

PD-AAA-413-A1

492-189

RT
334.68213
150

Dup.

AN EVALUATIVE STUDY OF THE MISAMIS
ORIENTAL RURAL ELECTRIC SERVICE COOPERATIVE

A.I.D.
Reference Center
Room 1656 NS

A.I.D.
Reference Center
Room 1656 NS

2

USAID/MANILA
1976

Mindanao Center for Population Studies, Research Institute
for Mindanao Culture, Xavier University

An Evaluative Study of the Misamis Oriental Rural Electric
Service Cooperative

United States Agency for International Development

Manila, Philippines

1976

120 pages

15 tables

43 exhibits

AID Contract Number:

AID Project Number: 492-51-220-189

Source: DIS

ARC Catalog No. RP 334,68213 U58

The main target of the Misamis Oriental Rural Electric Service Cooperative (MORESCO) has been the majority of the people who are poor in terms of economic goods. The target group has substantially benefitted from the project by increased quality in social and economic life. In addition, other segments of society have shared in the project's benefits. Electrification has improved health standards through (1) pure and safe water, (2) greater availability of services provided by clinics and hospitals, and (3) greater use of refrigerators to combat food spoilage. Electrification has increased the use and effectiveness of existing educational facilities. It has made homes safer and raised the quality of life by introducing household appliances such as electric irons. Production has increased in existing businesses and industries, and new businesses have been attracted to the area because of the cheap electricity. Agricultural production has increased due to electric power for pumping water (rice, etc.), and due to both water and lighting (hogs, poultry, etc.) Employment and income have increased because of the greater number of better paying jobs in the area due to the growing development of businesses, and due to the greater productivity of farms based upon electricity.

AN EVALUATIVE STUDY OF THE MISAMIS ORIENTAL
RURAL ELECTRIC SERVICE COOPERATIVE

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
SUMMARY AND CONCLUSIONS	1-5
SUMMARY OBSERVATIONS	6-18
INTRODUCTION	19
GEOPHYSICAL ASPECTS OF THE MORESCO SERVICE AREA	19-25
SOCIAL AND ECONOMIC IMPACT OF ELECTRIFICATION	26-53
DEMOGRAPHIC FACTORS	54-63
IMPACT OF ELECTRIFICATION UPON BUSINESS ESTABLISHMENTS	64-100
CONCLUSION	101
DESCRIPTION OF THE STUDY AREA	102-105
SOCIAL AND ECONOMIC IMPACT	106-120
Table 1 through Table 15	121-132
SUPPORTING DATA	
Exhibit A through Exhibit QQ	

AN EVALUATIVE STUDY OF THE MISAMIS ORIENTAL
RURAL ELECTRIC SERVICE COOPERATIVE

SUMMARY AND CONCLUSIONS

PURPOSE OF THE STUDY

The goal of rural electrification in the Philippines is to improve the quality of life of the rural poor. This goal considers not only the economic aspects of life, but the social as well. It has been the purpose of this study to discover whether or not the program has reached the poor in the area serviced by the Misamis Oriental Rural Electric Service Cooperative (MORESCO), the first and oldest cooperative established under the Philippine Rural Electrification program. The study was also to explore the nature and extent of the impact on the poor, if they had been reached by the program. Since people other than the poor have not been excluded from the benefits of electrification, the study was also to explore the impact upon the community as a whole. Finally, in view of the inevitable connection between improvement in level of living and gainful employment, the study was to explore the extent to which rural electrification has supplied the means for the development of business and industry, as well as for increasing agricultural employment.

DESIGN OF THE STUDY

The study consists of two samples: (1) an exploratory sample designed to demonstrate the basic economic and social effects of electrification in the MORESCO area; (2) a probability sample designed to establish the pattern of income distribution within the area. The entire study was undertaken by the Mindanao Center for Population Studies, Research Institute for Mindanao Culture, Xavier University, which is located at the Ateneo, Cagayan de Oro City, Mindanao.

FINDINGS AND CONCLUSIONS

1.a. Mean per capita income in the MORESCO area is sixty-nine dollars. Ninety-five percent confidence limits for mean per capita income are sixty-four to seventy-four dollars per annum. The level of incomes throughout the area must be considered low both by Philippine standards and by A.I.D. standards. Fifty-three percent of the households in the MORESCO area have an annual per capita income of less than fifty dollars. 80.2 percent of the households have an income under one hundred dollars per person per year. 89.7 percent of the households have a per capita income of less than one hundred fifty dollars per annum; the percentage of households with less than two hundred dollars per person per year income is 94.1 percent. Thus, approximately 95 percent of the population in this area earns an income of less than two hundred twenty-five dollars per capita per year or less than one hundred fifty dollars at 1969 prices.

1.b. Approximately 62 percent of users of MORESCO electricity belonging to the area's household population are below the subsistence level of income. Approximately 66 percent were below, at, or not far above it. This measure was based upon cash income mainly, but later investigation has shown that addition of income in kind will not greatly change these statistics. Occupational category of these users (household head) reinforces this picture. Farmers and/or fishermen constituted 59 percent of the household heads by occupation.

2. Electrification has brought the advantages of pure and safe water to many poblacions and barrios through construction of water systems based

upon water pumps and piping. Gastro-intestinal disease has been one of the main causes of death in rural areas and diseases transmitted through contaminated water have been a very large factor in such deaths.

3. We think it no exaggeration to say that services provided by clinics and hospitals are enabled to make a quantum jump through the availability of electric illumination and power.

4. The use of existing educational facilities has been multiplied by electrification and electrification has made such use much more effective. In addition, classes are benefitted by the facility with which teachers are now able to prepare their lesson plans and materials for the following day at night. Classes and learning are benefitted by the more thorough study which electric illumination makes possible at night.

5. The convenience of electric illumination in the household in contrast to the lighting of kerosene lamps and the utility of such adequate illumination in contrast to alternatives are points raised again and again by the respondents, both users and non-users alike.

6. One of the major household appliances bought by respondents was the simple thermostat electric clothes iron. Apparently this represents a great improvement from their point of view both from viewpoint of not burning clothes, and prevention of fires in the house.

7. Small refrigerators have also been bought by numerous households. Meat and fish spoilage as well as other food deterioration in the warm environment of a small house have been other main factors in the causation of gastro-intestinal disease. Storing these on top of shelves and on tables have permitted pests to contaminate them. Small ice boxes or refrigerators

combat both spoilage and pests. Because ice is not generally available in rural areas, small refrigerators are the practical alternative, presuming cheap electricity.

8. Monthly minimum electricity charge is for 17 kilowatt hours at ₱3.50. However, this minimum has had to be increased by levying a charge of ₱0.10 per kilowatt hour. At the minimum of 17 kilowatt hours per month, this makes the total minimum electricity bill ₱5.20. This charge is considerably less than the kerosene bill which households would otherwise have to pay for minimum illumination to meet their needs.

9. Initial costs of installation range from ₱50 to more than ₱150, depending upon number of outlets desired and distance from nearest MORESCO power pole. This charge for services (which MORESCO is willing to furnish almost for cost) and materials is competitive with the cost of pressure kerosene lamps, the alternative illumination system. Kerosene lamps are difficult to start, give wavering light after a time period of one or two hours, and are dirty because they emit fumes.

10. Efforts are being made by MORESCO to hook up isolated families providing distances are not too great to justify costs of construction and maintenance.

11. Other household appliances besides irons and refrigerators have also contributed to raise the level of quality of life, e.g., motors for sewing machines, house pumps, hot plates, electric radios, and the like. Electric radios save owners as much as ₱6.00 per month in battery costs because very many households do not consume their full 17 kilowatts per month and the radio thus runs without extra charge as much as the owner has time to listen to it.

12. Production has increased in existing businesses and industries, and new businesses have been attracted by the area to locate within it because of the cheap electricity. Agricultural production has increased due to electric power for pumping water (rice, etc.), and due to both water and lighting (hogs, poultry, etc.).

13. Employment and income have increased because of the greater number of better paying jobs in the area due to the growing development of large, medium, and small businesses, and due to the greater productivity of farms based upon electricity.

In view of these findings, which show that the main target of the MORESCO cooperative has been the majority of the people who are poor in terms of economic goods, and that such people have been substantially benefitted in increasing the quality of their social and economic life situations, the Research Institute for Mindanao Culture concludes that to a very substantial and highly satisfactory degree the MORESCO project has been realizing the goals and objectives which have been set for it, namely, improvement of the quality of life of the rural poor. At the same time, it has shared these benefits with other segments of society and thus contributed very substantially to a general social uplift of society in the area of its operations. One has the feeling when observing what has taken place, that he is watching economic and social take-off in a particular area of the Philippines, although in its incipient stages.

SUMMARY OBSERVATIONS

SOCIO-ECONOMIC IMPACT OF ELECTRIFICATION

The National Electrification Authority was enacted by RA 6038, August 4, 1969, with a national policy of total electrification on an "area coverage" basis through electric cooperatives, including all barrios on a 24-hour basis. By June 30, 1975, NEA electric coops had serviced 228,264 households in 1,615 barrios, that is 20 percent of the households in the covered areas.

MORESCO is an electrification project undertaken to demonstrate the viability of electric systems in rural areas. The project began in late 1967 with a feasibility study by the Agency for International Development and the National Rural Electrification Cooperative Association at the request of the Government of the Philippines. On September 26, 1971, the first section of the system was energized. Major construction was completed in June 1972. MORESCO is now in its fifth year of operation. It serves more than seven thousand members in ten municipalities of the western segment of Misamis Oriental province. The coop also serves five barrios of Cagayan de Oro City. By the time of the exploratory survey in 1975, the average person interviewed had been using electricity for more than 2.5 years. 16.3 percent of the users interviewed have had electric service in their homes since 1971. By the time the backbone of the system was completed in 1972, an additional 20.7 percent of the users interviewed had been reached. Another 45.8 percent have had electricity since 1973; 11.8 percent since 1974, and about 5.4 percent since 1975. The total number of heads of household "users" in the sample was two hundred three (203).

Threshold Income

The level at which families or households can begin to use electricity seems very low in terms of cash income per year per caput. The level of income at which a household becomes electrified apparently depends upon how urgently necessary electricity seems to the particular household. The lowest income which were found to be using electricity was in seven households in which annual per caput income was 222 pesos or about twenty-eight dollars. For a family of parents and five children, this amounts to a total annual income of approximately 1,555 pesos or about \$206.67. However, individual families among these seven were found to be below even this threshold income so that the twenty-eight dollar per capita figure must be considered as an average.

The Development Academy of the Philippines defines subsistence income as "the total annual income necessary to support a household of a given size at minimum standards of nutrition, good health and human existence." On a 1971 basis, the Academy established that about five thousand pesos would be the subsistence income for a family of six, including parents and four children or other household members. While probably high for 1971, investigators considered that the five thousand figure would be approximately correct for late 1975 when the survey was made. Two hundred eight (208) families out of the probability sample of two hundred fifty-three (253) households were found to be below this subsistence level, while another five were found to be within ten percent above these levels. Thus, about 84.2 percent of the families were below, at or near subsistence levels as defined by the Development Academy of the Philippines, in 1971. Only forty families, or 15.8 percent,

of the sample were found to have incomes exceeding the subsistence levels by more than ten percent.

STANDARDS OF LIVING

Users of electricity in the MORESCO area generally consider themselves to be enjoying a better present life situation than their neighbors. They also generally consider their present situation to be much better than their situation five years ago and much better than the situation of the previous generation. Their expectations, both for themselves and for their children revealed a greater degree of optimism than among their neighbors who have not yet joined the cooperative. Respondents stated two great advantages of electrification. First, that illumination can be as bright as desired and is most convenient compared to the lamps and candles previously used. Secondly, electric illumination permits further farm work at night with poultry and swine, preparing crops for market and for consumption, grading tobacco, making nipa roofing, etc. Women in particular were now free to work further from home in daytime, in the garden, with the poultry or livestock, or even to take a job since they could accomplish their home chores quickly and conveniently at night with the help of electric illumination and appliances.

To illustrate the attraction of electrical illumination, when one of the first poblacions was lit, barrio folk from all over the municipality came to see the lights on "Main Street." The people enjoyed the illumination so much that they stayed in groups talking into the small hours of the night. The next morning several youngsters were found curled up sleeping under or near the lights.

Among the appliances found to be in use were electric irons, motors for sewing machines, hot plates for cooking, small refrigerators, freezers, water pumps and electric radios. It was noted that conversion from battery to electric radios saved up to six pesos per month on batteries because it takes very little current to operate an electric radio - less than the amount that would cause a householder to go over the 17.5 kilowatt hours covered by the minimum monthly bill. The trend is definitely toward more appliances and higher levels of living.

IMPACT ON HEALTH SERVICES

In the 1950s Rural Health Units were established in each municipality by the Philippine Charity Sweepstakes. Each unit was staffed by a doctor, a nurse, a midwife and a sanitation inspector. These institutions provided a Monday to Saturday service which, unfortunately, was not very effective in many cases because kerosene-fueled sterilization stoves were difficult to pump, kerosene lamps were dirty, hot and spread fumes during operations, increasing the dangers of infection for patients being treated for wounds, open sores, etc. Daytime emergencies received much better treatment than those occurring at night. No funds were allocated to these institutions for purchase of fuel for either the lamps or the sterilization stoves.

During the first year of electrification, each Rural Health Unit installed an average of four electrical outlets as well as lighting. Three Rural Health Units immediately acquired electric stoves for sterilization purposes. Provision has now been made for Rural Health Units to acquire electric equipment such as stoves and sterilizers, spot light or flood light

for operations, and refrigerators for the storage of medicines. Investigation showed that the trend of clinics was to spend increasingly more for electricity each year thus demonstrating the increased use of lights and appliances. The Units are now able to do night emergencies as well as difficult parturition procedures and even Caesarean sections.

A Community Health Center has been inaugurated in Initao municipality by the Philippine Medical Care Commission. It has ten beds, an x-ray machine, an operating lamp, sterilizer, refrigerator, electric suction machines, electric stoves, and an electric fan. It is staffed by a doctor, a medical technician and three midwives. It treats an average of seventy clients per month and has an average of forty bed patients each month, both medicare and non-medicare. The Center would have been totally impractical prior to electrification. An emergency hospital has also been established in Initao with two doctors, nurses and a support staff of twenty. The hospital, which began operations in February 1975, has a sterilizer stove, electric suction machine, two fans and electric lighting. It has a twenty-six bed capacity, and treats an average of five hundred persons a month, with an average bed occupancy of eighteen.

IMPACT ON ENVIRONMENTAL HEALTH

Water supplies in the MORESCO area have been historically unsafe in many places. Drinking water is fetched from rivers or streams or from shallow wells, often open, in tin cans and bamboo tubes. When areas are flooded, water supplies are particularly unsafe for drinking. Human wastage has been a serious problem because of lack of water for flushing. This has led to

extensive pollution of rivers and streams. With electrification, the campaign for water-sealed toilet facilities has been stepped up, significantly improving sanitary disposal of human wastes. Every dwelling unit is now required to have sanitary disposals.

Many poblacions and barrios have established water systems. Twenty-seven systems were studied in nine municipalities. In the poblacions, eight of the nine municipalities use large water reservoirs and pipe water directly to houses. The ninth supplies water from the reservoir to public faucets via sanitary pipes. Sixteen of the eighteen barrios studied converted artesian wells into electrically operated systems, with two pumping water directly to houses while the others piped the water to public faucets. These systems use motors from 1/2 to 30 HP, costing water system members from two thousand to sixty thousand pesos. Funds come from community drives featuring dances, door-to-door solicitation and other social activities and from government agencies. Maintenance is provided for from monthly membership dues. Public water systems average about one hundred seven (107) members in the poblacions and about eighty (80) in the barrios, with additional people planning to join or to initiate similar neighborhood systems. When asked why they converted from other water supplies, members stated that the water is safer, the supply is faster and the maintenance is cheaper than when they previously had manual pumps. They emphasized that repairs are less frequent and parts less expensive for electric pumps than for the old manual pumps.

IMPACT ON EDUCATION

Interviews were held with eleven school principals and nine teachers in charge in twenty-two educational institutions, including a community college, three public high schools, two Catholic high schools, one public vocational school and one public barangay high school. Thirty-nine percent have already been electrified. The others are saving and planning for electrification.

Night classes are now possible in these institutions where they were impractical before except in areas served by diesel electricity. But even in those cases, great eye strain was noticed by teachers and students which has been eliminated since the more reliable power has become available from MORESCO. Today high school facilities can now be used for night vocational programs or for a second shift of students beyond the hours of darkness. The facilities can also be used now for community programs and ceremonies and for PTA meetings. The schools which have already been electrified cited a large and increasing number of fund-raising activities, dances, civic meetings, farmers' organization meetings, and other community activities. Teachers consider that they are now better prepared for their classes since they can work at night studying their subjects and preparing lesson plans as well as correcting papers, etc. Electricity is also used within the schools to sound bells for the starting and ending of classes, to operate audio visual systems and to facilitate a safe school water supply which is used both for drinking and in courses in gardening and animal husbandry, including swine and poultry raising. Nutrition programs, based on the

preparation and distribution of high calorie nutri-buns baked from PL 480 Title II ingredients supplied through voluntary agencies utilize electric stoves. Vocational courses need electricity for auto repair, electronics, woodworking, cooking, etc. Previously these courses were almost entirely theoretical since the schools lacked power to operate equipment essential to the conduct of practical training programs.

IMPACT ON BUSINESS AND COMMERCE

There is no doubt that business has been attracted to the MORESCO area by the availability of electricity and labor. It also affected business already in the area and stimulated the start of new businesses, all of which have tended to increase employment and raise income levels throughout the area.

Large Industries

1. The Mindanao Steel Corporation, formerly Jacinto Iron and Steel Corporation, relocated in Lugait municipality in 1973 with an authorized capitalization of five million pesos and a paid up capitalization of 1.4 million pesos. The company manufactures galvanized iron sheets. It enjoys gross sales of between three and four million pesos per annum. The company uses electric furnaces to heat base metals, chemicals, and black iron coils to proper temperatures, as well as much heavy electrical equipment. The plant presently employs ninety people at an average of twelve pesos per day. The company plans to expand its product line to include colored GI sheets during the next five years. It expects to require fifty percent more electricity than it is presently using if MORESCO can obtain additional power from its source, the Maria Christina Falls Hydroelectric facility.

2. Timber Industries of the Philippines. A saw mill located at El Salvador municipality which was founded in March 1975. Initial capitalization was three hundred thousand pesos but has now risen to about nine hundred thousand pesos. Gross monthly sales of lumber average about one hundred fifteen thousand pesos. The company used an average of 470 kilowatt hours in 1975 and wants an additional 1000 kilowatt hours if the additional power can be supplied. The company employs one hundred sixty (160) workers and has just initiated double shifting. In addition to its current equipment for moving and sawing timber, it expects to add a kiln drier which will use sawdust for fuel but electricity for ignition and circulation; a molding machine, a planer and a veneer plant. Maximum capacity is currently three hundred fifty thousand board feet but they hope to triple this within the near future with a concomitant increase in payroll.

3. Philippine Agro-Industries (Meiho Philippines) was established in 1973 in Kalabaylabay El Salvador municipality. The company is a joint venture with forty percent Japanese ownership. Capitalization is eight million pesos. The company produces sorghum hay cubes and powdered sorghum for export and sale in Japan and have gross monthly sales of \$10,000. The plant now employs one hundred fourteen (114) workers. The sorghum is grown by cooperative farmer suppliers who are paid thirty-two pesos per ton. There are two plantings a year, each planting results in three harvests at forty-five day intervals, with each harvest yielding thirty metric tons per hectare. The plant, however, is planning an irrigation system which they expect will increase yields to between sixty and ninety tons per hectare. The plant intends to increase the

area under cultivation by cooperating farmers from the present three hundred hectares to one thousand hectares and to establish six similar plants in the MORESCO area. This expansion, however, will be contingent upon additional electricity becoming available through MORESCO from Maria Christina Falls.

4. Other large industries planning and desirous of moving into the MORESCO area if power can be furnished include:

- (a) a ferro-chemical plant for the manufacture of ferrous silicon. Initial requirements are rather modest but will reach 22,000 kilowatt hours per year by 1977. The plant will be located in Manticao Rel municipality.
- (b) an electro-alloy plant which will require 500 kilowatt hours per month also wishes to locate in Manticao in 1977.
- (c) the existing P F Roa Cold Storage establishment wishes to expand to about 300 kilowatt hours per month by 1977 in El Salvador municipality.
- (d) a cannery wishes to locate in Initao in 1978 with an initial power load of 200 kilowatt hours per month.
- (e) an Oxygen and Acetylene Corporation plans to locate in the Manticao-Lugait area with initial requirements of 110 kilowatt hours per month.
- (f) Bagon Lipunam Marcos Prefab mill, a paper and pulp mill, proposes to locate in Opol. Electricity requirement has not yet been specified but it is anticipated to be very large.

5. Small to medium size enterprises. Small and medium size enterprises have sprung up throughout the MORESCO area. These include an iron foundry, producers of hollow cement blocks, rice and corn mill, a bulldozing and hauling business, and a large number of automotive repair shops. In addition, box factories, bowling pin manufacturers, bamboo fabrication plants and a wide variety of other enterprises too numerous to detail in this summary are cited in the main body of the report. Other commercial enterprises include furniture manufacturing, tailoring shops, facilities for entertainment such as the Society Theatre in Initao. Branch banks and various retail outlets have moved into the area because of the availability of electricity and because of the increased tempo of business in general since the inauguration of MORESCO. Pharmacies, bakeries and a large number of local neighborhood stores called Sari-Sari stores now boast refrigerators, freezers, electric stoves, jukeboxes, stereos, ovens, fans and illumination hitherto impossible.

