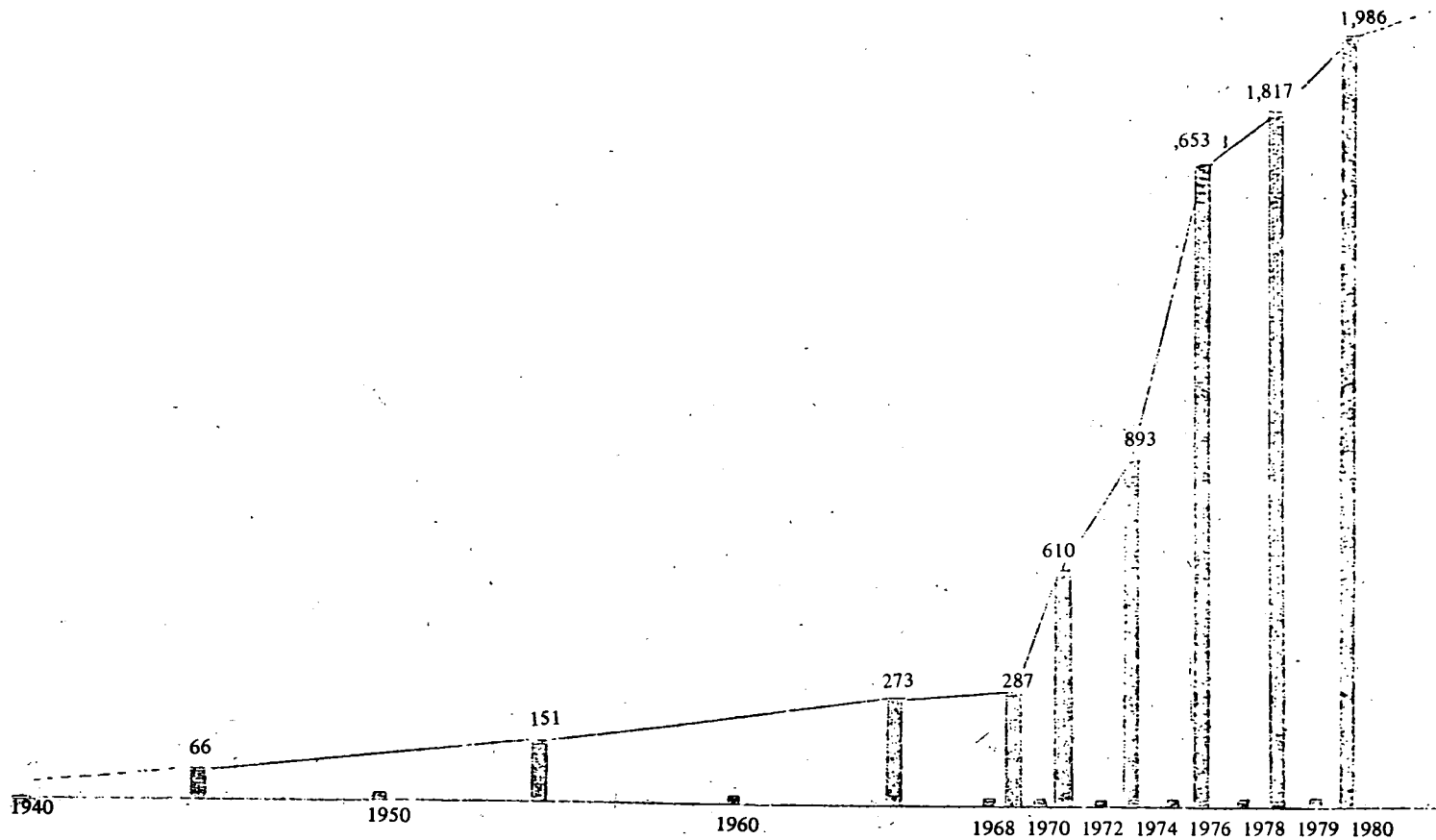


Figure 3. *Growth of off-family farm business and industrial enterprise operating in 1979, western ten municipalities, Misamis Oriental.*