IMPACT ON AGRICULTURE

Twenty-one irrigation systems have been initiated in the region. The largest of these is the Alub-Loguilo Irrigators Association which is called ALISA. Plans to irrigate 175 hectares, of which 75 are already being irrigated. The land now irrigated was previously idle or planted to corn, tobacco or coconuts. The Association began in 1973 with thirty members and only 27.5 hectares. Membership has now increased to 82. Funding came from a variety of sources. The Association borrowed eight thousand pesos from the Manticao Rural Bank for canal construction. MORESCO loaned the

Association 43,218 pesos for pumps and accessories and construction materials. Members put up 13,500 pesos in cash. Repayment is scheduled for each harvest when 150 pesos per hectare must be repaid to the Manticao Rural Bank, 75 pesos to amortize the MORESCO loan, 40 pesos for the cost of electricity. Based on interviews with eighteen ALISA members, it has been established that the total value of the annual harvest has increased from approximately 9,600 pesos to approximately 80,000 pesos. The Association total net value of the crop generated by each farmer has risen from 535 pesos before electrification and irrigation to about 3,150 pesos per year. The Cooperative plans to expand to include the entire 175 hectares in the system. Besides family members, farmers in the Association now employ more than 300 agricultural laborers or a ratio of about 2.6 paid agricultural workers for each unpaid family member laborer.

IMPACT ON POPULATION

The average annual population growth over the five year period 1970-1975 was 2.9 percent which indicates that growth in the MORESCO segment has been slowing up slightly from its growth in the 1960s when it was more than 3 percent. Since the growth rate was in excess of 3 percent at the beginning of the present decade, this indicates that natural increase has declined or out-migration has increased. However, the available data do not indicate a significant increase in out-migration after 1972. The intercensal growth (from the 1970 to the 1975 census) is therefore corroborative of the decline in birth rate directly indicated by the Mindanao Center for Population Study data. These data demonstrate that between 1970 and 1975 population in ten municipalities studied increased from 107,921 to 124,475. The number of

households increased from 17,775 to 20,717, indicating a slight decline in the average size of households from 6.1 to 6.0 members. The density of people per square kilometer has increased from 132.9 to 153.3 during the period. The most interesting data, however, are those which indicate a sharp decline in births from 46.0 per thousand in 1970 to 31.7 per thousand in 1975. This phenomena did not occur in the eastern portion of the province which is not served by the rural electrification program. Between the same years, deaths have decreased from 13.2 per thousand to 12.2 per thousand and infant mortality from 85.0 per thousand to 75.0 per thousand. The sharp decline in the crude birth rates is one of the most interesting phenomena uncovered by the study.

INTRODUCTION

The goal of the Misamis Oriental Rural Electric Service Cooperative (hereinafter called MORESCO) was stated by its proponents, the National Electrification Administration and the USAID, to improve the quality of life of the poor majority living in the Cooperative's intended area of coverage, in terms of economic goods. This goal has been described as including not only economic but also social gains in standards of living. It, of course, also extends to improving the living conditions of other segments of society as well, although stress is upon the poor, who make up the great bulk of the people. Since economic gains and improvement in level of living inevitably are connected with gainful employment, the purpose of the project also embraces supplying through electrification the means for the development of business industry of various magnitudes from small to very large.

GEOPHYSICAL ASPECTS OF THE MORESCO SERVICE AREA

The MORESCO is situated in the western segment of Misamis Oriental Province and lies westwards of the borders of Cagayan de Oro City. It will prove helpful to understand some features of the province within which the MORESCO operates for contextual purposes.

Misamis Oriental Province is a coastal province in north central Mindanao Island which is the second largest of the Philippine Islands. Since separation from Camiguin Island, which in 1966 became an independent province,

Misamis Oriental has included an area of 3,570.1 square kilometers. The percentage utilization of this land area has been estimated by the regional offices of the Bureau of Lands and of the Bureau of Fisheries as follows:

Agricultural lands		45.0
Pasture lands		m 5.8
Open pasture	5.6	
Other pasture	0.2	
Forest Area		9.5
Timberlands	5.5	
Forest reserves	2.1	
Reforestation proj.	1.9	
Fishponds (522.7 hac)		0.1
Brackish water type	99.7	
% Fresh water type	0.3	
Other types land (mountainous sites, swamplands, beaches, etc.)		<u>39.6</u>
All area (3,570.1 square km.)		100.0

Turning now more specifically to the MORESCO service area of the province, one finds that it covers 812.2 square kilometers, or 22.6 percent of the provincial territory. This segment is characterized by a relatively narrow coastal strip often only a few feet above sea level which rises, sometimes abruptly but more usually in a series of ridges of 10 to 20 meters, to heights of from 20 to more than 100 meters, when one has penetrated one to three kilometers inland from the coast. The highest mountains in the area are the Katanglad and the Caballero Ranges. The Caballero Range is found in the central part of the western segment of the province, south of Gitagum and west of Lourdes Barric of Alubijid, where it reaches heights of more than 500 meters in places. The more massive Katanglad Range is found running across the whole bottom of the western segment of the province and extends into Bukidnon Province where its highest peaks are found. However, even in the western segment of Misamis Oriental its peaks reach elevations of

800 and even 900 meters above sea level. In general, the topography of the inland areas of this western segment is rugged and hilly, although interspersed with fertile valleys and plateaus useful for agricultural purposes.

Short swift rivers and creeks characterize the drainage, which is northwards into Macajalar Bay or westwards into the Mindanao Sea. More than twenty such watercourses are found between Cagayan and the border of Iligan City, the capital of Lanao del Norte Province. The longest of these is the Alubijid River which rises in the Caballero and Katanglad ranges and flows about 35 kilometers into Macajalar Bay eastwards of the Alubijid municipal poblacion. No lakes of any size other than the coastal fishponds and swamplands are found in the area. The area of such swamplands is small, is found mainly in the Opol to Alubijid area, and would not include more than a few square kilometers altogether. The coastline from Opol to the border of Iligan City with Lugait is approximately 75 kilometers in length, exclusive of small indentations.

The climate is rainy and is characterized by high relative humidity and maximum daily Fahrenheit temperatures in the mid-80's with seasonal variations upwards during the short but dry summer (late March to early or middle May), and downwards in the cooler months of January and February. The latitude of the MORESCO segment (about 8° degrees, 15' North to about 8° degrees, 40' North) does not allow for much such seasonal variation. Annual rainfall averaged slightly more than 1600 millimeters (about 63 inches) between the years 1903 and 1933 inclusive, and slightly more than 1740 millimeters (about 68 inches) between 1970 and 1974.

As much as 45 percent of the MORESCO land area, despite its rugged character, is estimated to be agriculturable (partly for seasonal and partly for perennial crops) by the Bureau of Lands. The soils are mainly clay, clay loam, and loam in that order, or mountain soils. Typically, the soils of the inland area tend to be stony, and seasonal crops, unless grown by means of a digging stick technology, require removal of stones before or during plowing when new areas are farmed. Exceptions, of course, occur where the soil is both deep and relatively stoneless. It is of interest that of all swamplands in the province capable of development into fishponds, only 18.3 percent are to be found in the MORESCO service area, while on the other hand, 59.4 percent of all of the provincial brackish water fishponds (such as are used for cultivation of bangus, a tasty whitefleshed fish) are to be found in the 22.6 percent of the provincial area covered by the MORESCO. The figures suggest that the MORESCO segment inhabitants are more alert and eager for the development of such fishponds.

Ten municipalities, including the poblacions (town centers) of each (which in some cases include more than one barangay) and 321 more rural barangays, are found in the MORESCO service area in the province west of Cagayan de Oro. These all consist of a coastal strip and a much larger inland area, and begin with Opol Municipality, adjacent to Cagayan de Oro City, and extend westwards and southwards along the coast to Lugait Municipality, which borders on Iligan City and Lanao del Norte Province. The heaviest densities of population are found on or closely adjacent to the coastal strip, as is the national road connecting Cagayan with Iligan City. The municipal seats of government are invariably found close to this road.

The main occupation of the bulk of the population is farming. No barangays exist which devote themselves preponderantly to fishing, which is partly due to the limiting factor of Macajalar Bay and the adjacent areas of the Mindanao Sea, where the fishing is at best only moderately good. In most municipalities, however, some fishermen will be found, although not infrequently investigation will disclose that the occupation is only part-time. Alubijid, El Salvador, Gitagum, Initao, and Opol are the municipalities where larger numbers of fishermen are found.

Some population and related data for the ten municipalities of the MORESCO area, as estimated by the Mindanao Center for Population Studies (MCPS) are:

Type of Data Presented :	Y E A R					
	1970	1971	1972	1973	1974	1975
Population	107,921	111,046	114,260	117,568	120,971	124,475
Households	17,776	18,329	18,899	19,486	20,092	20,717
Av. Size, Households	6.1	6.1	6.0	6.0	6.0	6.0
Density per Square Km.	132.9	136.7	140.7	144.8	148.9	153.3
Births/1000	46.0	45.8	43.8	38.6	31.4	31.7
Deaths/1000	13.2*	13.0	12.8	12.6	12.4	12.2*
Inf. Mortality	85.0*	80.0	63.7	77.5	95.0	75.0*

*No data or only partial data for these years.

From these data we see that 22.3 percent of the Misamis Oriental population reside in the 22.6 percent of the provincial territory of the MORESCO segment. Thus the average density of the area is quite similar to that of the

remainder of the province. We also note that the average annual population growth over the five year period was 2.9 percent which indicates that population growth in the MORESCO segment has been slowing up slightly from its growth in the decade of the 1960's when it was more than 3 percent. Since the growth rate was in excess of 3 percent at the beginning of the present decade, this indicates that natural increase has declined or out-migration has increased. The available data do not indicate a significant increase in out-migration after 1972, however. The intercensal growth (from the 1970 to the 1975 census) is therefore corroborative of the decline in birth rate directly indicated by the MCPS data.

Migration data are available in MCPS for the years 1971, 1972, 1973, and 1974. They have been analyzed in detail however only for 1972. These data, shown below, indicate that while number of in-migrants and of out-migrants has been relatively large, about 16 and 14 percent respectively, the net migration has been small. Delayed marriage may also be a factor, but it seems unlikely by itself to have brought about more than a fraction of such a result since it has been a fairly regular factor, although progressively increasing since World War II. Migrants have been concentrated at ages 0 to 34 (85 percent or more of all migrants in 1972). While the largest number of these are single persons (46 to 53 percent), a very large proportion of these are children and youth under 14 years of age who presumably migrate with their parents. On the other hand, persons 25-34 years

of age account for 12 - 16 percent of all migrants, which would indicate the migration of many young couples and their children, as most Filipinos are married by age 30.

<u>In-migrants, 1972</u>	<u>Out-migrants, 1972</u>	<u>Net Migration, 1972</u>
19,996	17,825	2,171

SOCIAL AND ECONOMIC IMPACT OF ELECTRIFICATION

The purpose of this study was to determine the economic, social, and cultural impact upon the people of the western part of Misamis Oriental as a result of the introduction of and the availability of cheap electric current. This preliminary report will summarize and highlight principal findings of this study, leaving for the most part the mass of statistical tables and details to the later more detailed report.

Threshold Income

Threshold income for purposes of this study was defined as the minimum income necessary for an individual or family to switch from traditional sources of light and power to electricity. It was found to be astonishingly low, although some variation exists from household to household in terms of per capita income and although some households used exceptionally small amounts of electricity, as low as less than 4 kilowatts per month, although they had to pay for the minimum 17 kilowatts per month.

Seven families were investigated in this stratum of the purposive and exploratory sample drawn from the records of the Misamis Oriental Rural Electric Service Cooperative (MORESCO), the electric cooperative providing the electricity whose impact is the subject of this study. The lowest per caput income of the seven households studied was less than ₱111 per annum or less than \$15 per member of a nine-person household consisting of husband, wife, four children, and three other persons. Three other families had a per caput income of less than ₱200 (about \$26) for a five-person household consisting of parents and three children in two cases, and for parents, two children, and a third person in the other case. The fifth family had a per caput income of less than

₱250 (about \$33) for the married couple and their two children. The sixth family had a per caput income of less than ₱333 per year (about \$44) for the parents and their one child. Finally, the seventh family had a per caput income of less than ₱500 (about \$66) for each of the two parents. Overall, the threshold income computed on the basis of this investigation from one point of view may be taken as that received by the average of these seven families, namely, ₱222 per caput or about \$28 per annum. From another point of view, it may be taken as the average of the four families below this overall average, namely, ₱167 per annum or about \$22 per year per person. This figure incidentally is verified by the lowest per caput income in the next highest total household income class (₱1,000 - 1,999). A husband, wife, and ten children using electricity in this bracket also had a per caput income of ₱167.

Closely allied with the question of threshold income is the topic of subsistence income. This concept is defined for purposes of this research as the total income necessary to support a household of given size (number of persons) at minimum standards of good health, nutrition, and human existence. While the Development Academy of the Philippines published such estimates in 1971 relative to rural household size, at that time these estimates seemed high to some experts. With the results of the inflation and the oil crisis upon the Philippine economy, these estimates no longer seem too high and were therefore utilized in the present study.

Subsistence income is of interest because the distribution of households by income above and below subsistence income levels will enable one to conclude to the main type of persons assisted by the benefits of the project. In the section, Demographic Factors, a more detailed report will be found. Here it suffices to say that in our _____ PPS _____ of Users of electric current, drawn from the MORESCO records, 67.1 percent of the 253 households were trying to

make both ends meet with household incomes below subsistence levels of income.

A percentage breakdown of this finding by levels of household income found in our earlier exploratory sample of 203 user households in 411 user and non-user households interviewed is:

<u>TOTAL ANNUAL INCOME</u>	<u>BELOW SUBSISTENCE LEVEL</u>	<u>AT OR ABOVE SUBSISTENCE LEVEL</u>
Below ₦1,000	3.9	0.0
₦1,000 - 1,999	16.7	1.5
₦2,000 - 2,999	11.3	2.0
₦3,000 - 3,999	9.9	3.9
₦4,000 - 4,999	10.3	3.4
₦5,000 - 5,999	5.4	3.9
₦6,000 - 6,999	3.0	3.4
₦7,000 - 7,999	1.0	2.5
₦8,000 - 8,999	0.5	4.5
₦9,000 - 9,999	0.0	3.9
₦10,000 and above	0.0	8.9
	126 families	77 families

In the light of these data, it is hard not to conclude that the electric cooperative is in fact getting down very substantially to the level of the rural poor. In addition to the above data on those with below subsistence incomes, the 77 families above subsistence levels may be analyzed in terms of how far they are above such subsistence levels. If average household size is taken from the sample, 6.0 persons, then subsistence income by the DAP scale would be ₦5,000 for the average family. Only 55 of the 77 families, or 71 percent, would be above this subsistence level, while 8 families, or an additional 10 percent would be within a range of 20 percent above it. In short, 30 of the 77 families above subsistence income level are not far above bare minimum levels of living. This is a fairly large percentage of the total of 77 families, 39 percent, and this statistic further supports the conclusion that the MORESCO is rather fee effectively reaching down to the rural poor. Altogether, 156 of the 203 User families are below or near subsistence levels of total annual income.

Another way of judging upon the same question is to examine the main occupations of household heads of the User category of households. The prestige

make both ends meet with household incomes below subsistence levels of income.

A percentage breakdown of this finding by levels of household income is

<u>TOTAL ANNUAL INCOME</u>	<u>BELOW SUBSISTENCE LEVEL</u>	<u>AT OR ABOVE SUBSISTENCE LEVEL</u>
Below ₦1,000	3.9	0.0
₦1,000 - 1,999	16.7	1.5
₦2,000 - 2,999	11.3	2.0
₦3,000 - 3,999	9.9	3.9
₦4,000 - 4,999	10.3	3.4
₦5,000 - 5,999	5.4	3.9
₦6,000 - 6,999	3.0	3.4
₦7,000 - 7,999	1.0	2.5
₦8,000 - 8,999	0.5	4.5
₦9,000 - 9,999	0.0	3.9
₦10,000 and above	0.0	8.9
	126 families	77 families

In the light of these data, it is hard not to conclude that the electric cooperative is in fact getting down very substantially to the level of the rural poor. In addition to the above data on those with below subsistence incomes, the 77 families above subsistence levels may be analyzed in terms of how far they are above such subsistence levels. If average household size is taken from the sample, 6.0 persons, then subsistence income by the DAP scale would be ₦5,000 for the average family. Only 55 of the 77 families, or 71 per cent, would be above this subsistence level, while 8 families, or an additional 10 per cent would be within a range of 20 per cent above it. In short, 30 of the 77 families above subsistence income level are not far above bare minimum levels of living. This is a fairly large percentage of the total of 77 families, 39 per cent, and this statistic further supports the conclusion that the MORESCO is rather effectively reaching down to the rural poor. Altogether, 156 of the 203 User families are below or near subsistence levels of total annual income.

Another way of judging upon the same question is to examine the main occupations of household heads of the User category of households. The prestige

level of these occupations should indicate the extent to which the project is reaching the common man. Of the User category, 46 per cent are engaged in agriculture, 13 per cent in fishing, 4 per cent in transportation (bus and jeepney driving, etc.), 5 per cent in construction (carpenters, etc.), 9 per cent in commerce, 5 per cent in manufacturing, 3 per cent in personal and business services, and 9 per cent in various commercial enterprises. To a very large extent, these are the occupations of the common man in Misamis Oriental. Manufacturing tends to be small scale, and even when large scale, most of the persons employed are operatives rather than upper level personnel. Agriculture is mainly on a small farm basis and many owners do their own farming, assisted in some phases by some or all able-bodied of their family as at harvest time. Remaining categories include more of the prestige occupations, namely, persons principally living upon rents and other fixed income, 1.0 per cent, and professionals (doctors, lawyers, teachers, etc.) 11 per cent. Three per cent of all User category household heads were unemployed.

It seems clear from the above that the MORESCO project is primarily benefitting the common man type of User households.

Several human interest stories may be of interest in connection with the foregoing. In a piggery, the owner was bothered by a large labor turn-over. Trying to understand the reasons for this, he recalled that after electrification had begun, he had not switched over from his mechanical pump to electrification. Suspecting that his workers tired of work in his establishment because of the drudgery of pumping up water for cleaning the sties, giving drink to the pigs, etc., he experimented with an electricity-powered pump, and now finds that for over a year he has had no labor turn-over problems. This indicates ways other than illumination by which electricity has lightened the load of the common man.

The women say that because of electrification they can do their house-work at night and be available to take outside jobs or do more income-producing farm chores during the day time. Because of this, Initao Municipality has set up the beginning of a garment-sewing industry, and is currently giving specialized training to women who would like to work in this field.

A final anecdote illustrating the reaction to electrification of the population of western Misamis Oriental relates to Alubijid Municipality. When the small built-up center, called the poblacion, of this municipality had first been illuminated in a small way, residents from several of the barrios came in to revel in the light along the "main street". They liked it so much that they stayed there talking into the wee hours of the morning. Next morning when the residents of the poblacion came out to go to work, they found several of the youngsters coiled up asleep under or near some of the lights.

Standards of Living

Standards of living throughout the MORESCO area of western Misamis Oriental Province are generally low. One of the interesting questions concerned with the MORESCO electrification project is how low or high these are for the population of the area in general without relation to use category of electricity and then how the different use categories differ, if indeed they do, in terms of such standards.

Standard of living can of course be measured from numerous points of view, all of which contribute something to an overall picture. Because of the wide scope of the present study, however, it must limit itself to but several of these possible.

Income breakdown by use category is as follows:

<u>Use Category</u>	<u>Below ₱2,000</u>	<u>₱2000 - ₱4999</u>	<u>₱5000 and Above</u>	<u>Total Per Cents</u>	<u>Total Households</u>
Users	21.2	43.3	35.5	100.0	203
Non-Adoptors	45.8	44.9	9.3	100.0	118
Inaccessibles	57.5	40.0	2.5	100.0	40
Disconnected	30.0	46.0	24.0	100.0	50
All Categories	135	180	96		411

This breakdown indicates that 77 per cent of all households earn less than ₱5,000 per year. User households were 12 per cent above this level, while disconnecteds were only 1 per cent above it. On the other hand, the income of 14 per cent of the Non-Adaptor households was below this level while the income of 20 per cent of the households which had no access to electricity was beneath this income point.

This means that the Users had somewhat higher average income than any of the other households. Does this indicate that use of electricity has added to their incomes, and is the cause of the difference?

The data do not permit one to answer this question. It was felt that an interview question on total annual income four years before interview would not furnish reliable results, so the question was not asked.

However, in order to gain some insight into possibilities, several other questions were asked on level of social living. If the answers to all these questions indicated results favorable to electricity users, while not conclusive, these results would support the view that electrification had made some, if not all, of the difference.

The first set of questions asked was concerned with level of living. It was based upon such scaled items as house construction materials, rooms in home, cooking facilities, facilities for storage of perishable goods, type of

illumination, source of cooking and drinking water, toilet facilities, means of transportation, improvements in house, and house ownership. Higher scores show a higher level of living. The summary scores for this set of questions were:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnectedds</u>
3.8	2.2	2.4	3.0

A second set of questions was constructed in order to eliminate differences which could conceivably be due to appliances and facilities whose presence or absence might conceivably be due to the availability of electricity. (For example, one might purchase a refrigerator if electricity were available but might have no desire to purchase an icebox where electricity is not available, because of the difficulty of obtaining a ready supply of ice in a rural area.) The scores of this index (which eliminated scores on cooking facilities, facilities for food storage, and type of illumination) were:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnectedds</u>
3.7	2.2	2.3	3.0

As is evident, the scores were scarcely affected by elimination of the possibly electric-related items. In both sets, User households exhibited a higher average level of living index than any of the other categories. It may be mentioned here that one of the items noted in houses of both Users and non-Users were small radios. However, non-Users had to pay as much as ₦6.00 per month for batteries for their transistor radios. On the other hand users of electricity generally paid little for their radio current because their sets were connected directly to the electric current in their houses. In fact, many paid nothing more for this current since they usually did not consume more

than the 17 kilowatts monthly minimum of electricity, whether or not they used their radios constantly.