Table 2. *Distribution of employees by year in which the business which employs them began operations in the area of the western ten municipalities, Misamis Oriental Province, 1979*

<i>Date instituted</i>	<i>Employees 1979</i>	<i>Percent</i>	<i>Date instituted</i>	<i>Employees 1979</i>	<i>Percent</i>
Before 1949	66	3.3	1973	148	7.5
1950 - 1959	85	4.3	1974	222	11.2
1960 - 1968	122	6.1	1975	538	27.1
1969	14	0.7	1976	61	3.1
1970	227	11.4	1977	103	5.2
1971	96	4.8	1978	130	6.5
1972	135	6.8	1979*	39	2.0
Total	-	-	-	1,986	100.0

*January to June 1979 only.

businesses would generally wish to locate in or near the poblacion to take advantage of the larger poblacion populations, this coverage of electrification to all poblacions would be especially attractive to potential business groups interested in the area. The simultaneous presence of a large and low-priced labor force and of a good, typhoon-free bay (Macajalar Bay), and of a new concrete road connecting the two cities bordering the segment would of course enhance the attraction.

Of all 113 municipal barrios, only 16 have not been electrified by the MORESCO I (14 per cent). This of course does not mean that all *sitios* of every electrified barrio have received electricity. Lack of rights of way, lack of access roads, fewness of requested hook-ups and isolation are reasons impeding both *sitios* and *barrios* from connection with the power mains.

Non-farm employment, northeast and west. Tables 3, 4, and 5 show the occupational distribution of household heads, and then of all males and of all females for northeastern and western segments of Misamis Oriental. Each of these present number of persons employed by occupational category per thousand appropriate persons, except that for females, data are per ten thousand females.

The table of household heads by occupation is instructive. In it, one finds both in northeastern and western segments, large proportions employed in agriculture and in the other common outdoor, blue-collar occupations. Seventy-six (76.2) percent were farmers in the northeast and 67.0 percent in the west. An additional 4.6 percent in the northeast were engaged in fishing, hunting, logging, mining, quarrying and in other such related activities (making 80.8 percent in all), and an additional 8.9 percent (making 75.9 percent altogether) in the west. Obviously enough, both populations are highly blue-collar, rural, and agricultural.

Some interesting points appear in these data, however. In the 1960 census data (1965: 4-7, 100-102), 79.8 percent of all Misamis Oriental employed males, 10 years of age or older were employed in agriculture and related occupations, and, in 1970 in the two areas studied, northeast and west 75.1 and 72.6 respectively, were reported in agriculture (1974: p. 26, Ta. II-6). Thus Table 3 reveals that the agricultural nature of the northeastern segment has remained fairly constant while it has declined to 67.0 percent in the west.

Secondly, in the 1960 Census, farms operated by tenants were more numerous in

Table 3. *Occupational categories of household heads, northeastern and western segments, Misamis Oriental,^a 1978 and 1979, respectively.*

<i>Occupational categories</i>	<i>East</i>	<i>West</i>
Professional, technical and related	17	16
Administrative, executive and managerial	2	9
Sales	43	38
Clerical	3	7
Farming	762	670
Owners and managers	(493)	(406)
Tenants with or without small plot of owned land	(234)	(242)
Farm laborers	(35)	(22)
Fishing, hunting, logging and related	42	86
Mining, quarrying and related	4	3
Transport, communications and related	47	65
Crafts, factory/industrial and related	54	61
Service, sports, entertainment and related	13	21
Not employed (aged, disabled, not seeking work, etc.)	13	24
Total per thousand	1,000	1,000
Total Household Heads (est.)	34,320	23,280

^aNortheastern segment: The barrios of Gingoog City outside the Poblacion, and the eleven municipalities from Balingasag north and eastwards; western segment: the ten municipalities west of Cagayan de Oro City.

the west both in hundreds of hectares operated by tenants and in number of farms:

	<u>Northeast</u>	<u>West</u>
Percent of tenancy per hundred hectares of farm area	12.5	20.5
Percent of all farms operated by tenants	18.3	29.6

Table 3 appears to show that tenancy has declined in the west. While the gap between northeast and west with respect to tenancy had not been closed, it had narrowed by June 1979. In the northeast, out of every 762 household head farmers, 493 were owners or

managers (64.7 percent) and 234 were tenants (30.7) while 35 were laborers (4.6 percent). In the west, on the other hand for every 670 farmers, 406 (60.6 percent) were owners and managers, 242 (36.1 percent) were tenants, and 22 (3.3 percent) were agricultural laborers. The difference in tenants was only 15 percent (W/E) in 1979 but it had been 39 percent in 1963.

Since hours of daily work and remuneration of share tenants and of agricultural laborers usually are unattractive, it appears likely that many tenants and laborers switched to alternative, more promising alternatives in the western segment.

Table 4. *Occupational categories of males, northeastern and western segments, Misamis Oriental,^a 1978 and 1979, respectively.*

<i>Occupational categories</i>	<i>East</i>	<i>West</i>
Professional, technical and related	6	7
Administrative, executive and related	1	91
Sales	11	10
Clerical	1	3
Farming	346	226
Owners and managers	(159)	(130)
Tenants with or without small plot of owned land	(187)	(96)
Fishing, hunting, logging and related	30	
Mining, quarrying and related	1	2
Transport, communications and related	23	31
Crafts, factory/industrial and related	23	24
Service, sports, entertainment and related	7	11
Students (for east only), housewives unemployed, not seeking work (aged)	—	266
Not employed (retired, chronically sick, small children, etc., disabled)	550	292
Total per thousand	1,000	1,000
(Total Males, all ages (est.))	103,360	68,220

^aNortheastern segment: The barrios of Gingoog City outside the Poblacion, and the eleven municipalities from Balingasag north and eastwards; western segment: the ten municipalities west of Cagayan de Oro City.

A second point of interest is the larger proportion of western household heads engaged in off-farm occupations and outside fishing, hunting, logging, mining, quarrying and related work:

<i>Off-farm occupation</i>	<i>Northeast</i>	<i>West</i>
Professional, etc.	17	16
Administrative, etc.	2	9
Sales	43	38
Clerical	3	7
Transport and comm.	47	65
Crafts, etc.	54	61
Service, etc.	13	21
Total per 100	17.9	21.7
Estimated Total Households	6,143	5,052

If the category, "sales," is omitted (which tends to be predominantly composed of vendors, peddlers, and petty traders, white collar workers compose of larger proportion of household heads in the west than the east.

<i>Off-farm occupation</i>	<i>Northeast</i>	<i>West</i>
1. Professional, etc.	17	16
2. Administrative, etc.	2	9
3. Clerical, etc.	3	7
Total per 100	2.2	3.2
Estimated Total Households	755	777

Table 4 presents the occupational spread of males in the two categories. For reasons of

Table 5. *Occupational categories of females, northeastern and western segments, Misamis Oriental,^a 1978 and 1979, respectively.*

<i>Occupational categories</i>	<i>East</i>	<i>West</i>
Professional, technical and related	98	145
Administrative, managerial, executive	3	97
Sales	364	372
Clerical	17	32
Farmers:		
Owner/manager	(110)	(129)
Tenant with or without small lot of owned land	(89)	(29)
Fishing, logging, hunting and related	20	3
Transport and communication	9	3
Crafts, factory/industries and related	43	31
Domestic and other service, sports and related	121	127
Students	—	2,771
Housewives	—	2,879
Others (students) (for east only), small children, etc. unemployed not seeking work (disabled, retired, aged, chronically, sick)	9,126	3,382
Total per thousand	10,000	10,000
Total Females, all ages (est.)	97,140	64,370

^aNortheastern segment: The barrios of Gingoog City outside the Poblacion, and the eleven municipalities from Balingasag north and eastwards; western segment: the ten municipalities west of Cagayan de Oro City.

the data format, this table presents totals for males of all ages as does also the following table for females. The ratio of employed males to all males 15-59 years of age was estimated to be 92.0 per cent in the northeast and 88.9 in the west. The percentage of males employed in agriculture of all males 15-59 was estimated at 70.8 in the northeast but only 45.5 percent in the west.