Another indication of standard of living is social participation. Some indication of quality of life is conveyed by the degree to which a family participates in social organizations on a regular basis. Participation in the following organizations was the subject of inquiry: cooperatives, other farm associations, educational associations (P.T.A., especially), civic associations, cultural, and religious associations. Respondents who belonged to any organizations were asked whether they had ever been officers in such organizations, and if so, the precise position they had held, the frequency of their attendance at meetings, and the date of the last meeting of each organization they had attended. Weighted scores were assigned to the answers and these were summed. The scores for each of the four categories were:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnecteds</u>
2.4	1.6	2.5	2.3

Participation tended to be low for all categories. More than 37 per cent (37.2) belonged to no organization at all, while only 57.5 per cent of the Non-Adaptor household respondents belonged to one or more organizations, and only 60.1 per cent of the Users. More respondents of the Inaccessible and Disconnected households belonged to one or more organizations, 88.9 and 93.5 per cent, respectively.

An interesting sideline on quality of life is provided by recreational activities. Asked what recreational activities they usually engage in, 40.9 per cent of the respondents said their most frequent recreation was dancing, 21.7 per cent said cock fights, 20.2 per cent said visits with friends, and 18.2 per cent said sports. However, participation in terms of frequency in such activities seems low. Asked about this, respondents said that they were too

busy to spend much time on such activities.

Another indication of standard of living is exposure to the mass media. Persons with lower exposure to the media are usually those with lower incomes and lower social standing in communities. An index was constructed in terms of exposure of respondent households to radio, television, newspapers, and magazines. It is difficult in such an index to eliminate the effects of electricity in the household since so many people listen to the radio and this is more conveniently and economically listened to when electric power is available in the household. However, some attempt to eliminate some of the effects of electricity upon scores was made by eliminating television from the index to form a second, more electricity-free set of scores. The scores by use category were:

<u>INDEX</u>	<u>User</u>	<u>Non-Adopter</u>	<u>Inaccessible</u>	<u>Disconnected</u>
<u>I</u>	<u>Households</u>	<u>Households</u>	<u>Households</u>	<u>Households</u>
	3.2	2.6	2.8	2.6
<u>INDEX II</u> (w/o T.V.)	3.2	2.6	2.8	2.6

It is evident that electricity gives people greater access to mass media and to the news. Presumably this should give them an advantage in many ways relating to standards of living such as taking advantage of governmental services, capitalizing upon opportunities for employment or for advantageous transactions.

Another indication of level of life is found in educational achievement. This particular indicator should be free of the effects of the MORESCO electrification project and thus allow for some sorting out of use categories by previous educational backgrounds.

Of 411 household heads in the sample, 9.7 per cent had not completed one year of school. A majority, 56.7 per cent, had completed at least one grade of

elementary school, and of these (97 of 233), 42 per cent had completed grade school. Only 16.3 per cent had completed one grade of high school, and of these 22.4 per cent (15 of 67) had completed high school. Of the remaining 14 per cent who had attended college, only one in ten completed college. Median grade completed was 5.3 grades, less than a complete elementary education.

In this overall picture, educational achievement of use-categories of electricity in terms of median grade completed was:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnected</u>
5.8	4.0	3.8	5.3

Thus it can be seen that Users already were somewhat advantaged over non-Users even before the effects of electrification were felt. However, the differences between categories are not large, and leave room for the probability that some of the differences noted above for the different use-categories of electricity have resulted precisely from the advantage of electrification which Users have over non-Users.

A more immediate way of measuring change in standard of living is to focus upon satisfaction with the present situation and standard of life. In order to obtain some grip upon that elusive baseline condition which existed before inception of the electrification project, respondents were asked among other things to compare their present level of satisfaction with their situation with that they enjoyed five years ago. (Five years was chosen as the point of comparison because some electrification had been provided as early as 1971.) (This index was adapted from J. Michael Davis, John Saunders, and Galen Moses, Rural Electrification: An Evaluation of Effects on Economic and Social Changes in Costa Rica and Colombia, August 31, 1973).

In the first index, respondents were asked whether their present life situation was better (4), much better (5), worse (2), or much worse (1), or

about the same (3) as that of their neighbor. Higher scores indicate higher satisfaction. The numbers in parenthesis indicate the scores assigned answers.

Scores by use-categories were:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnected</u>
3.19	2.92	3.10	2.98

The second index presents scores of respondents relative to their situation five years ago as compared to their present situation. The same categories and scores were used as above. The scores were:

3.20	2.87	2.92	2.88
------	------	------	------

This set of answers relating to a comparison of the past with the present is particularly interesting in that it shows increased satisfaction with the life situation of Users, but decreased satisfaction with present as compared to past for all other categories of electrification use. This set of data offers strong evidence for an increase in quality of life among Users to offset the general decline in many satisfactions experienced by all categories due to inflation, reduced real wages, increased costs of food and commodities, and probably reflected in the answers supplied by the other three categories of electrification use. Since this increase tallies with the period of electrification and is found only among electricity users, it furnishes considerable support to the position that some of the increase in income and other aspects of standard of living derives from electrification itself.

The third index compares the situation of the household today with that of their father's household. Scores were:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnected</u>
3.32	2.97	2.98	3.00

The User's score is the only one that reflects an average sense of having improved conditions over those of their fathers' households. The other reflect

a decline from their fathers' situation, except for the disconnecteds who do not see much difference. (It should be emphasized that these scores are average scores, and that therefore a slight difference in score means much more than a slight difference in individual scores.)

The fourth index and the fifth index are buoyancy indexes and reflect optimism of respondent for the future. This is a function of present standard of living and of the hopes for the future that present prospects engender. Both these indexes therefore give some insight into respondent's evaluation of the quality of his present life situation. The first of the following two indices relates to the comparison of the present situation with that he expects to have five years in the future (better, worse, etc., as above) and the second relates to the future he expects for his children when they grow up. Scores for the first index were:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnecteds</u>
3.30	3.08	3.18	3.22

Scores for the second index were:

3.22	3.13	3.22	3.16
------	------	------	------

Once again, Users are characterized by higher scores, the only exception in the whole series of indices being the tie with the Inaccessibles in the last index.

Combining all the foregoing scores into one composite index (giving equal weight to all indices), the following composite scores for satisfaction with life situation result:

<u>Users</u>	<u>Non-Adoptors</u>	<u>Inaccessibles</u>	<u>Disconnecteds</u>
3.25	2.99	3.08	3.05

Summing up these indices, they indicate that since electrification User respondents had reason to feel that their life situation had improved, while

other respondents felt that theirs had degenerated. In addition, User respondents felt that their situation or living standard had improved over that of their fathers, while all other respondents felt it had remained the same or had degenerated. Finally, Users felt greater optimism for both their own and their children's future than did the other respondents with the exception of a tie score with Inaccessibles. Taken together, these indices furnish rather strong support for the view that electrification has already improved the standard of living of Users, at least in the estimation of the Users themselves, who in the last analysis are probably the best judges on the question.

A final attempt was made to pry into this improvement because of electrification question by means of a set of questions on "windfall" wealth. Respondents were asked how they would spend their winnings, if they should win first prize, second prize, or third prize in a lottery. The amounts proposed for these prizes to the respondents were ₱10,000, ₱5,000, and ₱1,000. The logic of the questions was that the responses might provide insight into how the different use-categories of electricity would employ these financial means to improve their life situations. It was thought that meaningful differences might be exposed in this way which would shed light upon electrification effects.

In fact, differences between use-categories were not very meaningful from this point of view. They are presented in the table following this page. However, they are of interest from other points of view and deserve some comment here.

Responses were grouped into five categories. The second category shown in the table includes investment in such productive enterprises as in businesses, in work animals and in other livestock, in farm land and in farm equipment, in fishing equipment, and the like. The third category includes allocation of funds to such items as buying or building a new house, making additions to or otherwise

remodelling the old home, and buying household appliances and necessities. The other categories are self explanatory.

The main allocation of all winnings made by respondents, regardless of electricity-use category, was to investment in productive enterprises and to bank deposits (taken jointly). This indicates the felt need for income-producing assets to upgrade their present standard of living, and the willingness to sacrifice current consumption desires for such longer range goals.

Differences in use-categories are observable. Non-Adoptors consistently allocated more funds to home improvements. This pattern may reflect the lower level of living of Non-Adoptors in comparison to the other three categories and a felt need to upgrade this level. The relatively high allocations of Users to home improvements may reflect awareness of new possibilities through electrification of further improving their life situation.

The relatively higher allocations of Non-Adoptors and of Disconnecteds to investment in productive enterprises is consistent with their lower levels of income and their need for more income. The relatively lower investment allocations of the inaccessibles may reflect less opportunity for such investments since they live in rural inland areas where opportunities for self-owned businesses are small. This may also explain their relatively larger allocations to savings deposits in banks.

Another way of looking at the data is to examine the relative importance of the productive investment category as winnings increase from ₱1,000 to ₱5,000, and from ₱5,000 to ₱10,000. It is interesting to note for all categories of electricity use that as winnings increase above ₱1,000, the allocations to investment in productive enterprises generally increase, while allocation to home improvements decreases. The reason may be that such investments as buying a farm or starting a business tend to require larger amounts

Percentages of Responses to Lottery Questions by Use-Category^a

Use-Cate- gories and Prizeclasses	ALLOCATIONS OF LOTTERY WINNINGS						'Household Heads
	'Bank 'Deposits	'Productive 'Investments	'Home 'Improvements	'Educa.tional 'Outlays	'Other 'Allocations		
<u>USERS</u>							
Prize 1	25.1	38.9	43.3	2.0	3.0	203	
Prize 2	24.6	63.0	39.5	4.4	3.9	203	
Prize 3	38.4	59.1	32.4	3.4	8.9	203	
<u>NON-ADOPTORS</u>							
Prize 1	16.1	48.3	47.5	0.8	0.0	118	
Prize 2	24.6	72.1	31.3	2.5	2.5	118	
Prize 3	46.6	68.6	37.3	1.7	5.9	118	
<u>INACCESSIBLES</u>							
Prize 1	22.5	37.5	40.0	0.0	0.0	40	
Prize 2	40.0	60.0	20.0	0.0	0.0	40	
Prize 3	60.0	52.5	12.5	0.0	0.0	40	
<u>DISCONNECTEDS</u>							
Prize 1	22.0	50.0	30.0	0.0	0.0	50	
Prize 2	34.0	66.0	17.0	4.0	0.0	50	
Prize 3	48.0	68.0	18.0	0.0	2.0	50	
<u>ALL USERS</u>							
Prize 1	21.9	42.8	42.7	1.2	1.5	411	
Prize 2	27.2	65.6	27.5	3.4	2.6	411	
Prize 3	44.0	62.2	30.1	2.4	6.3	411	

^a Respondents were allowed, although not encouraged, to give split answers to each question. Each answer was scored in the proper cell and the total of this cell divided by total responses for the use-prize category. Thus cell totals do not add to 100 per cent. Non-response is not shown.

of capital than do expenditures for home improvements. Possibly this reveals an implication for economic development, namely, that small and irregular increases in income are easily dissipated in household consumption, while on the other hand, only at particular thresholds do increases in income lay the basis for self-generating income through investment in productive enterprise.

Other Social Aspects of Electrification: Health, Water Supply, Religious, Civic, Demographic, Educational, and Entertainment Consequences

The five years of electrification in the rural west of Misamis Oriental have witnessed parallel progress in medical and health activities.

Some background information is necessary to understand this progress. In the early 1950's, through aid from the Philippine Charity Sweepstakes organization, the government instituted dispensaries, called Rural Health Units (RHU), in every municipality in order to meet the medical needs of the people. El Salvador Municipality was the first municipality to obtain such a unit, through the efforts of its mayor and council, and became the pilot RHU of the province. Subsequently, the other municipalities obtained establishment of their units. Alubijid Municipality instituted two public clinics, one the usual RHU and the other a clinic of the Institute of Maternal and Child Health (IMCH).

Each of the RHUs offer the following medical and health services to the public: consultation, medical care (including minor operations), maternal and child health care, control of communicable diseases through immunization, epidemiological services, campaigns for environmental sanitation, some laboratory and research services, and encouragement of the registration of vital events together with the compilation of vital and of health statistics.

The staff of RHU clinics is composed of a doctor, a nurse, a midwife, and a sanitary inspector, whose services are available Mondays through Saturdays.

RHU services were inadequate prior to electrification. Emergency services at night encountered lighting problems. Kerosene lamps, while usually employed, were slow to light up. Fuel costs constituted a problem because no funds had been allocated for this purpose. In some municipalities, patients had to bring their own lamps to illuminate the clinic. Sterilization presented another problem. Kerosene stoves require laborious pumping before the sterilization of needed medical instruments can begin. Environmental sanitation campaigns were not very effective, particularly that related to human wastage, because the water supply was not safe. Water was fetched in containers and bamboo tubes from rivers, streams, artesian wells, and more shallow wells. When these sources are flooded, the water often became unsafe for drinking.

The advent of electricity in 1971 made it possible to meet many of these problems. During the first year of electricity, the RHUs installed an average 4 electric light outlets in each clinic. Three of the seven RHUs immediately acquired electric stoves. The campaign for sanitation with regard to human excrement was stepped up. Water-sealed types of toilet facilities were required in every dwelling unit. Many localities established water systems so that pure water supply for drinking and cooking became less a problem. In 1972, the RHUs initiated a family planning program and also implemented the National Tuberculosis Program. With these programs often came provisions for electric equipment such as spotlights or floodlights and electric stoves or sterilizers. Spotlights for example were used in connection with family planning campaigns. It is of interest that the chief use of electric light in one clinic has been for the insertion of IUDs. Clients to the clinics have measurably increased since these two programs were initiated. Electricity charges are paid from the municipal treasury, and the usual monthly bill per clinic ranges from ₱5.00 to about ₱50 per month with a trend toward the growing consumption of electric

power because of increased frequency of use of electric stoves and sterilizers.

The government has made significant advances in the medical and health fields in recent months. In September, 1974, the Philippine Medical Care Commission instituted a Community and Health Center in Initao, one of the larger towns of the western segment of Misamis Oriental. The Center has a ten-bed capacity, and is equipped with a portable X-ray machine, an operating lamp, a sterilizer, a refrigerator, an electric suction machine, an electric stove, and an electric fan. It also has a stereo for the entertainment of patients. The staff is composed of a doctor, a medical technician, and three midwives. The average number of clients treated per month is at present 70, and the average number of patients treated is 40. Both Medicare and non-Medicare patients are treated.

An Emergency Hospital was also established in Initao Municipal Poblacion in February 1975 in virtue of Republic Act 1839 and Presidential Decree No. 503. It began operations during May 1975 with a staff of two doctors, a nurse, a medical technologist, and 20 persons assigned to various duties connected with administration. Its equipment includes an electric sterilizer, an electric stove, an electric suction machine, and two electric fans. The hospital has a bed capacity of 26 persons and the average number of patients admitted per month thus far is 18. An average of 500 clients are treated each month. The average monthly electricity bill is ₱75.00.

When asked what problems are presented when electricity is cut off for some reason (power breakdown, etc.), usual responses of the clinical and the hospital medical personnel are danger to patients' lives when electric suction is absolutely needed, problems of sterilizing instruments, and of refrigerating medical supplies, inconvenience during emergency treatments and when called outside to homes to treat emergencies, and degeneration of water supply, and of

course problems of lighting.

Summarily, electricity has proved an extremely important asset in connection with health and medical activities and for providing health education through meetings to the masses. The latter is particularly true of the National Tuberculosis Program and in regard to family planning projects.

A study of water systems was conducted in nine of the ten municipalities of the rural west of the province. Lugait, the farthest municipality westwards of the province, was omitted because of time constraints on this short research period.

Twenty-seven water system representatives were interviewed. Of these 27, 9 are serving municipal poblaciones. Of these, 8 utilize large water reservoirs from which pipes lead directly to houses, and the ninth supplies water to the public through common outlets.

The remaining 18 water systems are found in barrios. Of these, 16 are artesian wells, formerly pumped by hand, and now converted into electrically operated systems. Of these 16, 2 pipe water directly to houses, has public outlets in various locations, 1 has both pipes to houses and public outlets, and the remaining 11 each have only one common public outlet.

Motors with various power ratings supply these systems, ranging from $\frac{1}{4}$ to 30 HP. Accurate data upon costs of motors and accessories is not available at present because of memory lapses on the part of respondents, but estimates for the motor costs ranged from ₱2,000 for the lowest horsepower to ₱60,000 for the greatest horsepower. Funding came from various sources. Twelve came from self-funding, aided by fund-raising drives like dances, house-to-house solicitation, and so forth. Four systems borrowed money from MORESCO. The remaining eleven were funded by one of the following agencies: Department of Local Government and Community Development (DLGCD), National Economic and

Development Authority (NEDA), and the Provincial Government, Misamis Oriental.

Maintenance is taken care of through monthly membership fees. The municipal poblacion water systems average 107 members, while the barrio systems average 80.

The time sequence of electrification of water systems was as follows: 1 in 1971; 11 in 1972; 4 in 1973; and 7 in 1974, constituting 27 in all. Prior to 1971, in the communities now serviced by electrified power systems, twenty systems had used public artesian wells. Of these the present members of one had used both a gasoline pump and a manual pump as alternative sources of water supply, the present members of another had also used a diesel powered pump, the present members of thirteen other systems had also used another manual pump, and the present members of the five other systems had had no alternative sources to the artesian wells. Of the present members of the remaining seven systems, one set had used a public open well as its source with a mechanical pump as an alternative; one had used both a public artesian well and several open wells with mechanical pumps; a third had used a public artesian well, several private open wells, and a diesel pump well; two more had principally obtained their water from springs, although one of these also made some use of a diesel pump connected into a well; one had used a well with a mechanical pump, an artesian well, and the open river as alternative water sources, and the last set had used a well with a gasoline pump and a well with a manual pump as alternative sources. In summary, 17 manual pumps, 3 diesel pumps, and 1 gasoline powered pump supplied whatever alternatives there were to simple drawing of water from sources such as rivers or wells.

When asked reasons for conversion to electric powered water supplies, respondents stated that such systems were safer in terms of pure water, more economical in terms of time invested in obtaining water, and in terms of

maintenance costs. To doubts expressed by the interviewer on the last point, respondents asserted that maintenance of manual pumps was more expensive because repairs were more frequent, and parts generally were more expensive than for an electric pump.

Disadvantages however were also expressed. Chief among these is the danger of a current breakdown for a longish period - a week or more. While the residents were used from past experience to providing for a water supply locally, they pointed out that problems would now be greater because the artesian wells had no longer been maintained with the advent of electricity-powered water systems with the result that many of them were no longer in operating condition and it might be difficult to have them repaired in time to be of any use during emergencies. Thus obtaining safe water would be a real problem.

Assessment of the effects of electrification upon education in the western half of Misamis Oriental was based upon interviews with eleven school principals and nine teachers in charge representing twenty-two educational institutions. These included a public community college, 2 Catholic high schools, 3 public national high schools, a public vocational high school, and a public barangay high school. All types of schools found in the electrified area are represented in this sample.

Of all schools in western Misamis Oriental, 39 per cent have been electrified, while the remaining 61 per cent are planning for or already saving funds for such electrification. The 22 institutions interviewed comprise half of the 30 per cent now using electricity.

The effects of electrification upon education as stated by these respondents are as follows. The presence of electric light makes night classes possible now where before the difficulties virtually rendered such classes impractical in locations where diesel electricity was not available. Further

where diesel illumination had previously been used, poor lighting at night had made eye strain common. The MORESCO power has eliminated such eye strain. School facilities used in the day time for high school classes may now be used at night for vocational classes or a night shift of students at any appropriate level of education. With electrification of poblacion residences and streets, students are less absent out of fear of attack or robbery on the way to school, and so are more regular in class attendance or in participating in night activities of the school. Such school activities as commencement programs, candle light ceremonies, Christmas programs, boy and girl scout camping activities on school grounds or in the poblacion, PTA dances, other fund-raising programs, and athletic practice can be held at night. Civic sponsored seminars, Samahang Nayon meetings, farmers' associations, and other groups can now use school facilities for their purposes. Office personnel of the schools can now work overtime at night to finish urgent matters.

Of the schools represented, 70 per cent regularly use sound systems (owned, borrowed, or rented) for programs, meetings, seminars, and other large gatherings in the daytime or at night. Adequate supplies of water made available by the previously described electricity-powered water supply systems makes possible more adequate courses in poultry and hog raising, gardening, and general sanitation. Electric bells are used by 30 per cent of the schools to announce the start and the end of classes. Four schools utilize electric stoves and kneaders in their nutribun program to counter malnutrition. Of these one supplies such buns to approximately 2300 students daily and another to 760 students daily. Three schools now hold home economics courses with the aid of electric stoves (owned or rented).

Vocational and/or technical courses can now be held, state our respondents, in such fields as automobile repairs, electronics, woodwork, cooking,

and sewing because schools can now operate such equipment as soldering irons, electric stoves and heaters, cassava and banana slicers, electric sewing machines, and electric powered saws for the cutting of timber or boards. They state that not only can such courses be made available, but that they can now be taught better.

Other electrical equipment in use observed by our interviewers were an electric wall clock, electric fans, and electric pressing irons for clothes.

From the above, one should be no means conclude that the schools are by now saturated with such equipment. Rather as time goes by one is led to expect increased investments in such electric equipment from the following rather pitiful present list of items possessed at present by the above-mentioned 22 schools. There are 6 sound systems, 4 kneading machines, 8 electric bell systems, 6 electric water pumps, 4 electric fans, 3 electric slicers, 2 soldering irons, 2 electric stoves, 2 dynamos, and one each of the following items: a wall clock, an electric saw, an electric water heater, and an electric sewing machine.

With a growing dependence of schools upon electricity, interruption of electric current would mean class difficulties on dark days; cancellation of nighttime classes, programs, and activities, difficulties for teachers in preparing lesson plans at night, and lack of safety on school premises at night.

A word should be said about the Institute of Fisheries and Research Development (IFRD) in Naawan. Established as a marine station in 1963, it became the marine science division of the College of Fisheries of Mindanao State University in 1975. It offers undergraduate courses in marine fisheries, marine biology, and aquaculture, and is oriented toward research and technology, that is, toward mass production, culture, and propagation of the marine organisms it "prunes" (breeds). The complexity of such operations has made the IFRD

totally dependent, on a 24-hour basis, upon electricity which provides power for their equipment, appliances, water pumps, and lighting system. Among other things these operations include distilling of water, aeration of water, blending of feeds, protein analysis through a spectrophotometer, and light microscopy. Because they are so dependent upon electricity, two standby diesel units are necessary to provide emergency power to keep their organisms alive until regular power delivery is resumed.

Eleven interviews were conducted with representatives of four religious groups found in the area of study, specifically, with three Catholic priests, four ministers of the Philippine Independent Church, two pastors of the United Church of Christ in the Philippines (UCCP), and with two Elders of the Seventh Day Adventists. The purpose was to ascertain from their assessment the principal effects of electrification upon religious activities of western Misamis Oriental. Each of these representatives has more than one church or chapel under his jurisdiction in the area. Since some of these representatives have churches or chapels which are in electrified and others in non-electrified because inaccessible areas, the contrast caused by electrification remains sharp in their minds.

It is not yet completely clear to the researchers from their statement whether church activities have increased or whether some of those formerly held in the daylight hours have simply been transferred to the evening. However, the best conclusion seems to be that both these possibilities have been verified.

All respondents agreed that the most important contribution which electrification has made from the point of view of religious affairs is that it has made nighttime church activities possible. They point out that for parishioners, this means not having their daytime livelihood hours disturbed by religious duties. Students who go to school during the daytime, can meet at

night for prayer and other activities. The night time is also more pleasant for the parishioners since the church is cool at night whereas it is often hot in the daytime, and there is less disturbance from nearby noise. Electric light makes the church premises more attractive for various lively activities than during the daytime.

From the viewpoint of the various pastors and elders, nighttime religious activities mean larger attending congregations, and also mean that the pastors can devote more daylight time to attending to sick and other parishioners and to various kinds of social work and other forms of extra-sacramental type activities.

The main use of electricity in the churches is for lighting. Electric bulbs and fluorescent lights are decidedly more convenient, economical, attractive, and practical than petromax lamps and candles, which are not only hot, sticky, and more expensive but are a potent fire hazard if carelessly treated by a parishioner.

A sound system is used by most of the groups, although the UCCP group does not yet have one. It is almost indispensable equipment in churches if what is said is to be heard by all parishioners. Ventilation by electric fans also makes night activities in crowded churches more comfortable and are at present provided by the Philippine Independent Church group and by the Adventists.

Several of the religious leaders pointed out that certain religious affairs like baptisms, marriages, and pre-marriage conferences can now be held at times more convenient for their busy parishioners.

Entertainment aspects have largely been already treated in connection with the mass media, the schools and the churches, civic activities, and recreational and organizational participation. Summarily, most entertainment

consists of school programs, academic, athletic, and other, church programs, fund-raising dances, visiting, going to evening parties such as birthday parties at private homes, and going to the cockpit. An additional note may be added to these matters with regard to moving pictures and to cockpits.

A movie theatre has been established in Initao Municipality by the Initao Amusement Company, which seems to be doing a fairly good business at present. It is the only movie house between Iligan and Cagayan de Oro Cities and therefore is something of a first. The proprietor plans to establish movie houses in other municipalities of the western part of the province if this one proves a truly profitable enterprise. The movie house is air conditioned which makes it particularly attractive to local customers and makes the competition of a trip to Iligan or Cagayan to see a show less of a hazard to the management of the Initao establishment.

The managements of two cockpits were interviewed for this study. Both of these offer other entertainment services beyond cockfighting, since they willingly convert their cockpits into boxing arenas, stages, or movie theatres. They obtain ₱50 - ₱100 per event from boxing promoters, and ₱15 per movie show.

These two cockpits have converted to electricity. However they do not seem to have profited by this. The first, managed by an association, has not increased its net profits. The second has suffered a decline in income. Possibly the availability of electricity has diverted people to other forms of entertainment or activities such as television, radio, basketball, and church activities. Both cockpits utilize a sound system and are illuminated by fluorescent lights.

The impact of electrification upon demographic behavior, specifically upon fertility, is the topic of the next section, which concludes the summary of the impact of electrification upon the social and economic life of the

people considered more from the point of view of a household population.

No formal study has been made of the effects of electrification upon morbidity and mortality as this would constitute a formidable undertaking even by itself. However, from the above sections on health and pure water supply, there can be no doubt that the effects of electrification have been depressive of both morbidity and mortality curves. One of the major set of causes of death in the Philippines has been the complex of the gastro-intestinal diseases, and in this picture a major part has been played by intestinal parasites, delivered via impure water and spoiled foods. In addition, tuberculosis and lack of medical services and facilities have added to the effects upon morbidity and mortality, the latter for example, in such matters as unexpected caesarean birth presentations. As previously indicated, electrification has made possible some activities and supported others in a way substantially to decrease environmental, germ or insect-born, and human error hazards to health.

DEMOGRAPHIC FACTORS

Little doubt exists that birth rates have declined in the western half of Misamis Oriental Province since the establishment of the Misamis Oriental Rural Electric Service Cooperative (MDRESCO).

First, for the immediate area of the MDRESCO headquarters (Laguindingan, Alubijid, and adjacent slivers of El Salvador and Gitagum Municipalities), birth and death rates have been investigated since April 7, 1971, by the Mindanao Center for Population Studies project of the Research Institute for Mindanao Culture (RIMCU) of Xavier University. The dual record methodology is the most accurate way at present known by demographers for obtaining birth and death rates, and the RIMCU project is an integral part of the system of International Laboratories for Population Statistics with headquarters in the University of North Carolina. The crude birth rates for this immediate MDRESCO area established by the dual record system for six month periods (excepting the first period which was four months in length), and for annual periods are:

<u>1971b</u>	<u>1972a</u>	<u>1972b</u>	<u>1973a</u>	<u>1973b</u>	<u>1974a</u>	<u>1974b</u>
45.8	39.6	48.0	38.0	39.1	31.6	31.1
45.8	43.8		38.6		31.4	

Secondly, for the entire MDRESCO area (co-extensive with western half the of Misamis Oriental Province) data on fertility are available from the probability sample of a province-wide MCPS dual record study from July, 1973, through December 31, 1974. The crude birth rates per thousand population from this study by six-month periods are:

<u>1973b</u>	<u>1974a</u>	<u>1974b</u>
51.0	32.1	39.3
51.0	35.7	

What had caused this decline in fertility was the question concerning which the present exploratory investigation hoped to obtain some light. The principal question was whether the decline was somehow connected with electrification (working of course through some means of fertility restriction like family planning or delayed marriage) or was it due to seasonal or annual some variation or other non-relevant vagary of sampling which will not remain constant.

Undoubtedly, delayed marriage has played and continues to play some part in the decline. It would be difficult to establish that an increase in age at first marriage of women had taken place after 1971 precisely because electrification had laid the basis for increased participation of young females in the labor force, for the reason that a general progression in average age at marriage has been experienced in the Philippines since 1935. Nevertheless, it is very likely that electrification in rural western Misamis Oriental has produced precisely this effect and thus added to the effect of the general Philippine trend in this area.

However, delayed marriage (i.e., increased age of females at first marriage) is by no means the only cause for the decline in fertility revealed by the preceding data. The following data from the same source for currently married women indicate a similar downward fertility trend. General fertility rates for currently married women exclude the effects of delayed marriage as well as of widowhood or separation or divorce of spouses. These rates, first for the immediate MORESCO area and then for the probability sample of the entire western half of Misamis Oriental were:

<u>1971b</u>	<u>1972a</u>	<u>1972b</u>	<u>1973a</u>	<u>1973b</u>	<u>1974a</u>	<u>1974b</u>
353.1	299.6	369.0	289.5	297.9	236.6	232.8
353.1	334.3		293.7		234.7	

<u>1973b</u>	<u>1974a</u>	<u>1974b</u>
374.3	243.1	287.7
374.3	<u>265.4</u>	

Obviously, therefore a real decline in fertility has occurred in western Misamis Oriental and a substantial portion cannot be explained merely by delayed marriage. Can this decline be attributed merely to sampling vagaries or is it due to purposive restriction of birth through some means of family planning? It is not yet possible entirely to rule out sampling variation at this time, although the probability of this explanation in the face of such a decline seems small. On the other hand, if due to family planning how long will practise of such birth control continue? It is not possible to answer this question completely at present but populations which have begun to practise family planning rarely return to former high levels of fertility although there can be short-term "baby booms" as in the U.S. in the 1950's.

If electrification should be a catalyst in this fertility decline (which began to occur in 1973, about one year - the approximate range of time for a woman to conceive and bear a child - after electricity had become cheaply available to large numbers of residents in the MORESCO area and in western immediate Misamis Oriental), how can this be determined?

Obviously very few persons (if any) in answer to a question on decreased fertility would think of specifying electrification of their homes as the answer. However, on some conditions, what they might specify would be economic costs which they previously would not have mentioned. These conditions would be desire for conditions at home (illumination for study, reading, visits of neighbors, etc., appliances such as refrigerators or cooking ranges or plates, or items like electric radios or recorders) which would make them weigh costs of an additional child against purchase prices of

such commodities.

On the assumption that family planning had been substantially involved in the decline in fertility described above, RDMCU survey interviewers inquired of respondents what reasons people in their area might have for the practise of family planning. Many persons were able to give no answers. But of those who replied, the answers were overwhelming economic, as follows:

	<u>First Reason</u>	<u>Second Reason</u>	<u>Third Reason</u>
High costs of raising children, financial problems, hard times	205	5	0
Unemployment, insufficient income to support more children	3	5	0
Other economic reasons	12	1	0
Other non-economic reasons	1	0	0
Availability of family planning services	80	1	1
Don't know, no response, reason given irrelevant	110	399	410
	<hr/>	<hr/>	<hr/>
	411	411	411

These data do not of course prove that electricity was the catalyst behind the decline in fertility. But they are clearly consonant with such a cause. Further, it is noteworthy that hard times and high costs existed before the availability of electricity without triggering a desire for family planning. It was only after electrification became widespread that fertility began to decline - and about one year later, the precise duration needed for such a catalyst to begin having an effect upon fertility levels.

The attempt to obtain further information upon the relation of electrification in 1972 to the decline in fertility turned next to a comparison of electricity users of the MORESCO area with non-users. If electrification

had the catalytic effects upon fertility decline suggested by the preceding data, some indications of these effects should appear in a comparison of electricity adopters currently using such power with those not using electricity, and especially with those who had never opted for electrification of their homes although current was readily available to them.

Where electric current is readily available as in most parts of the MORESCO area in western Misamis Oriental Province, the household population may conveniently be divided into households which have had electric lines installed in their houses and those which have not. The former are termed Adoptors in this report and the latter Non-Adoptors. Adoptors may be subdivided into those who have continued to use electricity and those who have had their lines disconnected from the power mains which categories may be termed Users and Drop-outs. The exploratory sample consists of 203 users, 50 drop-outs, and 118 non-adoptors. To round out the picture, 40 households where electricity is at present not available (due to inaccessibility of location, etc.) were added.

Subsistence income may be defined as that total income level relative to size of household to be supported by it which is necessary for maintenance of minimum standards of good health, nutrition, and human existence. This level will vary with size of household because a total income which may support a household of four at minimum levels of subsistence, will not necessarily support a family of six at the same level. The Development Academy of the Philippines (DAF) published in 1971 estimates of such subsistence income levels relative to rural household size. At present (October--December, 1975) levels of peso buying power, these levels do not seem to be too high and are utilized in the present study.

Only 27.3 per cent of the sample households had achieved or surpassed subsistence income levels for their household size. Correlatively, 72.7 per cent of all households were characterized by total incomes less than sufficient to maintain minimum subsistence. The breakdown of this statistic by percentages into the four categories presented above is:

<u>Household Type</u>	<u>At or Above Minimum Subsistence Levels</u>	<u>Below Minimum Subsistence Levels</u>	<u>Category Total</u>
Users	37.9	62.1	100.0
Drop-outs	32.0	68.0	100.0
Non-Adoptors	13.6	86.4	100.0
Inaccessibles	7.5	92.5	100.0

Fertility data on all the above households were collected by regular staff interviewers of the Research Institute for Mindanao Culture (RIMCU). An "expected births" approach based upon currently married women was employed for analysis of the sample data for these 411 households and approximately 2,500 persons (2,478 persons), since the sample is small from the demographic point of view.

Major findings of the investigation were fertility differences between Users and Non-Adoptors, and within each of these classes, between households at or above subsistence levels and households below subsistence levels.

Users and Non-Adoptors exhibited the expected births and standardized fertility rates for currently married women 20-49 years of age shown in greater detail in Table F-1. The distribution of currently married women of the rural methodological sample of 1974 of the Research Institute's dual record project (MCPS) was used as the standard population for this purpose. Overall annual expected births per thousand currently married women were:

<u>Users</u>	<u>Non-Adoptors</u>	<u>100 (Non-Adoptors/Users - 1)</u>
585	671	14.7% excess births

It is desirable to break down each of these total expected birth categories into the subclasses, Below and Not Below Subsistence Income. A difficulty in doing so presented itself in the Non-Adaptor categories where cells with insufficient data occur in the Not Below subclasses. The comparison was made by supplying the lacking cells with the rate from the opposite subclass. This equalizes fertility effects of rates for that age group upon overall totals, permitting comparison of these totals since differences are based only upon cells for which rates for both subclasses are available.

It should be noted that as a result the subclasses "Not Below" of User and Non-Adaptor categories should not be compared.

In terms of expected births per 1,000 currently married women the comparisons are:

<u>USER HOUSEHOLDS</u>		<u>NON-ADOPTOR HOUSEHOLDS</u>	
<u>Below Subsistence</u>	<u>Not Below</u>	<u>Below Subsistence</u>	<u>Not Below</u>
854	349	773	536
<u>100(Below/Not Below - 1)</u>		<u>100 (Below/Not Below - 1)</u>	
144.7% excess births		44.2% excess births	

Table F-1. Expected Births Per Annum, Per 1000 Currently Married Women, in Households of Users and Non-Adoptors of Electricity,^a Western Misamis Oriental Province, October - December, 1975

Ages of Women	Currently Married Women, Rural RIMEU Dual Record Sample (RA-2) ^b	Expected Births	
		Users	Non-Adoptors
20-24	533	99	195
25-29	582	188	150
30-34	560	93	124
35-39	561	109	109
40-44	374	84	77
45-49	373	12	16
All	2,983	585	671

^aUsers: households who have installed electricity in their homes from MORESCO electric mains and continue to use them; Non-Adoptors: households who have not installed such electricity connections, although MORESCO electric mains were conveniently available.

^bStandard population was that of currently married women of 1974, of dual record project of Research Institute for Mindanao Culture (RIMCU), of rural methodological sample (Reference Area 2).

Summary and Conclusions

The findings on Users and Non-Adopters are interesting. Many Third World demographers argue today that fertility decline will not take place in particular countries until development projects significantly affect the common man and until genuine improvements begin to appear in his social milieu. Electricity is one such improvement. One who has not lived in an area where electricity is not within reach of the common man can hardly imagine the convenience and the support that relatively cheap electricity provide when made readily available. Cheap electricity also engenders hope and plans for the future because of the entrepreneurial and employment opportunities it engenders.

The finding that Users of electricity had lower annual fertility between 1972 and interview date in 1975 is therefore an important finding and should be followed up by further research. The difference of 14 per cent in expected births is relatively large and in the direction that social improvements might be expected to influence fertility. On the other hand seasonal and annual fluctuations in rural fertility tend to be large where birth control is practised by few. The finding of the present study should therefore be corroborated by further investigation before too much weight is placed upon it.

Even more interesting in some ways is the finding in both User and Non-Adopter categories/subsistence income levels were characterized by higher that^a fertility than households at or above such levels. This may be the most important finding of this research project. It suggests very strongly, because of the largeness of differences between the Below Subsistence and the Above Subsistence Income levels, that a true set of income thresholds by household size does exist and that population control programs only affect significantly families with total income at least reaching these minimum levels.

^ahouseholds below [continue at "subsistence"]

This finding must of course be used with due caution because of limited sample size. Nevertheless, besides the magnitude of differences within categories between the fertility of households above and below subsistence levels, another aspect of the data is persuasive that the differences found may be real differences, and not due to sampling, seasonal, or annual variation. This is the fact that in every one of the ten age-group categories of the subclasses for which a pair of expected birth measures could be computed from the data, the fertility of the Below Subsistence subclass was always substantially higher than the At or Above Subsistence subclass. This finding if borne out by further research, would be very much in line with the social development theory of fertility noted above.

IMPACT OF ELECTRIFICATION UPON BUSINESS ESTABLISHMENTS

The previous part of this report was concerned with the impact of electrification in western Misamis Oriental upon the household population of the area. A second major objective of the study was to investigate the manner in which electrification had affected business in the area. This second part of the preliminary report presents a summary and the highlights of this research, again leaving statistical data and greater detail to the later report.

The investigation attempted to obtain an economic profile of electricity-dependent and electricity partially-dependent business establishments, to present their growth over time, and their income and employment generation. The necessary information was to be obtained from field interviews and from collected data already available from various sources.

To obtain data on growth by type of establishment, the records of various government agencies were examined. These included municipal governments which issue business permits to establishments, the National Census and Statistics Office (NCSO) Regional Headquarters which conducts censuses of business establishments from time to time, the latest two of which were in 1972 and in 1975, the regional (or provincial) offices of the Bureau of Labor, the Social Security System, and the Bureau of Trade and Commerce, all of which keep records of various kinds relating to specific business establishments, and the National Cottage Industries Development Administration (NACIDA) which keeps records of registered cottage industries, especially those to which the NACIDA has made loans.

Such records gave information upon individual business enterprises by name of owner, type of establishment, and by area, and for some, the date of establishment, initial capitalization, and number of employees. They thus provided specific information upon kinds of businesses in the MORESCO area.

However the data from these sources, neither singly nor in combination, were adequate to provide a time-phase profile of the growth of businesses by type, by employment, and by income generated. Municipal records included only those establishments which had registered or had obtained a permit, and in some municipalities the records did not even list establishments which had obtained permits.

No office records provided information upon employment adequate for the purpose of this study. The 1972 NCSO census of establishments provided a comprehensive list of business establishments operating in the MORESCO area. However, records available in the regional office did not contain information upon size of establishment and number of employees. The updating of the 1972 listing by the 1975 census conducted late last year was not available in the regional office, since census results had been sent to Manila. The records of other remaining sources were likewise inadequate for the purposes of the investigation.

Establishments using electricity in the degree reflected by MORESCO billing records were selected for interview. These records distinguish establishments into three categories in terms of kilowatt hours of electricity consumed per month: small commercial (0 - 20 kwh), large commercial (21 - 500 kwh), and industrial (501 kwh and above). Unfortunately, while these billing records listed establishments by name of owner and address, they did not identify type of establishment.

Since it was necessary to identify what these establishments were (whether retail stores, rice or corn mills, auto repair shops, or what) for selection of respondents, the MORESCO records had to be matched by name of owner and location of business with the records in the government offices mentioned above. For others who might wish to accomplish similar goals, the records of

business permits granted by each municipality and the 1972 census of business establishments proved especially useful for matching. Altogether more than 95 per cent of the establishments in the MORESCO billing records were thus identified by type.

As many different types of businesses were interviewed as possible within the constraints of our very limited time period for research, with extra attention focussed upon types totally dependent upon electricity. Only a small sample of sari-sari or small retail stores was included, because these are not apt to generate much employment nor income and are not particularly productive business enterprises. However since more than half the enterprises using electricity which had been identified were sari-sari stores, a careful selection was made which emphasized inclusion both of small and of large stores and both of stores located in barrios and of stores located in poblaciones.

The information asked of each business establishment included date of establishment, initial and current capitalization, sources of investment funds, nature of business activity, principal products and by-products, markets for products, types and sources of raw materials utilized, number of employees and types of employment, uses and costs of electricity and of alternative sources of energy, and both plans for expansion and foreseen future demand for electricity.¹

An important category of establishment was the banking institution. Interest here centered in the bank, not so much as a user of electricity, but as a source of credit for the financing of new institutions or for the expansion or modification of already existing establishments. Thus interest extended not only to the four rural banks located in the MORESCO half of the province but also to the two governmental and the eleven private banks located in Cagayan de Oro City. Information was sought regarding their operations,

¹The RIMCU interviewers asked to see the owners or in large organizations the responsible persons (managers, chief accountants, etc.). In some cases, they interviewed both manager and chief accountant. The data obtained therefore would appear to be reliable.

especially the specific types and average amounts of loans they had granted to establishments in the MORESCO area, or the types and average amounts applied for by these institutions. In addition to banks, interviews were planned for appropriate representatives of credit unions to obtain information on credit facilities in the MORESCO area.

Unfortunately, the banks in Cagayan were unduly secretive about their loans. In view of the importance of the information for policy decisions and for evaluation of the MORESCO project, which from a social development viewpoint is one of the most important infrastructure facilities so far set up in the Philippines, the attitude of the concerned bank officials seems clearly against the public common good, and, to say the least, excessively conservative. It is hoped that national authorities will instruct regional bank managers to be more cooperative in helping to solve research questions vitally connected with the public good in the future. The Philippines is no longer a country in which a public utility can pursue its own serene path against the common good.

Largest Industrial Consumers of Electricity

The three largest users of MORESCO electric power in western Misamis Oriental are all industrial corporations. They are the Mindanao Steel Corporation (MSC), the Sawmill Department of the Timber Industries of the Philippines, Incorporated (TIPI), and the Meiho-Philippines Agro-Industries Incorporated (MPAII).

The MSC was formerly the Jacinto Iron and Steel Corporation. In June 1973 this corporation moved into western Misamis Oriental and located in Lugait Municipality. It had an initial authorized capital of ₱100,000 and paid-up capital of ₱15,000. Its authorized capital is now ₱5 million and its paid-up capital is ₱1.4 million, according to the company representative

interviewed. Monthly sales of galvanized iron sheeting, according to the same representative, gross as high as ₱3 to ₱4 million. Most of the sales are in the Philippine market.