Table 4 reveals that only 65 percent (226/346) as many men were employed in agriculture in the western as in the northeastern segment. Of an estimated 46,465 employed northeastern men, 77.0 percent

were working in agriculture, and 83.8 percent were employed in the outdoor occupations of agriculture, logging, fishing, and hunting. The figures for the west are much smaller, 51.0 for agriculture and 59.4 for agriculture, logging, fishing, and hunting. These differences are significant beyond .05.

Table 4 also shows large differences between northeastern and western segment males in white collar type jobs (again omitting the sales category for the same reason), and also for transport, crafts, and service, etc. The fact that males of all ages are covered in this table should be borne in mind to explain

smaller proportions in comparison to household heads (who must be at least young adults in age).

<i>Occupation</i>	<i>Northeast</i>	<i>West</i>
1. Professional, etc.	6	7
2. Administrative, etc.	1	91
3. Clerical	1	3
Per 100 families, all ages	0.8	10.1
Estimated total	830	6,890
1. Transport, etc.	23	31
2. Crafts, etc.	23	24
3. Service, etc.	7	11
Per 100, all ages	5.3	6.6
Estimated total	5,480	4,500

Table 5 presents data for all women (of all ages). Occupations are presented per 10,000 women rather than per 1,000 because employed women are relatively rare in both northeast and west.

The first notable aspect of Table 5 is the relative rareness of working women. The table reveals that 91.3 percent of northeastern women and 90.3 percent of western women (students 27.1, housewives, 28.9, others 33.8) are not working (infants, young girls, adolescents, students, housewives, and old ladies, etc.).

A second point of interest is the comparison of east and west for white collar type occupations:

<i>Occupation</i>	<i>Northeast</i>	<i>West</i>
1. Professional, etc.	98	145
2. Administrative, etc.	3	97
3. Clerical	17	32
Per 100 females	1.18	2.74
Estimated Total	1,150	1,765

The larger relative number in the west would appear to reflect the larger opportunities for employment of women in non-farm enterprise.

However, the interview responses revealed that not all women for whom a present occupation was given (other than student, housewife, or "other") were in fact currently employed. This was due apparently to some idea of respondents that past occupation should be cited in lieu of present occupation, if the lady had ever held a job.

Thus another question separated actually employed at time of interview from ever employed. The following percentage distribution however is for currently employed, currently married women, 15-49 years of age, only:

<i>Type of occupation</i>	<i>Northeast</i>	<i>West</i>
1. Teachers	12.3	15.7
2. Medical workers	0.5	2.6
3. Business and industrial administrators, etc.	0.0	0.9
4. Accountants	0.0	0.4
5. Bookkeepers, accounting clerks, cashiers	0.0	0.9
6. Stenographers, typists	0.0	0.5
7. Office machine operators	0.0	0.4
8. Clerical workers	0.5	1.3
9. Packers and labellers	0.0	0.4
10. Minor government positions	0.5	0.0
11. Sales workers	(65.7)	(66.4)
Wholesale and retail trade	2.1	1.7
Commercial travellers, "dealers"	1.0	0.4
Vendors, peddlers, petty trade	62.6	64.3
12. Crafts and cottage industries		
Manufacturing	0.5	0.5
Carpentering, cabinet making	0.0	0.5
Tailors, dressmakers, sewers, embroiderers, etc.	5.1	3.0
Weavers	1.0	0.0
Nipa square makers	0.5	0.0
13. Agricultural work	(8.2)	(0.9)

<u>Type of occupation</u>	<u>Northeast</u>	<u>West</u>
Farm owners, managers	1.5	0.0
Tenants	2.1	0.0
Laborers	4.6	0.9
14. Barbering, hair-dressing, beauticians	1.1	1.3
15. Sports, entertainers, and related	0.0	0.5
16. Domestic work (maids, cleaners, etc.)	4.1	4.3
Totals (Percent)	100.0	100.0
N (est.)	5,470	2,440