The operations of MSC depend upon electricity. Black iron coils, bought locally, and base metals and chemicals (imported from various countries) need electricity for the type of furnaces used to heat the mixture to the proper temperature for production of the galvanized sheeting. The only other energy source used by the MSC is bunker oil which is employed to start the plant boiler. In the first year of operation in Lugait, MSC consumed 30,000 - 35,000 kilowatt hours of current (30 - 35 megawatts), as the same representative reported. The MSC electric equipment includes 27 light and heavy machines at the entry section of the plant, 15 coating machines, 39 machines for delivering (moving) the iron pieces and other materials, 2 machine room assemblies, 4 sets of machine shop equipment, 34 electric motors, 11 water pumps, and 15 other pieces of machinery used for various other tasks.

Personnel include 20 office and administrative workers, a traffic director, 2 drivers for the hauling equipment, 3 drivers of the service vehicles, and 64 factory workers. Averages wages are ₱12.00 a day.

The MSC expects to expand its line of goods to production of colored GI sheets within the next five years. This will require, they estimate, as much as 50 per cent more electric power. This would bring power consumption up to nearly the entire rated capacity of the plant, namely, 65,000 kilowatts. All these estimates were given us by the MSC corporation representative.

Timber Industries of the Philippines, Inc., is the property of 5 incorporators and 10 stockholders, all of whom are Filipinos. Operations of the TIPI sawmill, located in El Salvador Municipality, began in March, 1975. Initial capitalization of the sawmill was ₱300,000 but capitalization has now

grown to ₱900,000, according to the TIPI representative interviewed. Lumber, the principal product, is marketed locally and averages a gross monthly sale of ₱115,000. The sawmill was located in El Salvador because of the availability of electricity, but also because TIPI's logpond is also situated there and because manpower was abundantly available. Electricity is required for the TIPI sawmill operations. The machinery and appliances for these include approximately 15 electric motors, sets of welding equipment, bandsaws, and edgers. MORESCO supplied 475 Kw in 1975. Expected demand can increase to 1,000 kw (if as in all these other cases NPC can supply MORESCO the needed power). Personnel consist of 5 office workers (including the manager), and 80 machine operators with their helpers and other operatives. The total monthly payroll was reported to be approximately ₱13,000 per month.

Plans for expansion of the TIPI logpond and sawmill complex include construction of a wharf (which is already under way). Although previous plans had called for construction of a second sawmill plant to be serviced in 1978 with 500 Kw by MORESCO, this project is somewhat in abeyance at present because of the recent law banning the export of logs.

The Meiho-Philippines Agro-Industries Incorporated was established in 1973. It is located in Kalabaylabay, El Salvador, and its ownership is 60 per cent Filipino and 40 per cent Japanese. Its initial and present capitalization is ₱8 million. The sale of sorghum hay cubes and powdered hogfeed bases in Japan grosses on the average \$10,000 (₱76,000 at ₱7.60 per \$1). Electric power is considered by MPAII representatives indispensable for their operations, because in addition to illumination of their compound and buildings, it drives the plant's 12 electric processing motors, a 15 HP pump, 2 drills, 3 grinders, a welder, and an air compressor. However, the MPAII does also use other energy sources: kerosene for the plant furnace which dries the sorghum, gasoline for

its cars and trucks, and crude oil for its farm equipment. Consumption of electricity averaged 2 megawatts per month during the first year of operation, and is currently averaging 3 megawatts per month.

MPAII employs 105 workers, of whom 80 are field workers who receive ₱7 daily for 8 hours of work. Fifteen are factory workers who receive ₱10 a day. The remainder are office workers, who unlike the previous workers, are full time employees who work 7 hours a day and who are therefore paid a monthly salary, averaging ₱300 a month. Field workers are hired for various time lengths in accordance with the needs (ground preparation, planting, fertilizing, spraying, harvesting, etc.) of three crop seasons.

Meiho-Philippines plans to expand its plantation area beyond 300 the hectares at present leased so as to increase sorghum production. It also hopes to procure additional farm and shop equipment and to increase number of employees to the point where three shifts a day in plant operations would be possible.

MORESCO Plans and Estimates

MORESCO itself is of course a large business organization, although a cooperative one, operating in western Oriental Misamis. It has its own plans of expansion and one can also trace its own growth in power consumption. It is however not included in this report, whose intent is to study the impact and effects of electrification, on the grounds that the MORESCO is itself the cause of the impact under study. While some argument could be made for its inclusion on the grounds of reciprocal causality, i.e., growth which it has stimulated has in turn stimulated its own growth, it has not seemed proper to RIMCU to include MORESCO in the study because of the dubious nature of an attempt to separate what is cause and what is effect in its operations.

Nevertheless, something must be said of its plans of expansion as these affect power growth in the area.

The date for completion by the National Power Corporation (NPC) of transmission lines from the Maria Cristina power source to Agusan del Norte Province has been targetted for September, 1977. When this is accomplished, MORESCO hopes to be able to establish transmission lines between municipalities.

Further, subject to the volume of power to be allocated by the NPC, MORESCO plans to service the following large industries during the next few years:

(a) A ferro-chemical plant in Manticao is expected to open early in January, 1976. Although its initial kilowatt hour consumption will be small, it is expected to be consuming as much as 22,000 KWH a year by 1977. This plant will produce the ferrous silicon needed in the steel melting process.

(b) An electro-alloy plant is expected to open in Manticao and to be serviced in 1977. The interviewer was not able to obtain a very precise estimate of initial power needs but her understanding was that these would be about 500 KW.

(c) The existing P.N. Roa Cold Storage establishment situated in Molugan, El Salvador, is expected to expand to about 300 KW in 1977.

(d) A cannery is in the planning stage for Initao. If it opens as planned in 1978, it will require an estimated initial load of 200 KW.

(e) An initial power load of 110 KW has been proposed for the Iligan Oxygen and Acetylene Corporation.

(f) A paper and pulp mill, the Bagong Lipunan Marcos Prefab Mill, has been proposed for location in Igit, Opol, to be serviced by MORESCO for an unspecified but apparently relatively large initial KW allocation.

Large and Small Commercial Enterprises

Approximately ten rice and/or corn mills, from Opol to Naawan were receiving electricity allocations in September, 1975, ranging from 26 to 42 KW and averaging more than 30 KW. One of these wants to increase his load to 100 KW.

Some 13 small to large commercial enterprises have been serviced with current allocations ranging from 10 to 60 KWH for one or more years. A good many of these like the larger establishments would like to increase their power supply. Obviously, MORSOCO cannot satisfy all these requests without receiving larger power commitments from NPC power stations on the Agusan River. The enterprises just mentioned do not of course include some 27 water systems discussed in the first part of this report, which have allocations ranging from .7 KWH to 23. Nor do they include the Naawan Institute of Fisheries and Research Development which receives 50 KW which would like to increase this allocation to 80 KW. They also do not include the Hanil Development Corporation (engaged in building the Butuan-Cagayan-Iligan highway) which has been receiving 30 KW and wishes to receive an additional 30. The Hanil headquarters are (at present) in Initao. The irrigation systems discussed in a later section of this report are also not included above.

Auto repair shops. Six auto repair shops, all electrified, are found in western Misamis Oriental. Five of these are located in Opol and Laguindingan. Although differently capitalized, they all offer general auto body repair, welding, and tire vulcanizing services. The more highly capitalized also offer other services such as body building, drilling, the making of grill work, overhauling, and painting. One of these businesses was established in 1959, one in 1971, three in 1972, and one in 1975. Four were capitalized at ₱10,500 or less, one at ₱13,000, and the last at

₱28,000. Capital funds, initial or added, generally came from the pooled resources of relatives, although two of the six also borrowed from rural banks to swell their resources. Altogether these shops employ 7 full time and 11 part-time paid employees as well as 7 owners and unpaid family workers. The smaller shops are usually run by working owners with the help of unpaid family members or relatives. The larger shops generally employ two to four part-time workers and at least one full time worker.

The shop which began in 1959, started as a tire vulcanizing business, and changed to a welding and auto repair shop with the advent of electric power. Four of the other shops started up within 6 months of electrification. They generally possess welding equipment, electric motors, compressors, grinding stones, and electric drills. They consider illumination as well as electric power to be important for their businesses because they can thus stretch working hours into the night as necessary. Each of these shops wants to expand. The smaller shops want to grow bigger, and the bigger shops want to become foundries.

Foundry. This business is the only foundry establishment in western Misamis Oriental. Called the Engineering Steel Industries, it is owned by located* Mr. B. A. Gacasan, who launched it in September, 1975. Capital came from ₱500 owned by Gacasan, ₱70,000 gained from the sale of scrap iron, second hand lumber, and such materials, and ₱130,000 borrowed from commercial banks. The equipment used includes electric motors for grinding operations, acetylene for the cutting of steel, compressors for use in melting steel, welding equipment, electric angle grinders, and electric hand drills. Almost none of the equipment can be operated without electricity. Raw materials consist of scrap metal bought locally and foundry chemicals and cakes bought from Australia. The work force consists of 30 full time but casual employees.

*in Igpit, Opol and

Gacasan's plans of expansion include purchase of an electric furnace and the building of a larger machine in order to be able to handle an increasing number of customers. The business was serviced by a 10 KWH allocation in 1975.

Hollow block businesses. Two hollow block establishments were located* included in the sample. Both were launched after electrification, one in 1971. One however began with capitalization of ₱50 with a non-electric hollow block making machine, while the other began with an initial capitalization of ₱4,000 and an electric block maker. Both businesses have increased their capitalization and now both of them operate electric block makers. Initial capitalization came from savings of the owners, but MORESCO loans totalling ₱3,851 together with further savings have assisted later capitalization.

Products are hollow blocks, decorative blocks, bowls, and floor tiles. Sales grossed an average ₱500 per month during the first year and an average ₱1000 in 1975. Cost of raw materials averaged ₱150 a month during the first year and ₱600 during 1975. The first factory employs three men on a piecework basis at ₱0.045 per piece, and the second employs eight men on a piecework basis of whom 6 machine operators receive ₱0.05 per piece, a floor tile maker ₱0.15 per piece, and a decorative block maker ₱2.50 per bag of cement consumed.

Output of product varies with electricity used. This averaged ₱4.00 per month during the first year of operation for one establishment and ₱9.00 for the other, which consumptions had increased, respectively, to an average ₱7.00 and ₱14.00 per month during 1975. Each business now possesses two electric block making machines, consisting of vibrators and driving units.

The proprietors consider electricity essential to their businesses. When power fails, operations stop, and business suffers, especially when cement has already been mixed. Both businesses plan to add additional units

*in Initao and in Alubijid

to increase production. One plans to start manufacturing glazed tiles which will require doubled electrical consumption.

Bulldozing, hauling, ground-clearing, and coconut and other tree cutting business. Capitalized mainly from savings in 1973 with ₱35,000, this business of Mr. Guillermo Manzon grossed ₱25,000 in 1974, and ₱40,000 in 1975. Raw materials and other expenses (labor, gasoline, maintenance, etc.) totalled ₱25,000 in 1975. The business is located in Naawan Municipality.

Of the 15 workers employed in the business, three are drivers, two are mechanics, two are bulldozer operators, one is a chainsaw operator, and seven are laborers. The service drivers are paid ₱240 a month, the mechanics ₱400 a month, the haulers ₱6 to ₱10 per trip, bulldozer operators are paid ₱15 per day, chainsaw operators ₱12 per day, and laborers ₱9 per day.

Electric consumption is related to illumination and to power for electric motors, compressors, electric drills, welding equipment. Since most and of the equipment is dependent upon electricity, power failures are hard on the business, and a long continued failure, states Mr. Manzon, would be disastrous for it. Expansion is planned for the future from own funds and savings principally, as it has been in the past, and will come fairly smoothly, probably without large increments at any one time to the extent possible. Details of expansion are still not finalized.

Rice and corn mills. Six millers of those who were using electric power for milling were interviewed and five millers of those who were not using such power.

Of the six electrified establishments, two had begun operations before electrification of the area in 1964, and in 1970, respectively, and the others had begun after electrification, between 1972 and 1975. Capitalization of each was closely associated with the number and capacity of the electric motors

possessed. The mill with smallest motor, a 40 horsepower model, had been capitalized at ₱14,000, while the largest mill, with four motors, with 15, 35, 40, and 60 horsepower, had been capitalized at ₱150,000. The other millers had motors with 30, 32, 40, and 70 horsepower.

In general, initial capitalization had come from personal and family savings, from rural and commercial bank loans, and from MORESCO loans. Motors used before the advent of electricity had operated on engine oil and crude oil at costs of about ₱35 per drum. Their present electric motors do the same work faster and more efficiently, and cost less to operate. Plans for expansion include the purchase of such additional machinery as motors, grinders, threshers, and peelers.

Four of the five millers who were not using electric power had started business before electrification, specifically, in 1950, in 1961, in 1963, and in 1970. Capitalization had initially been smaller, and had not been increased in any case, namely, ₱6,000, ₱7,000, ₱14,000, and ₱25,000. ₱30,000. These The fifth* establishments mill rice and corn by means of diesel machines run by crude oil bought by the liter and by the drum. Businesses are operated by the owner as principal worker and by family-member assistants. Where the owner does not work, the main operations are carried on by one full-time or two part-time employees. Electric consumption is restricted to lighting.

All five millers would like to convert to electric motors, as they say that with the high and rising prices of crude oil, electric motors are more efficient and will provide better results in the long run. Except for one operator who is on the verge of business failure, all look forward to eventual purchase of electric motors for their businesses, although they cannot at present afford the expense of such a purchase.

*had been established in 1970 with initial capitalization of

Piggeries. One piggery establishment was interviewed. Operated by Mr. Luther Uy, it began operations on May 8, 1974, with an initial capitalization of ₱16,500, of which ₱12,500 had been obtained by means of a rural bank loan. The business is located in Libertad Municipality.

Business was good during the first year, when pigs were being disposed of at a rate of 25 per month. From the early part of 1975, however, turnover fell to 2 to 3 head a month. This drop in purchase of pigs was the effect of price increases in feeds and decreases or price stabilization in meat prices, both of which rendered purchase of pigs less attractive to potential buyers. Feed purchases per head were also higher because of the reduction of hogs raised due to declining demand.

Scientific principles are incorporated into the operation of the piggery and it has its own independent electrically powered water system and is electrically illuminated. Average electricity consumption per month during the first year of operation was 18 KW, and average monthly expense was ₱28 for this current. The installation of the wiring system, the bulbs, and the water system cost ₱2,000. The water system is equipped with a half horsepower pump whose price and installation cost ₱1,500. Illumination is supplied by two 50 watt bulbs, one of which is left burning during the night.

In the event of failure of electric current, states Mr. Uy, the main problem is water supply. Expansion of business is out of the question at this time, he states, because of the increase in prices of feed and the decrease in prices of meat. In fact, he has cut down piggery production for the time being.

Sawmills and box factories. The Naawan Sawmill and Construction Corporation, now owned by eight relatives, started business in 1973, when it was launched by its original owner, Mr. Andresito Sarenas. It became a

corporation in 1975. The corporation began in 1975 with a capitalization of ₱80,000, mainly raised from own and relatives' savings. The mill receives logs, and slices them up into lumber of various dimensions, and also makes boxes. Fifteen full time employees are distributed into the following specializations. Pay is indicated in parentheses: book keeper (₱240 per month), sawyers and chainsaw operators (₱12 per day), lumber shipment receiver (₱8 a day), guard (₱8 a day), and box makers (₱0.13 per piece for mango boxes and ₱0.21 per piece for boxes for salted fish). Recorded gross sales amounted to ₱10,000 for 1975, while raw materials cost ₱5,000.

Sawmill equipment consists of 10 electric motors ranging from 5 to 40 horsepower, 2 electricity-powered saws, and several electric cutters and planers. Monthly electricity bills during 1975 ran from ₱200 to ₱290. Twenty KWH service is provided by MORESCO, and expansion is foreseen to 80 within the next few years if additional NPC current is made available to MORESCO.

The sawmill is almost completely dependent upon electric power for operations and these practically cease during power interruptions. The corporation plans for expansion call for establishment of a creosoting plant for the preservation of wood. This plant will probably double present power requirements.

In addition to the NSCC which also makes boxes, three other establishments which make boxes were interviewed. Box making however was the only main activity of the latter three establishments.

All three of these box-making businesses were established after electrification, between 1972 and 1974. Initial capitalizations were ₱4,000, ₱6,000, and ₱10,000. Capitalizations were later increased in each of them to as high as ₱23,000. Gross sales reached as high as ₱18,000 during the first year of operation. The locations of the businesses are Manticao, Molugan, and Naawan.

During 1975, the gross sales of the Molugan Box Factory jumped to ₱100,000, while those of the other two companies declined drastically, one dropping to only ₱1,000 and the other falling to zero sales. For the time, both other companies have had to suspend operations. The Molugan establishment had prospered because it was supplying most of the tomato producers and dealers with their boxes while at the same time making pallets for the Philippine Packing Corporation cannery (used in manufacturing the cans). One of the other establishments was supplying a Bacolod entrepreneur with boxes which were then sold to Bacolod buyers, the other was supplying the Cagayan Coca-Cola plant with boxes for its soft drinks. When box prices had risen because of the increase in price of nails and of wood, the Bacolod supplier found that his Bacolod buyers stopped making orders and he in turn cancelled his orders to the Misamis Oriental manufacturer. The Coca-cola plant, on the other hand, is switching to plastic boxes because these are said to be cheaper, lighter, and more durable. Both the temporarily inactive plants intend to resume operations again as soon as they can discover a profitable new market for boxes.

During profitable operations, output in all three factories is high. The Molugan Box Factory supplies tomato dealers and producers with 1,000 boxes a day during harvest seasons and with 300 boxes a day at other times of the year. Slab and waste lumber from nearby sawmills are utilized for the raw materials of the boxes. The MBF buys 7 to 8 truckloads of slab and waste lumber per month, valued at ₱15,000. The other two buy 2 to 3 truckloads of slab and waste lumber at ₱250 per truckload.

Employment varies to some extent with the need to make deadlines for delivery. The MBF employs regularly 10 full time workers, 5 part-time workers, and 4 unpaid family workers. Ten of the workers are sawyers, who receive ₱15 a

day. The rest are helpers who are paid ₱0.15 per box. One of the other businesses employed only full-time workers, including a driver (₱8 a day plus meal allowance), a chainsaw operator (₱6 a day), and six helpers (₱6 a day). The other business employed part-time workers on a piece work basis at ₱0.30 per box frame.

The Molugan Box Factory has two bandsaws, three circular saws, two trimmers, and two grinders, all relying upon electric power. The other establishments have electrically powered bandsaws in each case driven by two electric motors. A MORESCO loan furnished the capital for purchase of two of these machines by one of the companies.

Average monthly electricity bills ranged from ₱87 to ₱6,000 during the first year of operations of these companies. However, partly due to the slowing down of business in two of the companies in 1975, a large decline in power consumption has occurred. The Molugan Box Factory now pays an average of ₱300 a month for electricity. One of the other two at present has zero consumption, and the second is using electricity only for illumination.

Without electricity, the three box factories would be unable to operate as all motors are electrically operated. Despite present work stoppage of two of the three factories, all three have plans not only to get back in production as soon as markets can be found, but to purchase heavy duty motors and to double and even triple present electrical consumption.

In connection with the above, a small store that sells small bundles of firewood was also interviewed. The proprietor, Mrs. Ebuna, buys reject or slab pieces of lumber from sawmills, sorts these, and sells them. She also however takes orders for lumber (and thus calls her business a "Lumberyard"). On receiving such an order, she immediately goes and purchases the precise material and dimensions ordered, and supplies it to the customer. Starting with ₱500 worth of slabs, and sorting these in her ₱500 building, she grossed sales of

₱350 a month in her first year. Business in 1975 however declined to a gross of ₱300 a month. She has never increased her capital, using profits from sales to improve her beach resort. She has no employees and consumes electricity only for lighting. Her bill for the first year was exactly the flat rate. During 1975, it was ₱8.00 per month.

Power failure would present no problems to Mrs. Ebuna. She gets little business at night, and what she might get, she can easily handle with her kerosene lamp. She plans to expand her business after the road has been widened, but expects that the only effect upon electricity consumption will be to double her illumination requirements.

Woodworking businesses. Two woodworking businesses were interviewed. One manufactures duckpins for sale to bowling alleys in Bacolod, Cebu, Ozamis, Iligan, Cagayan de Oro, and Butuan Cities. The other manufactures furniture and also does upholstering.

The duckpin manufacturer began business in 1973 with ₱4000 as initial capitalization, raised from his own savings. The furniture manufacturer began without capital, simply requiring down payments from persons who ordered furniture sets from him. During the first year of operation, the furniture business grossed ₱300 a month, and the duckpin enterprise ₱400. While the duckpin manufacturer's gross sales had climbed to an average of ₱800 a month in 1975, the furniture business' gross sales remained at the ₱300 level as orders this year have been less frequent. Raw materials for the duckpin business are hardwoods such as molave, while for the furniture business they are acacia, lawaan, narra, and other woods as specified. Both businesses employ only part-time workers who are supervised by the proprietors. The furniture manufacturer pays his workers ₱10 a day, while the duckpin manufacturer pays ₱60 per completed duckpin.

Electricity is necessary for both businesses both for lighting and for running electric motors, compressors, sprayers, sanders, and similar equipment. Each business had about the same monthly electric bill during the first year of operation and during 1975, about ₱8.70. The furniture shop hopes to add welding to its services, while the duckpin manufacturer hopes to obtain a DBP loan to add furniture to its products.

Copra, tobacco, and general merchandise. In 1929, a Chinese businessman, Mr. Velasco, began a business in wholesale and retail general merchandise with an initial capitalization of ₱5,000. The business prospered over the years and in 1973 the Velasco and Sons Company obtained a commercial bank loan of ₱200,000 for the buying and selling of copra and of tobacco. Annual gross sales during 1973 totalled ₱123,000 and totalled ₱130,000 in 1974, while gross expenditures totalled ₱257,000 for 1973 and ₱380,000 for 1974. The company employs 36 full time workers, of whom 11 have executive or administrative functions, while 25 are laborers or helpers. The location is Gitagum Municipality.

As soon as electricity became available in 1971, the company began to use it for lighting, refrigeration, air conditioning, other electrical equipment, and for cooking. The monthly electric bill at that time was ₱90 - 110, while it has now increased to ₱260 - 270. The electrical installations put in cost ₱4,500 which sum was financed from company funds. Five 100 watt lamps were installed about the Velasco compound, and 12 more outlets with 40 watt bulbs were installed inside the buildings. Before electrification, the company consumed about ₱30 worth of kerosene per month for illumination. The company possesses 14 trucks, a jeep, and an automobile, and consumes about 100 liters of crude oil a month in its operations.

The business is not very electricity dependent. The main problems during power failures are illumination and procurement of water.

Tailoring shops. Seven such business establishments were interviewed, all of single ownership. Of these, six had an initial capitalization of less than ₱1,000.00. Five of these businesses had already been established before electrification. More than half had increased their initial capitalization, mainly by adding small amounts over time. Six had been capitalized by their own savings, while one had borrowed the required initial capital from a bank. Comparison of gross receipts for the first year of business with those for 1975 revealed a general increase of about 100 per cent with the exception of one business whose gross earnings had declined by 40 per cent. This was the oldest and least capitalized of the establishments. The shops averaged four employees, most of whom are full time workers. Compensation may be upon a piece rate or upon a monthly basis. Piece rates ranged from ₱2.25 to 2.50 for a pair of pants and from ₱1.50 to 2.00 for shirts. Monthly salaries ranged from ₱20 to ₱600, depending upon type of work, master cutters receiving highest and unskilled workers (desrograderas) the lowest compensation.

These tailor shops used electricity for illumination, for operating sewing machines, and for operating irons or perma-press devices. Five employed sewing machines, most used electric irons. Average cost of illumination before electrification had been ₱5.20 a month and kerosene lamps had been used. Queried upon the advantages of electricity, respondents pointed to the perma-press appliances and the electric sewing machines, and stated the brightness of electric lights is really very important since intricate stitching requires strong illumination. Overtime jobs cannot be accomplished without it. These advantages are also the main problems during power failures. All seven shops planned expansion of business through purchase of additional machines and appliances and greater production of pants and shirts. They all expected their electricity consumption to increase.

Entertainment enterprises. Before concluding this section with a summary account of the growth of small stores (bakeries, carenderias, sari-sari stores, and so forth), a word should be said of formal entertainment enterprises.

Other forms of formal entertainment of course exist beyond movie houses and cockpits. Such are travelling circuses and/or carnivals, travelling movie enterprises, basketball games, plays, and programs. However in the area of study, these tend to be occasional events. The concern here is with enterprises regularly holding scheduled events.

The Society Theatre, a movie house situated in Initao Poblacion and owned by the Initao Amusement Company, opened in 1974. Its total seating capacity is 150 persons. It grossed ₱100 to ₱300 during its first year of operations on each showday, and is at present grossing ₱100 to ₱400.

The theatre is staffed by five full time employees: two projector operators, a ticket seller, a guard-watcher, and a janitor. Each are paid ₱8 a day, plus a living allowance of ₱15 per month. Equipment besides illumination consists of two movie projectors and four large air conditioners, two of which are 3-ton and the other two 5-ton in capacity. Monthly electricity bills have remained fairly constant from the beginning till interview date, ranging from ₱700 to ₱800. Besides the above equipment and accessories, the electricity is consumed by the building's 30 incandescent bulbs and 15 fluorescent lights.

Expansion plans call for the establishment of similar movie houses in other municipalities if the Initao venture proves sufficiently profitable.

Cockpits. The only other organized entertainment enterprises interviewed were two of the cockpit establishments. One is a partnership, capitalized initially in 1973 at ₱10,000, in Initao, the second an association, located in El Salvador, capitalized in 1970 at ₱5,445. The association sold

shares to members at ₱5.00, and now has 130 members.

An addition to capital of ₱2,000 was made by the partners in 1974. The association has not yet recapitalized. Both cockpits offer their cockpits to promoters of boxing contests, and to showers of stage or movie shows. During cockfights, the cockpits collect 10 per cent of total bets, payable by the winners. They obtain from ₱50 to ₱100 for prize fight events, and ₱15 for shows or movies. Neither has profited much by electrification. The association maintains the same income (₱1000) it had before electrification, the partnership has seen a decline in gross sales from 1973 to the present of ₱300 to ₱200. Employment is mainly on Sundays and includes 22 part time workers employed by the association and somewhat less, apparently, for the partnership.

Electricity is used in both cockpits for lighting and for sound systems. The monthly bill, about ₱10 each, is small, because the cockpits operate mainly on Sundays. Power failure is not much of a problem because most cock-fighting is generally a day time activity, although lights are turned on in the evening up to the closing at 6:30 and 7:00 P.M. The sound systems are not so necessary as cockpit workers often have strong voices and can be heard without amplification.

Plans for expansion on the part of the association include improvement of the cockpit building which might increase electricity consumption by about a third. At this time the partners are not planning expansion.

In conclusion, noteworthy of mention are the terms of wage payments at these cockpits. Gatekeepers get ₱8 per day, most other employees obtain a percentage of the appropriate receipts. For example, the association cashier gets 10 per cent of the gross, the association collectors get 30 per cent of sales inside the premises.

Food, pharmacy, and smaller general merchandise stores. One pharmacy proprietor, the managers or owners of 3 restaurants (carenderias), of 3 bakeries, of 4 general merchandise stores, and of 33 sari-sari stores were interviewed in an attempt to discover the effects of electrification upon such businesses.

Of the above stores, the pharmacy, all carenderias, one of the bakeries, three of the general merchandise stores, and twenty of the sari-sari stores had pre-existed electrification. The pharmacy was established in 1963, while one of the general merchandise stores was started in 1946, a second in 1947, and the third in 1951. One of the sari-sari stores was established in 1938, another in 1946, a third in 1958, and others in 1959, 1961, 1962, and 1963.

The stores which began after electrification were established in this order: in 1971, a sari-sari store; in 1972, 3 sari-sari stores; in 1973, a bakery and 2 sari-sari stores; in 1974, 4 sari-sari stores; and in 1975, a bakery and a general merchandise store.

Initial capitalization of these stores was as follows:

Pharmacy	- 1	- Below ₱2,000
Carenderias	- 3	- About ₱500
Bakeries	- 1	- ₱3,000
	- 2	- Above ₱5,000
Gen. merch.	- 1	- Below ₱1,000
	- 3	- Above ₱5,000
Sari-sari	- 17	- Below ₱500
	8	- ₱500 - ₱999
	4	- ₱1000 - 1999
	1	- About ₱3500

Of the above, beyond the establishments which began in 1975, all but 8 sari-sari stores and a carenderia have increased their capitalization. Capital, initial and additional, had come primarily from personal property and savings. The carenderias, a bakery, and the general merchandise stores were self funded. Of the sari-sari stores, 14 sold copra, cattle, hogs, land, and

other possessions to obtain the needed capital. Twelve sari-sari stores did not need to sell productive property, but some of these needed assistance from relatives in the form of loans or co-capital. Only two establishments, both sari-sari stores, borrowed money from a commercial bank.

The capitalizations are reflected in the volume of gross monthly sales. For example, 21 of the sari-sari stores gross ₱1,000 or less in monthly sales, 6 of them less than ₱2,000, and 2 gross from ₱2,000 to ₱4,000. The gross monthly earnings of the carenderias was in every case less than ₱2,000. The bakery with the smallest capitalization grossed less than ₱1,000, while the other two grossed from ₱3,000 to ₱4,000 a month. The general merchandise stores were grossing ₱9,000, ₱20,000, ₱30,000, and ₱40,000 a month.

In most of these establishments, employment of persons outside the family is minimal. Only 4 of the sari-sari stores employ even one full time worker outside the family. The three bakeries employ a total of five such full time workers. The pharmacy is staffed by the pharmacist and his full time assistant. The carenderias are entirely staffed by family workers. However, the four general merchandise stores employ a total of sixteen full time workers. The total of workers, family and non-family, is: 60 for the 30 sari-sari stores, 3 for the carenderias, 12 for the bakeries, 23 for the general merchandise businesses, and 2 for the small pharmacy.

Electric equipment of these businesses is various. The sari-sari stores own 32 refrigerators and freezers, 2 electric stoves, 7 fans, 3 electric motors, a jukebox, and 9 stereos. The carenderias own 2 refrigerators and/or deep freezers, a fan, and a stereo, while the bakeries own 4 refrigerators and/or deep freezers, an electric stove, an electric motor, a fan, and a stereo. The general merchandise stores own 4 refrigerators and/or deep freezers, an electric motor, a stereo, and 5 fans. The pharmacy owns a refrigerator.

Altogether the 41 establishments employ 156 fluorescent lamps and 61 incandescent bulbs. The carenderias, sari-sari stores, and general merchandise businesses are not very electricity dependent, although electricity is more convenient for them. Other than illumination and water supply, they can carry on business during power shortages, although the food of the carenderias preserved in the freezers may go bad and the soft drinks will not be cold. The pharmacy is in an intermediate position, because some serums and medicines require refrigeration to prevent spoilage. The bakery with the electric stove would be seriously disturbed by power shortage or failure, while those with kerosene stoves would not be disturbed more than the carenderias.

Summing up all these data, one may say that small, medium, and large business establishments have been stimulated both as to establishment and with regard to expansion by the presence of cheap electricity. The western part of the province is a booming land of small, medium, and large entrepreneurs which has suddenly come to life with the advent of electricity, which has often with its own savings and property furnished the capitalization needed to start useful businesses. A great many of the businesses are directly electricity dependent, others are electricity partially dependent, and all rely upon electricity for lighting and for more convenient, efficient, and pleasant business conditions. Among other things, it is clear that making electricity available has stimulated widespread enterprise and industrial development. One has the heady feeling when observing the reaction of this people to the availability of cheap electricity that he is watching the beginnings of economic take-off.

Irrigation Projects

These projects are given separate treatment here because they neither fall under business establishments in the usual sense of the word although the

farms they service can be looked upon as agricultural industries and therefore businesses in that sense. Neither were they put under any of the sections of the first part of the report because, for while they obviously pertain to the social and economic impact of electrification, on the other hand consideration of such projects seems more proper to the part that treats of occupations rather/to that which treats of the household population. /than

The ALISA project. This association, the Alubijid - Logullo Irrigators Association, located in Alubijid Municipality, is an organization of small landowners and tenants who obtain water from the same cooperative system, but who manage their own plots of land. Two 25 horsepower electric pumps irrigate 75 hectares of their 175 hectares of farm land.

The objective of ALISA is to transform idle or less productive land into rice land and thereby to increase production and income of members. The Masagana 99 program of the President, the encouragement of the association by government officials and by private agencies, and the availability of electricity as a power source are considered by members important factors in the realization of the ALISA objective.

The project has had a long and interesting history. In the 19th century an irrigation system was established based upon a dam across the Mahan-ob Creek. This system remained until the 1930's when for reasons not clear to the respondents, it was discontinued. Corn and tobacco became the chief crops of the area rather than the rice grown in it previously. After some time however these crops were found less suited to the soil and local conditions in this particular area, and farmers began to switch back to the production of rice. The dam over the creek was repaired, and the irrigation system, fed by a gravity flow, supplied the necessary water for lowland rice culture. However with the coming of World War II and large-scale involvement

of the population in the resistance movement against the Japanese, especially the withdrawal of the population to the mountains in many cases, maintenance of the irrigation system was discontinued. The last cropping seasons were in 1941.

Afterwards, the land was either left idle or planted with coconuts, corn, or tobacco. It was not until 1973, that a group of nine farmers organized themselves, and began working for the reestablishment of the irrigation system. On August 12, this group was able to persuade 21 other local land owners of the area to join them in establishing an irrigation organization, the Alubijid - Loguilo Irrigators Association. All together they had a combined area of 27.5 hectares. About this time the government was launching its national food production campaign, and the association was therefore the recipient of much encouragement from governmental and private agencies, and material and financial assistance as well. The NEA and the MORESCO were among such agencies.

As the irrigation system began to become operational, membership grew until in December 1975, 82 members had a combined area of 67.4 hectares. Some of the landholdings of owners are as large as 10 hectares, it appears, but individual farm sizes, whether operated by owner or by tenant, range from 1/7 to 1.75 hectares.

Loans extended by rural banks, government banks, and the NEA through MORESCO made capitalization of the system possible. Two 25 horsepower electric pumps with accessories and construction materials for their installation were purchased through a loan of ₱43,218 from NEA-MORESCO. The canals were constructed on the basis of an ₱8,000 loan from the Municipal Rural Bank. Two individual members obtained loans from the Development Bank of the Philippines by means of which each purchased a tractor for ₱32,000. The Association itself spent ₱13,500 in counterpart funds. The municipal and the provincial governments

donated gravel and culvert materials and extended trucking assistance for the hauling of such materials. In addition, the provincial government provided technical advice and supervision for the installation of the pumps and the construction of the canals. In addition, barangay captains solicited ₱700 from members of their barangays, which they contributed to ALISA toward expenses of the construction of the irrigation system.

Each member manages his own farm but can take advantage of the technical advice of two farm technicians from the Bureau of Plant Industries who provide advice on such aspects of production as land cultivation, seed selection, fertilizer applications, and pest control. Members usually form groups (called seldas) of 5 to 15 farmers organized for the purpose of obtaining loans for production inputs from rural banks.

Members have obligations to the ALISA. These include payment at each harvest of ₱150 for each hectare owned or worked for repayment of the ₱8,000 loan to the Manticao bank. In addition, for each hectare owned they must pay ₱75 at each harvest to amortize the loan for the electric motors and they must pay ₱40 for electricity expenses of the association. They also must contribute ₱2.00 per month toward an Association Fund. Each member is required in addition to contribute manpower for construction and maintenance jobs of the irrigation system, and must regularly attend weekly meetings.

Production information furnished by the two technicians does not tally perfectly with that of the ALISA members interviewed. The technicians may have exaggerated average production, or the members interviewed may have produced less, or either group may have made mistakes in computation. than average

According to the technicians, since the start of the 1974 operations, there had been as of November, 1975, three cropping seasons. They estimated yield per hectare in the first cropping (November, 1974) to have ranged

between 50 and 80 cavans of palay per hectare. Yields during the second harvest (May, 1975) were higher, ranging from 75 to 85 cavans. Yields in the third cropping (November, 1975) were almost as good, ranging from 75 to 83 cavans. The slight decline was attributed to rats, poorer weather conditions, and to late fertilizer application upon some farms. According to the President of the Association, the produce had usually been marketed to grain dealers in Cagayan de Oro and in Opol, and to the National Grains Authority. Recently, they said, much of the harvest had been purchased by a Moslem business man who had bid ₱1.05 per kilo for the rice as against the ₱1.00 price given by the usual markets.

To obtain a better in-depth profile of the production activities of ALISA members, interviews were conducted with individual members. A total of 27 interviews were completed.

Of the 27, 9 were tilling their own land and 18 were tenants. Average area of irrigated land was the same in both groups, 0.85 hectares. Area sizes were small and did not vary much among the two groups. An owner cultivated the smallest plot, 1/7 of a hectare, while a tenant cultivated the largest, 2 hectares. The combined irrigated area farmed by all 27 respondents was only 22.89 hectares.

Prior to irrigation, the main crop had been corn and the yield averaged about 10 cavans per hectare per harvest. Other than the occasional hiring of part-time labor, as at the harvest, no major inputs such as fertilizers or pesticides were used. After irrigation was in operation, the main crop became wet rice, and during the first year of irrigation, the average yield of this group was 47 cavans per hectare. The average yield for the two harvests of 1975 was 62.3 cavans. While these reported yields are somewhat lower than those reported by the BPL technicians, the two reports are consistent in

reported direction of increase. This increase in productivity per hectare may be attributed partly to increased fertilization and use of chemicals. Expenditures for these in the group interviewed had averaged ₱1.60 and ₱1.78 per hectare, respectively. The employment generated by this group of 27 farmers included, beside the 47 family members who worked part time, 121 hired farm laborers who were assigned to various tasks.

The ALISA plans to irrigate up to 175 hectares of land, that is, all the land which had been part of the pre-war irrigation system. For this purpose, the ALISA is currently constructing another dam across the Mahan-ob Creek. Water from this dam would then be distributed by gravity to the various fields. In more elevated areas where water supply would be less adequate, multiple cropping of such alternative farm products as vegetables, mushrooms, and melons will be rotated with rice. The ALISA has been receiving an electricity allocation of 37 KWH and apparently no increase in this allocation is expected over the next five years.

Other electric pump irrigation users. Most of these users were individual farm owners and their tenants. Twenty such irrigation system users were interviewed, of whom 9 were utilizing electric pumps for irrigation, and 11 were utilizing gravity flow systems as means of water distribution.

The users of irrigation employing electric pumps had a combined area under cultivation of 33.75 hectares, or an average of 3.8 hectares. Areas irrigated ranged in size from 0.5 to 21.0 hectares. All these irrigation systems began after MORESCO began to supply electricity in 1971, and all but one used electric pumps from the beginning. Prior to irrigation, one of the areas had been chiefly planted to coconuts, six others to corn, and only two to rice. The average yield per hectare per harvest of corn had been 12 cavans according to five respondents, while the average yield for rice according to two respondents had been 21 cavans a hectare.

These irrigation systems involved pumping water from streams, rivers, or wells and distributing this to the fields by gravity flow through canals. Electric pumps were therefore necessary in addition to the construction of dikes and canals. The total investment of these 9 users in electric pumps totalled almost ₱45,000 or about an average of ₱5,000 each. The largest of these irrigation systems utilized two electric pumps to irrigate its 21 hectares. One of the others expanded from a $\frac{1}{2}$ horsepower pump to irrigate $\frac{1}{4}$ hectare to a 3 horsepower pump to irrigate 1 hectare. Most investments in pumps and accessories were financed from savings and property of the irrigators. However, the MORESCO made a loan to one of the investors, a rural bank financed another, and a third obtained the necessary loan from the dealer who sold him the pump.

Yields of palay per hectare of these irrigated farm areas, according to the respondents, averaged 60 cavans, although they ranged from about 8 cavans to an average of 70 on the large 21 hectare system. Fertilizers and chemicals, which had not been utilized before irrigation, cost an average ₱130 per hectare per cropping season for fertilizer and about ₱22 per hectare for chemicals. In all, 110 workers are employed on these irrigation systems per season, 25 on a full time basis. Of these, 12 are family members, 16 are pump operators and maintenance men, 2 are technicians who advise on production techniques, and 80 are laborers hired during seasons.

The irrigators responded to the question on the advantages of electrification in terms of comparing electric pumps to diesel or gasoline powered pumps and stated that the electric pumps were more economical from three distinct points of view: (a) in fuel costs, (b) in maintenance costs, and (c) in availability of adequately skilled operators. They also mentioned provision of an adequate water supply which presumably would be handled as well

by the other type pumps but at higher cost. Five of the nine irrigators planned to exchange their pumps to units of higher capacity or to add new pumps to their system in order to expand their areas under irrigation. The other four had no expansion plans since for the most part they had no further irrigable lands.

Irrigation systems not using electric pumps. Eleven respondents belonging to such systems were interviewed. Five of these systems were established before 1970, one of these dating back to 1940 and another to 1957. The other six, state the respondents, began operations after 1970. These systems are rather small except for one of ten hectares, which is being administrated by its owner. The others have an average size of 0.74 hectares, ranging from $\frac{1}{2}$ hectare to 1.5 hectares. Two working owners are among the eleven, one farming an area of 1 hectare and the other an area of 2 hectares.

Prior to irrigation, 5 areas were planted to corn (4 by tenants, 1 by an owner), 2 areas were planted to coconuts with some additional corn, 1 was planted to rice, and 6 areas were left idle (all 6 now are cultivated by tenants). All fields are now planted to rice. Average yield per hectare for corn per harvest was 11 cavans before irrigation, while average yield in the one rice area had been about 13 cavans. Average yield per hectare per harvest is now 24 cavans, ranging from 9 to 40 cavans on the smaller areas to 50 on the largest area. The decision to irrigate was motivated by the soggy nature of the places during the rainy season which made for poor land for corn and most crops other than rice, while water sources for rice were available nearby.

These irrigation systems principally rely upon the distribution through gravity flow of water from rivers or streams. One system however utilizes a diesel pump and the other is a rain-fed system.

In all, 104 persons are employed on these eleven farm-irrigation systems. The largest system, that of the 10 hectares, employs one full-time administrator, and two full-time maintenance workers to tend the canals and distribution system. In addition to the administrator, two members of his family work upon the project in a part time capacity. A total of 30 part-time laborers are hired during the year to accomplish such tasks as ground preparation, planting, and harvesting. Taken as a whole, the smaller remaining systems employ 24 family members doing part-time work, 9 full-time maintenance or pump operator personnel, and 32 farm laborers. Four technicians have been available to the eleven systems.

Except for the one diesel-operated pump, no expenses are incurred for power output. Electricity is not used for power on any of these projects. When asked why they did not use electric pumps, one owner pointed out that his area was thus far not accessible for the electric lines. Both he and another respondent, while favorable to the idea, stated that they would first need to obtain capital for pumps and would need technical advice before they could make a switch to electric pumps. One of these pointed out that he could irrigate a larger area with electrification. Two others stated that no advantage would accrue to them by switching to electricity since they already had an adequate water flow from their gravity systems. On the other hand, they indicated that the additional costs would eat seriously into their present profits. The remaining seven operators did not respond to the question.

When queried about the advantages of electric pumps over alternative systems for obtaining water for distribution, three of the four who responded above stated that electric pumps increased the reliability of sufficient water being on hand when needed. The disadvantage they saw was that during power failures or pump breakdowns, no water would be available, whereas systems built

solely upon gravity flow do not have such problems. One of the four saw no advantages in purchase of an electric pump in his situation since he already had adequate water. Such a purchase would simply be an expense without commensurable return.