What of these are the more substantial jobs, likely to increase household income significantly? The following table attempts this evaluation. It adds percentage points from the preceding table; it does not recompute percentages. Jobs from which women household heads might substantially increase household income appear to be:

	<u>Northeast</u>	<u>West</u>
1. Teachers and med. workers	12.8	18.3
2. Administrators, etc.	0.0	0.9
3. Office workers	1.0	3.9
4. Crafts and industries	7.1	3.5
5. Hairdressing, beauticians, barbers, etc.	1.1	1.3
Total percent	22.0	27.9

In what year did these women begin to work? If these years were largely after electrification, this further supports the hypothesis that rural cooperative electrification has indeed exercised causal influence upon the observed increase on income. Data are for women respondents 15-49 who had ever worked. Results were:

	<u>Before 1970</u>	<u>After Jan. 1, 1970</u>
Began work	26.2%	73.8%

The median women had begun work during April 1974. Presumably therefore electrification influenced the employment and thus the income of these working women.

Returns for work in the form of wages and salary appear to have been greater for western women 15-49 years of age. Assuming that these women, who are the wives or mothers of the male household head, or themselves the household head, contribute most, if not all, their earnings to household income, a reply can be drawn from comparison of their usual monthly contributions to household cash income. The median woman employed in family businesses contributed these sums:

<u>Northeast</u>	<u>West</u>
P141	P276

Returns were greater for all working respondents 15-49 years old in the west. The median contribution was P351. When this was broken down by source of income, it became apparent that non-family employment brought in larger contributions:

<u>Family Business</u>	<u>Non-Family Enterprise</u>
P276	P509

Finally, these respondents were asked how many hours they worked in a typical week. The replies showed that hours were long for pay received, and this response suggests the neediness of the families of these respondents for even the small incomes they receive from their work. Median hours reported worked for the usual week were:

<u>Northeast</u>	<u>West</u>
54.2	48.7

Perhaps the longer hours worked in the northeast by respondent women reflect typically longer hours of work of agricultural laborers and tenants, and of vendors, peddlers, and petty traders (sweepstake tickets, foods, trinkets, etc.) who go about trying to sell their wares.

The data presented support the hypothesis that rural cooperative electrification has been positively associated with employment in non-farm enterprise.

The data have shown: (a) a large increase in off-farm enterprise, (b) this took place especially at and after the initiation of electricity, and (c) this increase largely affected household heads and males. Female employment remains restricted in volume, substantial types of jobs for them remain infrequent, and their wage and hour arrangements do not appear, except for rather infrequent more substantial employment, very attractive. Nevertheless, relatively more such substantial employment was found in the western, electrified segment than in the northeast which at the time of survey interviews had not been provided with electricity by MORESCO II.

Summary

This paper has presented data upon two aspects of the socio-economic impact of a rural cooperative electrification project in Misamis Oriental Province. It has done so in the attempt to contribute empirical data to questions raised concerning the contributions of various possible "packages" of developmental inputs to be made in particular localities or areas of developing countries. The paper has studied only one possible item of such potential packages, and that in just one rural electrification project. And it has done so by considering this item in isolation from other possible items. Other studies are needed of other single development infrastructures as well as studies of specific packages. On the basis of such data, cost/benefit and social soundness project proposals and project evaluations can be more demonstrably based upon factual data from past applications. Obviously, such studies are desirable, and especially those more complicated research investigations which would attempt to study several, or all, the items in a development project, each of them both in isolation as well as in combination with the other items of the package, in order to evaluate the different potential packages that could be delivered at different financial and social costs and returns. The techniques necessary for handling such complex

investigations are now at hand in various type model and multivariate analysis approaches. While the techniques are far from all that could be desired (when have they ever been so?), they are sufficient to make a credible beginning of such work.

This paper has reported upon only two aspects of the rural cooperative electrification project, MORESCO I. It has shown positive association between electrification and median income, and between electrification and non-farm employment. In doing so, it has also provided much material indicating positive results from the points of view of costs/benefits and social soundness aspects of the MORESCO I project.

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