When asked about plans for expansion, 7 of the eleven operators replied they had no such plans since they had no further lands to expand to. Four however planned an expansion of their irrigated areas. Notable among these was the largest operator, who planned to expand from his present 10 hectares to an additional 10 hectares. He planned to employ an electric pump or pumps to supplement his current gravity flow system. Another of the respondents, proprietor of a smaller farm, wished to add an electric pump or pumps to better facilitate the distribution of water.

Large Scale Suppliers of Credit

Implicit throughout most of the preceding sections, and at times explicitly alluded to, has been the role of financial institutions in providing credit for the initiation and the expansion of business establishments, of irrigation systems, of pure water systems, of household electrification, of the purchase of household facilities, and of the like. It remains desirable to treat briefly of the part which these financing institutions have played in the development of economic and social activities in western Misamis Oriental. Matters that have already been discussed will be taken for granted and will not be repeated here.

Rural banks in the MORESCO area. Four rural banks are to be found in the MORESCO area which endeavor to serve the credit needs of the ten municipalities of western Misamis Oriental. Each has its own preferences as to the type of loans which they wish to grant to applicants. All however agree that electrification has definitely affected the volume of transactions in their institutions,

which in turn has affected the birth and maintenance, as well as the expansion, of small and medium scale industrial and commercial endeavors in their areas.

a.) The Rural Bank of Manticao. Founded on October 4, 1967, this institution is the oldest bank in western Misamis Oriental. Its initial capitalization was ₱100,000 but at the present this has grown to ₱279,000. The bank is currently servicing 1500 borrowers with loans up to ₱15,000. The bank officials note that with the electrification of Manticao and the rest of western Misamis Oriental which gradually began in 1971, more people had started applying for loans to finance such matters as purchase of electric pumps for piggeries and for gasoline stations, for electric sewing machines, for refrigerators, for stereo equipment, and for television sets.

b.) The Rural Bank of Lugait. This bank was inaugurated on January 24, 1974, to serve farmers, small scale commercial establishments, and small industries. It has a subscribed capitalization of ₱500,000 and a paid-up capitalization of ₱121,000. From its establishment to date of interview, it had granted 1,547 loans, the largest number of which, 722, had been to poultry and piggery operators. Bank officials believe that electrification "has fostered the proliferation of piggery and poultry operations" in Lugait and its neighborhood. They note that operators consider an electric pump not only as a convenience but as a necessity for the running of piggery and poultry enterprises. They also credit to the availability of electricity the establishment of a "beer garden" and also a beach resort in the local area of Lugait. They also mentioned their belief that street lights in town had made night life more possible and safe.

c.) The Gitagum Rural Bank. The most recently established of the rural banks, this institution was inaugurated on April 15, 1975, to "provide credit facilities, particularly to small borrowers", for those engaged in commercial,

agricultural, and industrial activities. Authorized capitalization was ₱500,000. These credit facilities have been taken advantage of both by Gitagum and extra-Gitagum residents. In fact, among non-residents have been a Cagayan de Oro and a Naawan business man, both of whom have established cattle feed projects on the basis of loans from this bank. Of the credit extended thus far, 90 per cent of the funds have gone towards cattle enterprises, 7 per cent for land improvements and work animals, 2 per cent for the establishment of carenderias, refreshment parlors, drug stores, and sari-sari stores, and 1 per cent for dress and tailoring businesses.

d.) The Rural Bank of Copol. This institution was established in 1971, apparently a few months before the energization provided by MORESCO in September. Capitalization of the bank was not available to the interviewer at the time of interview. Data however were available on amounts and types of loans. First place was occupied by ordinary and supervised agricultural loans (₱2,243,700), followed by Masagana 55 and 99 loans (₱954,770) and poultry and piggery institution loans (₱300,200).

The bank administrators noted that after electrification their largest group of clients, farmers, had stated that overtime work was now possible with the availability of electric light and power. They indicated that small scale businesses were cropping up, although slowly from their point of view, like tailors, dress shops, and vulcanizing businesses. Total loans for such small scale commercial and industrial establishments had reached about ₱22,000. They also remarked that many sari-sari stores and carenderias were applying for loans to buy refrigerators and freezers because cold drinks had become competitive in the area.

MORESCO as a source of credit. While MORESCO is an electric service cooperative, fortunately it has interpreted this role broadly and has been in

a position financially through funds advanced for such purposes by the NEA. /to³

Since 1973 alone, it has made loans totalling ₱190,633.22. The following data on these loans give some insight into the nature of these loans. (The house wiring loans appended, as indicated below, are not included in the above total.)

<u>Productive enterprise loans</u>	
a) ALISA	₱42,437.27
b) Other irrigation	44,343.00
c) Hogs and poultry	8,070.35
d) Sewing machines	1,217.50
e) Furniture, hollow blocks, other small industrial	29,350.91
 <u>Household-related loans</u>	
a) Piped water systems	10,735.00
b) Household appliances	54,479.19
	190,633.22
 c) House wiring loans (for installation of electricity)	
i) In poblacions of municipalities	32,040.93
ii) In barrios of municipalities	65,290.52
iii) In Cagayan barrios	6,600.00

At time of interview, the largest number of applicants for loans were those desirous of purchasing electric ranges or stoves, 52 in number.

Special five year repayment terms were given to the ALISA irrigation project in concordance with its development importance, particularly its relationship to the small and poor farmer. Six irrigation projects received three year repayment terms, and three received two year loans. The smaller irrigation projects obtained loans ranging from ₱1,500 to ₱8,000.

House wiring loans were extended to 2,349 families, of whom 611 lived in municipal poblacions, 1573 in municipal barrios, and 165 in Cagayan de Oro barrios.

*extend credit to capitalize worthwhile projects.

CONCLUSION

This report has attempted to communicate highlights and summaries of the more than three months of investigation its teams have conducted upon records and in the field in western Misamis Oriental upon the social impact of electrification first upon the household population and secondly upon agriculture, businesses, and industries in this area. Needless to say, its summary nature and exploratory character have left unanswered numerous questions that will have occurred to its careful readers. Some of these which relate to data already gathered, will be cleared up by statistical materials to be appended to a later version of this report. Others can only be answered by survey research to be carried out after the end of the present contract on February 26, 1976. These questions because of their relationship to such an important infrastructural component of the economy as electrification, cry out for such further investigation. Only survey research with a fixed interview schedule will be capable of rendering definite answers to such questions. Such research would require a minimum of twelve months of work and for a more comprehensive and thorough treatment fifteen to eighteen months.

DESCRIPTION OF THE STUDY AREA

Physical Characteristics

Misamis Oriental is located along the northern coast of Mindanao Island, the second largest island of the Philippine Archipelago. It is bounded in the east by Agusan Province, in the south by Bukidnon, in the southwest by Lanao del Norte, and in the north by three bays that run from east to west of the province: the Gingoog, Macajalar and Iligan bays.

The total land area of the province is 366,325 hectares. More than half of this area consists of hills, high uplands and mountains while about 14 percent consists of plains, valleys, and undulating areas. Protected by mountain ranges in its northeastern border, Misamis Oriental has never been ravaged by devastating typhoons which cause much damage to properties and lives as in other parts of the country. The climate is generally dry from January to April or May, while heavy rainfall from the southwest monsoon generally occurs from May or June to November.

The western part of the province, which is the present MORESCO area, covers the ten municipalities of Opol, El Salvador, Alubijid, Laguindingan, Gitagum, Libertad, Initao, Naawan, Manticao and Lugait. Together they have an area of 82,219 hectares or 22.0 percent of the total land area of the province.

Minerals like copper, gold, silver, chromite, manganese, nickel, iron, etc. are found here in varying quantities. The municipalities of Opol, Manticao, and Alubijid are three areas where the most number of claims have been made. When properly and fully exploited, these resources will contribute greatly to the province's economy.

Economic Characteristics

The province's economy is basically agricultural. More than half of the population (53.0%) are engaged in agriculture. The main agricultural products of Misamis Oriental are coconut, palay, white corn, fruits and vegetables, bananas, coffee, cabbage, root crops, and tobacco. Misamis Oriental is considered the second leading coconut-producing province in the Philippines. It has a total of 129,970 hectares (35% of the total land area) planted with coconuts and one-third or 33% of this land area and of coconut production is found in western Misamis Oriental. In the seven municipalities of Alubijid, El Salvador, Gitagum, Initao, Laguindingan, Libertad and Lugait are found some of the best locations in the province for the planting of rice, corn and sorghum. In Kalabaylabay, El Salvador is a P8 million Filipino-Japanese agro-industrial establishment which processes locally produced sorghum into hay cubes and powdered hogfeds for export to Japan.

The livestock industry is important for the province. The western municipalities of Misamis Oriental account for more than one-third of cattle production and more than one-fourth of hog production in the province.

The fishing industry in Misamis Oriental is still underexploited. It is believed that there have not been enough fish to meet the demands of the province's growing population. The three types of fishing practiced are inland fishing, marine fishing and commercial fishing. Inland fishing is done mostly in the province's 521.3 hectares of brackish water fishpond areas of which 60 percent are found in Opol and Alubijid. Marine fishing is the major occupation of some 1,695 fishermen in western Misamis Oriental

using motorized and unmotorized bancas. Commercial fishing occurs along the bays of Gingoog and Macajalar.

Industry. Misamis Oriental has been deemed the best area for industrial development in Mindanao. Apart from being the gateway to the South, it is well-known for its peace and order situation. Misamis Oriental also avails of cheap electric power from Maria Cristina Hydro-Electric plant. The latest industrial development is the establishment of the Philippine Sinter Corporation or KAWASAKI. Soon to come up are another 60 heavy industries in some 3000 hectares of land in an eastern municipality. In the western section of the province MORESCO currently serves three big industries; a steel factory producing galvanized irons, a timber processing factor and an agri-business establishment producing sorghum and processing this into hogfeeds for export. With the availability of cheap electricity, western Misamis Oriental will soon be the site of such establishments as a pre-fab mill in Opol, a ferro-chemical plant in Manticao, which will produce ferrous silicon for melting steel, an Electro-Alloy plant also in Manticao, a cold storage in El Salvador, a cannery in Initao, saw mills in El Salvador, and various corn mills in different municipalities.

Transportation and Communication. In this province there are ports, an airport, and roads connecting all cities and municipalities. Different forms of transportation are available from each of the municipalities of Misamis Oriental to Cagayan de Oro City. Overland carriers consisting of jeepneys, buses, tricycles, motorelas, and others constitute the main volume of traffic. Next to land transport is water transport through its nine public and nine private ports situated strategically along the municipalities in the Iligan and Macajalar Bay areas. Government-owned

facilities in the province consist of 16 telegraphs, 4 radio telegraphs, 3 butel radios, 4 telephones, and 26 law enforcement communication systems. Privately owned communication facilities are 15 telegraph systems, 1 telephone system, 5 radio stations, one television station and 4 radio phones. The principal medium of mass communication is the radio.

Credit Institutions. Credit and financial institutions in serving western Misamis Oriental include four rural banks located in Lugait, Gitaguan, Manticao and Opol, two government banks and eleven commercial banks located in Cagayan de Oro City. Finance companies and investment houses are also located in Cagayan de Oro.

Health. In the province are 15 hospitals manned by 89 doctors, 190 nurses, 28 midwives, 152 attendants, and 34 lab technicians to take care of the needs of the provinces' 550,000 people. In different municipalities are established health care centers in providing medical assistance. As of June 1974, the Provincial Health Office's sanitary toilet program has constructed some 2,110 toilets. Maternal and child health activities of the province are programmed to include the establishment of well-baby clinics, health education of mother, pediatric immunization, supplementary feeding and family planning through its 22 rural health units. Other activities undertaken are the correction of malnutrition and disease control.

Education. The province as a whole has a literacy rate of 76.8 percent. Literacy here is defined as the ability of any person 6 years or over to read or write in any language or dialect. In western Misamis Oriental there are 117 primary public schools, 55 intermediate public schools with a total of 23,505 students and 725 teachers.

SOCIAL AND ECONOMIC IMPACT

Social and Economic Factors: The Residential Population

Population Distribution

A total of 411 households were interviewed for this study, representing a total population of 2,478. The average household size was 6.03 persons per household.

Age-Sex and Area Distribution. The population distribution by age and sex are shown in Table 1. Males and females were about equally distributed: 1223 and 1255, with a masculinity of 0.97 (ratio of male to female population). More males, however, are found in the ages 0-9 and in the ages 30 and over, with masculinity ratios averaging 104, while more females were found in the ages 10-29, a masculinity ratio around 90 males per 100 females.

Percentage distribution of the population residing in the municipal poblacions, the rural coastal and the rural inland regions, are 32.0, 27.7 and 40.3 percent, respectively.

Dependency ratio, defined in this study simply as the ratio of the population less than 10 years of age and of the population 60 years old and over, to the total population ages 10 to 60 was computed for the total study population as well as by areas. The dependency ratio was 53 per 100 for the total population. The ratios were 53, 54, and 53 per hundred population, in the poblacion, rural coastal, and rural inland areas, respectively. The dependency ratio, with its well-known limitations, is often used as a crude but convenient measure of dependency burden. It signifies the number of dependents that will have to be supported by the theoretically working members of the population in addition to themselves.

Age of Household Heads. The age distribution of household heads by users category is presented in Table 2. More than two-thirds of household heads in all categories are between the ages 30 to 59 years. Less than one-third of the household heads are equally divided between those below 30 years of age and those age 60 and over. The median age of all household heads was 42.3 years.

The 411 household interviewed in this study included 203 users, 118 non-adoptors, 40 inaccessible, and 50 disconnected. Household heads among electric consumers tend to be older than among non-adoptors and among inaccessibles, with the disconnected occupying an intermediate position. Percentage of household heads less than 40 years of age were 39.9, 51.7, 55.0 and 40.0 among users, non-adoptors, inaccessibles and disconnected. The median ages were respectively 44.9, 39.1, 38.6, and 42.8 years. The data are shown in Table 2.

Average Household Size. The average household size of the 411 households interviewed was 6.03. This is the average household size one might expect under current Philippine demographic situation. Table 3 summarizes the average household sizes among different categories of the population in terms of electricity use and area of residence.

Users of electricity tended to have a higher average household size of 6.4 persons per household, while non-adoptors tended to have smaller household sizes, with an average of 5.4 persons per household. This difference might be due to the lower median age of household heads for non-adoptors than users: 39.1 to 44.9 years. Furthermore, more cases

of widows as household head were found among the inaccessible and the disconnected averaged 6.12 and 6.18, respectively, which were close to average household size of users.

Residents in the poblacions and in the rural inland areas have about the same household sizes of around 6.1 persons per household. In the rural coastal areas however, the average household size of 5.8 persons per household was slightly lower than in these two areas.

Household size included all persons who usually reside in the house. This includes persons who are temporarily away but excludes visitors. Due to the extended nature of the Filipino family, a typical household usually includes, in addition to the nuclear unit, a relative or a surviving parent. If we exclude members not belonging to the nuclear family unit, the average family size, as opposed to the average household size, for the total interview population was 5.23. Table 4 shows average family sizes by area and users categories.

Average family sizes of inaccessible and disconnected tend to be high, 5.8 and 5.6 respectively. It is lower for non-adoptors, 4.8 and an out average for users, 5.3 persons per family. Rural inland families tend to be larger, 5.5, than among families in poblacions, 5.1 or in rural coastal families, 5.0.

When the average household size and average family size are compared by area and by users categories, one finds that household in the poblacions tend to be more extended. The extended family decreases and become more nuclear as one moves from households in poblacion, to rural coastal and

and to rural inland areas. Similarly, households of users tend to be more extended than any other category of households, while the most nuclear are those in inland areas.

Occupation

Of the total 411 household heads in the study, 216, or 52.6 percent, were engaged in agricultural and another 51, or 12.4 percent, in fishing activities. Together they constitute almost two-thirds of the household heads in the study. Household heads whose occupations were included in the categories of commerce, transportation, construction, manufacturing, business and personal services, accounted for 24.7 percent of all household heads. There were relatively few in the sample who were professionals, 6.3%; who received fixed incomes, seven-tenths of one percent; and who were unemployed, 3.2 percent.

Users of electricity tend to be engaged less in agricultural and fishing activities and more into the presumably more productive occupations of business and the professions. Among users of electricity, the proportion of household heads engaged in agriculture was 45.8 percent. This was lower than among non-adoptors, 59.3 percent, and among inaccessibles, 80.0 percent. It was slightly higher than among the disconnected, however, 42.0 percent. A large proportion of professionals, 10.8 percent, is found among users. Among non-users, percentages were 0.8, 0.0 and 6.0, for non-adoptors, inaccessibles, and disconnected, respectively. The proportion in fishing among users was about the same among non-adoptors, 12.8 to 12.7 percent, but lower than among the disconnected, 12.8 to 20.0 percent.

The inaccessibles who were located in inland villages far from the coast understandably did not engage in any fishing activities. The proportion of users in the business occupation was also larger than among the other categories of household heads, 27.1 percent as opposed to 23.7, 17.5 and 24.0 percent for non-adoptors, inaccessibles and disconnected, respectively. Finally, the users had a higher proportion in the fixed groups and a lower proportion unemployed than among the non-users. (Table 5).

In examining the types of economic activity by area, it is not surprising to find household heads in poblacions to engage in business-related activities (commerce, transportation, construction, manufacturing services), the professions and fixed income categories than in other occupations. Similarly, household heads in the rural coastal areas tend to engage more heavily in fishing activities, as rural inland household heads do in farming activities, than in any other types of occupation. For example, 58.8 percent of all household heads whose main occupation is fishing, are found in rural coastal areas. Similarly, 59.3 percent of all household heads engaged in farming are from rural inland areas, while 55.9 percent of all heads engaged in business-related activities reside in the poblacions. Professionals and fixed income groups also tend to be concentrated in poblacions than in the rural areas.

Education

Of the 411 household heads, almost ten percent (9.7) had no formal schooling. Majority had at least gone to elementary schools (233 or 56.7 percent), and among these, two-fifths, or 97 out of 233, actually completed elementary education. Those who have gone to high school

constituted 16.3 percent and out of which 15 out of 67 or 22.4 percent completed high school. Of the remaining 14 percent who had attended college, only one out of ten completed college. The median year of schooling for all household heads was 5.3 years, less than a completed elementary education.

Electric consumers were found to have a generally higher level of education than non-users with median year of schooling equal to 5.77 years, compared to 3.96, 3.80 and 5.27 years for non-adoptors, inaccessible and disconnected respectively, compared to only 3.9 percent among users. The data are shown in Table 6.

Income

The difficulties obtaining accurate data on income are well known. The difficulties are compounded when respondents have several sources of income, and where income from each source varies from month to month or from season to season. Some of the respondent's net output from a productive activity may not pass through the market system. And to top it all, respondents may not have the knack for mathematical computations. Several alternatives to the direct question approach of obtaining income data have been suggested. These alternative approaches include conducting detailed budget studies of households, asking respondents their position on an income scale, or simply obtaining data which will proxy income such as education, occupation and level of living. Each approach has its own advantages and shortcomings, and decision as to which approach or combination of approaches to use depends upon the purpose of the study.

There are two objectives of this study for which income data is useful:

- (a) to determine whether rural electrification reaches the rural poor, and
- (b) to determine threshold income for electric users, i.e., the minimum income necessary before an individual or family can switch from traditional sources to electricity as a source of light and energy.

The approach of obtaining income data used was to ask respondents directly what their usual income is per time unit. The time unit usually varies among different classes of respondents, but it was the respondent's, not the interviewer's, time unit that was stressed. Secondly, respondents were asked of their usual income from all sources, i.e., from main occupation, from secondary sources such as farming, gardening, backyard livestock production, fishing, business, etc., and from income contributed by family members for household use. Each of these categories of income were annualized and summed to obtain a total income figure for each household.

To determine whether rural electrification is reacting to rural poor, the income data obtained from each household by size of household was compared with a standard subsistence income for that group. The standard subsistence incomes by size of family published by the Development Academy of the Philippines (DAP) in 1971 were used in this study. These subsistence incomes by family size or threshold levels represent the minimum levels of expenditure necessary to fulfill basic requirements of food, clothing and shelter.

Two sets of data are shown in Table 7 and 8. In Table 7, respondents were classified according to whether they were below or above the

threshold level of income by household size; in Table 8 the same procedure was done but according to family size instead of household size. The DAP study computes threshold levels by varying family sizes. It is not clear whether this means the nuclear or the extended family.

The data in Table 7 show that of the total 411 households, 72.7 percent were below threshold levels of income classified according to household size. Only 27.3 percent obtained incomes at or above the minimum level to achieve fulfillment of basic nutritional and other requirements. For each of the user categories, both non-adoptors and inaccessibles showed high percentages below the threshold income, 86.4 and 92.4 percent, respectively. The users and the disconnected showed lower percentages of 62.1 and 68.0 percent respectively, than did the other categories. However, in absolute terms their proportions below the threshold levels were quite high as about two-thirds in both groups fail to achieve minimum income requirements.

The same pattern is revealed when classification of households are based upon family size rather than household size. Only the level is somewhat lower for users but practically about the same for other categories.

Level of Living

The level of living was measured by a scale which is based upon such items as principal materials of house construction, number of rooms, source of water, toilet facilities, cooking facilities, storage of perishable goods, lighting, means of transportation, ownership of and improvements made in current house. Scores based upon all these items

for all households were examined and five levels of living were constructed. This is referred to as LEVEL. Another scale was constructed which eliminated scores on cooking facilities, storage of perishable foods and lighting to obtain an electricity-free living scale, referred to as LEVEL-EF. This scale indicates level of living of household holding availability of electricity is held constant.

Table 9 summarizes mean level of living (LEVEL) scores by user category and by area. Users show a much higher level of living, compared to non-adoptors, 3.768 to 2.178. Users also show higher level of living than the inaccessible, 3.768 to 2.350, and the disconnected, 3.768 to 3.000. Both inaccessible and disconnected, however, have higher level of living than the non-adoptors.

The same pattern in level of living differentials between the four categories of households is revealed when area of residence is controlled. In poblaciones, rural coastal and rural inland areas, users show the highest level of living, the non-adoptors the lowest, with the other two categories occupying intermediate positions. In terms of real differences, however, level of living of households regardless of user categories decreases as one moves from poblacion to rural coastal to rural inland areas.

The pattern of level of living differentials between different households and between areas remain the same even when availability of electricity is controlled, as can be observed from Table 10.

Satisfaction with Life Situation

In the measure, satisfaction with life situation, adopted for this study from Davis, Saunders and Moses, respondents were asked to compare their present life situation, stating whether it is much worse, worse, the same, better or much better, with (a) that of their neighbor, (SIT PRES), (b) that of their own five years earlier (SIT PAST A), (c) that of their father, (SIT PAST B), (d) their expected life situation five years into the future (SIT FUT A), and (e) that which they expected for today's children when they grow up (SIT FUT B). Scores ranged from one for much worse to five for much better. Mean scores were computed for each question and for all the five questions. Table 11 summarizes the data.

Users scored higher than non-users in all satisfaction with life categories. For total satisfaction with life situation (SIT TOT) which reflect the combined scores for the five questions, the mean scores were 3.246 for users, 3.080 for inaccessibles and 3.048 for disconnected. Non-adoptors had the lowest mean score of 2.993. This means that users were more satisfied with their life situation compared to non-users. Both inaccessibles and disconnected were slightly satisfied while the non-adoptors were slightly dissatisfied or thought their life situation slightly worse than in the past or present.

The ranking among the user categories in terms of mean scores in each of the satisfaction with life indexes, except for one inversion were the same as the ranking in terms of total satisfaction (SIT TOT).

Lottery Questions

The interview guide for residential population included three "lottery" questions. Respondents were asked what they would do with lottery winnings of ₱1000, ₱5000 and ₱10,000. These questions were designed to obtain insights into how respondents would improve their present life situation if they had the financial means to do so.

Categories of responses to the lottery questions are shown in Table 12. These categories were further grouped into four categories: (a) save winning in bank; (b) productive investment, which includes investment in agricultural land and equipment, in fishing equipment, in livestock and work animals, and business; (c) household investments, which includes investment in household necessities, in a new house, and in home appliances; and (d) others. This group is shown in Table 13.

For all respondents regardless of user category, the main use for their winnings would be for productive investment, followed by savings in banks and then for household. This is true for responses to each of the lottery questions. This indicates their need for income producing investments to increase their present level of living, and less on the need for current consumption.

When examined by users category, differences can readily be observed. (Table 13). Non-adoptors consistently showed in all three questions higher percentages responding to use of lottery winnings for household investments. They are followed in order by users, inaccessibles, and disconnected, with only one inversion between inaccessibles and disconnected. This pattern may reflect the lower level of living of non-adoptors

compared to the three categories of households and their need to improve their situation. The relatively higher percentages for users who already possess higher level of living, may reflect awareness of new possibilities of further improving their situation. This awareness may be more keen among non-adoptors, however, who live in close proximity with the users having higher levels of living than their own. The lower percentage for inaccessibles may reflect lack of opportunities for such investment, i.e., investment in electric appliances. For the disconnected, however, possible reasons are as yet not clear.

Furthermore, non-adoptors and disconnected showed relatively higher percentage responding to use of lottery winnings for productive investments. This is consistent with their relatively lower income level compared to users. The inaccessibles, however, consistently show relatively lower percentages than the three categories in all three questions, which may reflect the lack of productive investment opportunities for them, especially as they live in rural inland areas where opportunities for business are small. Instead they tend to save their winnings in banks.

Another way of looking at the data is to see the relative importance of the reported use of the winnings as the winnings become larger. It is interesting to note that as the amount of winnings increases from ₦1000 to ₦10,000, the proportion of respondents in the productive investment category generally increases, but decreases in the household investment category. This is true for all categories of users. This may be because productive investments such as buying a farm or starting a business tends to involve larger amounts of money than are expenditures for household necessities and appliances. A possible implication for economic

development of the above relationship might be that small income increases are easily dissipated in household consumption. Only at some threshold do increases in income become self-generating.

Mass Media Exposure

A mass media exposure index was constructed based on degree of exposure to radio, television, newspapers and magazines. This is referred to as mass media index (MMEI). An electricity-free index was also constructed by eliminating exposure on mass media which requires electricity for its operation, namely television. This index is referred to as the electricity-free mass media index (MMEI-EF).

As the data show in Table 14, users tend to exhibit high mass media exposure (MMEI) than non-users. Among the non-users, however, non-adoptors and the disconnected are the less exposed to mass media than the inaccessible. This differential exposure among different user categories remains the same even when availability of electricity is controlled. The data is shown in Table 15.

Residents in different area categories show increasing mass media exposure of respondents as measured by MMEI and MMEI-EF as one moves from rural areas to poblacions. However, the mean scores in both indices do not vary greatly by area, and probably are not significant. The differential mass media exposure pattern among the user categories remain the same in the poblacion and in rural inland areas. In the rural coastal areas, however, users and disconnected tend to have the same degree of mass media exposure.

Social and Recreational Activities

Social Participation. Social participation among respondents was measured by an index based on membership in organizations, official position in the organization, and frequency of attendance to meetings. In addition, information on types of organizations respondents usually belong to was obtained.

Social participation among respondents was generally low irrespective of user category. The mean scores in the social participation index were 2.433, 1.644, 2.525 and 2.260 for users, non-adoptors, inaccessible, and disconnected, respectively. (The index was five point scale from low of one to a high of five). While mean scores were low for all categories, it was lowest for non-adoptors.

Among the respondents, 153 of 411, or 37.2 percent, belong to any organization and therefore had zero scores. Membership in organizations tend to be low among adoptors, 57.5 percent, and users, 60.1 percent. It tends to be high among disconnected, 88.9 percent, and inaccessible, 93.5 percent.

Among the types of organizations respondents usually join are the Parent Teachers Association (PT), followed by farm associations and cooperatives.

Recreational Activities. Information on recreational activities was obtained by asking respondents what recreational activities they usually engage in. Furthermore, they were asked what recreational activities people in his neighborhood usually engaged in as a result of electrification.

Respondents seem to have a low level of activity when it comes to participation in recreational activities. Among recreational activities most frequently engaged in by all respondents were dances (40.9 of respondents), sports events (18.2), cock fighting (21.7), and visit with friends (20.2). Among those who do not frequently attend such activities, the reasons given were because they are busy and do not have time for such activities.

However, when asked about what activities are frequently engaged in by persons in their neighborhood, benefit dances and sports events ranked the two highest. More than 80.0 percent of respondents answered benefit dances, while 46.2 percent answered sports events. Both events have become popular in barrios and municipalities with the availability of electricity since these events can now be held conveniently at night.

Table 1

Age and Sex Distribution of Survey Population

AGE	POBLACION		RURAL COASTAL		RURAL INLAND		TOTAL
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	
0-9	119	106	100	105	158	149	737
10-19	88	122	96	92	140	151	689
20-29	59	78	48	40	61	68	354
30-39	40	34	44	42	51	54	265
40-49	26	32	22	20	43	40	183
50-59	24	19	17	24	25	19	128
60 +	22	25	20	16	20	19	122
Total	378	416	347	339	498	500	2,478

100.0 100.0 100.0 100.0

Total cards - 2,478
Males - 1,223
Females - 1,255

Table 2
Percent Distribution of Household Heads
By Age And By User Category

AGE	USER TOTAL	TOTAL	NON-ADOPTORS	INACCESSIBLES	DISCONNECTED	ALL HOUSEHOLD HEADS
Less 30	: 8.9	: 21.1	: 27.1	: 20.0	: 8.0	: 15.1
30-39	: 31.0	: 28.4	: 24.6	: 35.0	: 32.0	: 29.7
40-49	: 20.7	: 25.5	: 20.3	: 27.5	: 36.0	: 23.1
50-59	: 20.7	: 12.0	: 11.9	: 15.0	: 10.0	: 16.3
60+	: 18.7	: 13.0	: 16.1	: 2.5	: 14.0	: 15.8
Total per- cent	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0
Total house- hold head	: 203	: 208	: 118	: 40	: 50	: 411
Median age	: 44.9	: 40.0	: 39.1	: 38.6	: 42.8	: 42.3

Table 3

Average Sizes of Households by Area and by Users Category ^{a/}

User Category	Poblacion	Area		Total
		Rural Coastal	Rural Inland	
User	6.608 (77)	6.000 (65)	6.441 (59)	6.373 (203)
Non-Adaptor	5.189 (37)	5.281 (32)	5.388 (49)	5.356 (118)
Inaccessible	- -	- -	6.125 (40)	6.125 (40)
Disconnected	5.214 (14)	6.095 (21)	7.267 (15)	6.180 (50)
T o t a l	6.108 (130)	5.814 (118)	6.123 (163)	6.029 (411)

^{a/} Numbers in parenthesis indicate number of households.

Table 4
Average Family Size By Area and Users Category^{a/}

User Category	Poblacion	Rural Coastal	Rural Inland	Total
User	5.291 (79)	4.969 (65)	5.576 (59)	5.276 (203)
Non-Adaptor	4.865 (37)	4.906 (32)	4.735 (49)	4.822 (118)
Inaccessible	-	-	5.825 (40)	5.825 (40)
Disconnected	4.571 (14)	5.238 (21)	7.000 (15)	5.580 (50)
Total	5.092 (130)	5.008 (118)	5.509 (163)	5.231 (411)

^{a/} Numbers in parenthesis indicate number of households.

Table 5

Distribution of Household Heads by Occupation
and by Users Category a/

Occupation	Users Category			Total
	Users	Non-Adaptor	Inaccessible	
Agriculture	93 (45.8)	70 (59.3)	32 (80)	216 (52.6)
Fishing	26 (12.8)	15 (12.7)	0 (0)	51 (12.4)
Commerce	19 (9.4)	4 (3.4)	0 (0)	23 (6.8)
Transportation	9 (4.4)	4 (3.4)	2 (5.0)	15 (3.6)
Construction	11 (5.4)	7 (5.9)	2 (5.0)	20 (4.9)
Manufacturing	11 (5.4)	7 (5.9)	1 (2.5)	24 (5.8)
Bus, Pers & Service	5 (2.5)	6 (5.1)	2 (5.0)	15 (3.6)
Professional	22 (10.8)	1 (0.8)	0 (0)	26 (6.3)
Fixed Income	2 (1.0)	0 (0.0)	1 (2.5)	3 (0.7)
Unemployed	5 (2.5)	4 (3.4)	0	13 (3.2)
T o t a l	203 (100)	118 (99.9)	40 (100)	411 (99.9)

a/ Numbers in parenthesis indicate percentages.

Table 6

Distribution of Household Heads by Education and by User Category^{a/}

Highest Grade Completed	User Category				Total
	' User	'Non-Adaptor	'Inaccessible	' Disconnected	
0	8(3.9)	19(16.1)	6(15.0)	7(14.0)	49(9.7)
1-6	105(51.8)	74(62.7)	28(70.0)	26(52.0)	233(56.7)
7-10	45(22.2)	12(10.2)	4(10.0)	6(12.0)	67(16.3)
11-14	34(16.7)	13(11.0)	1(2.5)	9(18.0)	57(13.9)
15+	10(4.9)	0	0	2(4.0)	12(2.9)
Unknown	1(0.5)	0	1(2.5)	0	2(0.5)
TOTAL	203(100.0)	118(100.)	40(100)	50(100)	411(100.0)
Median Year of Schooling	5.77	3.96	3.80	5.27	5.3

^{a/} Numbers in parenthesis indicate percentages.

Table 7

Percent of Households Above and Below Threshold
Levels By Size of Households By User Category

Users Category	Threshold Categories		Number of Households
	Below Threshold	At or Above Threshold	
Users	62.1	37.9	203
Non-Adoptors	86.4	13.6	118
Inaccessibles	92.5	7.5	40
Disconnected	68.0	32.0	50
T o t a l	72.7	27.3	411

Table 8

Percent of Households Above and Below Threshold
Levels By Size of Family By Users Category

Users Category	Threshold Categories		Number of Families
	Below Threshold	At or Above Threshold	
Users	51.2	48.8	203
Non-Adoptors	82.2	17.8	118
Inaccessibles	90.0	10.0	40
Disconnected	68.0	32.0	50
T o t a l	65.9	34.1	411

Table 9

Mean Scores in Level of Living Index
(LEVEL) By User Category By Area

User Category	Poblacion	Rural Coastal	Rural Inland	Total
User	4.139	3.800	3.237	3.768
Non-Adaptor	2.189	2.250	2.122	2.178
Inaccessible	-	-	2.350	2.350
Disconnected	3.143	3.330	2.533	3.000
T o t a l	3.477	3.280	2.620	3.080

Table 10

Mean Scores in Electricity Free Level of Living Index
(LEVEL-EF) By User Category and By Area

User Category	Poblacion	Rural Coastal	Rural Inland	Total
User	3.975	3.800	3.220	3.699
Non-Adaptor	2.135	2.344	2.041	2.153
Inaccessible	-	-	2.325	2.325
Disconnected	3.285	3.095	2.666	3.020
T o t a l	3.377	3.280	2.595	3.039

Table 11
Mean Scores for Respondents of Satisfaction
With Life Situation Indexes By User Category

User Categories	Satisfaction With Life Indexes					
	: SIT PRES	: SIT PAST A	: SIT PAST B	: SIT FUT A	: SIT FUT B	: SIT TOT
User	: 3.187	: 3.202	: 3.315	: 3.305	: 3.222	: 3.246
Non-Adopter	: 2.923	: 2.873	: 2.966	: 3.076	: 3.127	: 2.993
Inaccessible	: 3.100	: 2.925	: 2.975	: 3.175	: 3.225	: 3.080
Disconnected	: 2.080	: 2.880	: 3.000	: 3.220	: 3.160	: 3.048
Total	: 3.078	: 3.041	: 3.144	: 3.217	: 3.187	: 3.133

Table 12

Percentages of Respondents Answering Lottery Questions By Users Category

How It Would Be Used	User Category												Total		
	User			Non-Adaptor			Inaccessible			Disconnected					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Save in Bank	25.1	24.6	38.4	16.1	24.6	46.6	22.5	40.0	60.0	22.0	34.0	48.0	21.9	27.2	44.0
Productive Investment <u>a/</u>	38.9	63.0	59.1	48.3	72.1	68.6	3.75	60.0	52.5	50.0	66.0	68.0	42.8	65.6	62.2
Household Investment <u>b/</u>	43.3	29.5	32.4	47.5	31.3	37.3	40.0	20.0	12.5	30.0	17.0	18.0	42.7	27.5	30.1
Education	2.0	4.4	3.4	0.8	2.5	1.7	0	0	0	0	4.0	0	1.2	3.4	2.4
Others	3.0	3.9	8.9	0	2.5	5.9	0	0	0	0	0	2.0	1.5	2.6	6.3
Number of Respondents	203			118			40			50			411		

- 1 Refers to question on winning P1000 prize.
 2 Refers to question on winning P5000 prize.
 3 Refers to question on winning P10,000 prize.

a/ Includes categories (2), (3), (7) and (8) in Table ____.

b/ Includes categories (4), (5) and (6) in Table ____.

Table 13
Percentages of Respondents Answering Lottery
Questions By User Category

How It Would Be Used	User Category											
	User			Non-Adaptor			Inaccessible			Disconnected		
	1	2	3	1	2	3	1	2	3	1	2	3
1) Save in Bank	25.1	24.6	38.4	16.1	24.6	46.6	22.5	40.0	60.0	22.0	34.0	48.0
2) Buy agri land/equip	13.9	32.0	28.1	22.9	42.4	43.2	15.0	25.0	20.0	8.0	26.0	32.0
3) Buy Fishing Equipment	3.9	5.9	4.9	5.1	6.8	2.5	0.0	0.0	0.0	4.0	12.0	10.0
4) Buy household necessities	21.2	5.9	3.4	22.9	7.6	6.8	25.0	2.5	12.5	18.0	2.0	2.0
5) Build/Buy New House	10.3	11.3	17.7	10.2	16.1	25.4	5.0	12.5	0.0	2.0	6.0	8.0
6) Buy Home Appliances	11.8	12.3	11.3	14.4	7.6	5.1	10.0	5.0	20.0	10.0	9.0	8.0
7) Buy livestock Work Animals	3.4	6.4	5.9	7.6	9.3	10.2	10.0	12.5	0.0	16.0	4.0	4.0
8) Expand/start Business	17.7	18.7	20.2	12.7	13.6	12.7	12.5	22.5	0.0	22.0	24.0	22.0
9) Spend for Education	2.0	4.4	3.4	0.8	2.5	1.7	0	0	0	0	4.0	0
10) Trans/Donation Others	3.0	3.4	8.4	0.0	2.5	5.9	0	0	0	0	0	2.0
11) Don't Know No Response	0	0.5	0.5	0.0	0.0	0.0	0	0	0	0	0	0
Number of Respondents	203			118			40			50		

- 1 Refers to question on winning P1000 prize.
2. Refers to question on winning P5000 prize.
- 3 Refers to question on winning P10,000 prize.

Table 14

Mean Scores of Respondents in Mass Media Exposure
Index (MMEI) By User Category and by Residence

User Category	Mean MMEI Scores			
	Poblacion	Rural Coastal	Rural Inland	Total
User	3.33	3.02	3.24	3.20
Non-Adopter	2.62	2.50	2.71	2.63
Inaccessible	-	-	2.85	2.85
Disconnected	2.43	3.00	2.33	2.64
Total	3.03	2.87	2.90	2.49

Table 15

Mean Scores of Respondents in Electricity-free Mass Media
Exposure Index (MMEI-EF) By User Category and by Residence

User Category	Mean MMEI-EF			
	Poblacion	Rural Coastal	Rural Inland	Total
User	3.29	2.95	3.24	3.17
Non-Adopter	2.62	2.50	2.71	2.63
Inaccessible	-	-	2.85	2.85
Disconnected	2.43	3.00	2.33	2.64
Total	3.01	2.84	2.90	2.92

AN EVALUATIVE STUDY OF THE MISAMIS ORIENTAL RURAL ELECTRIC
SERVICE COOPERATIVE

Table of Supporting Data

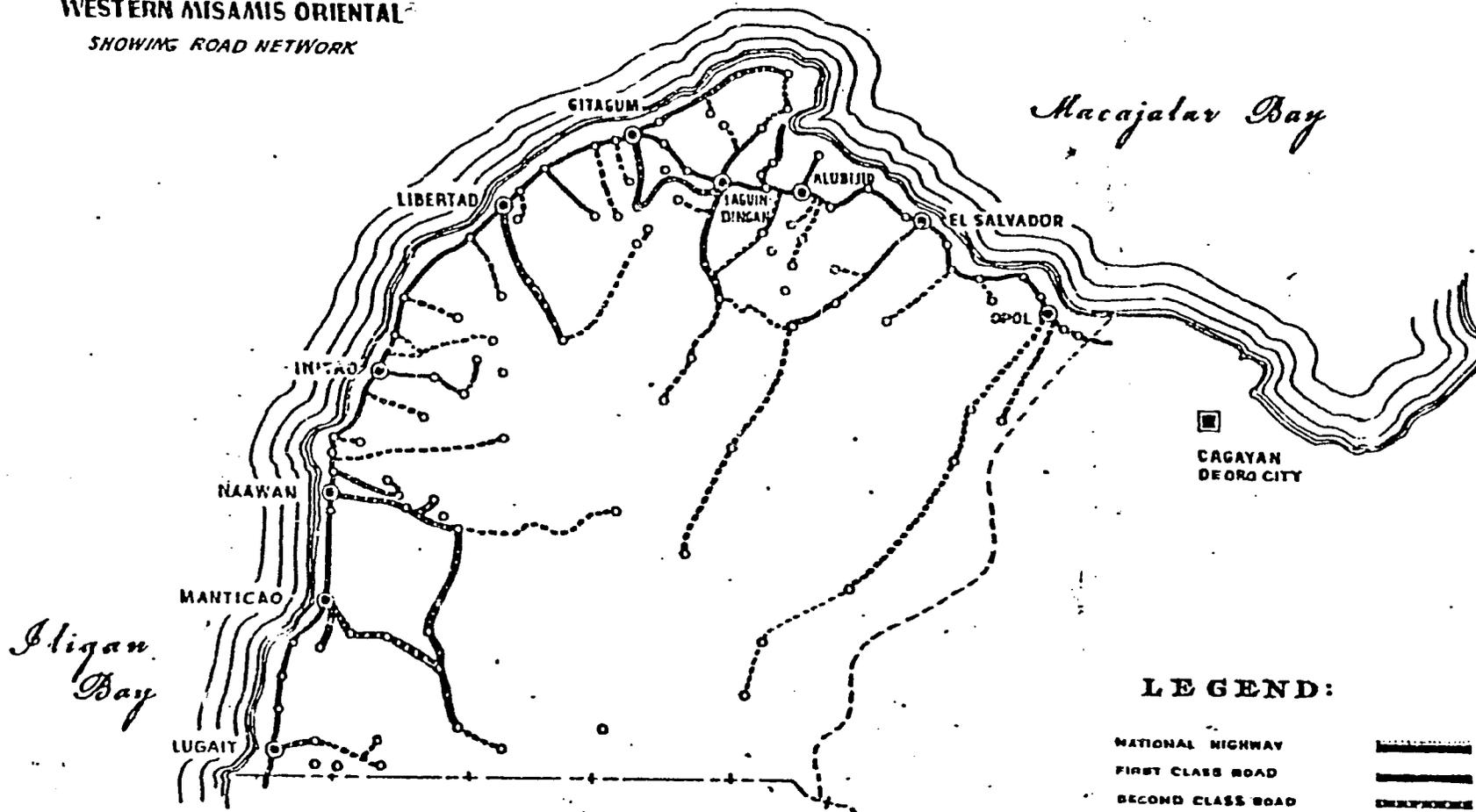
<u>Exhibit</u>	<u>T i t l e</u>
A	Map of Western Misamis Oriental showing the Road Network
B	Map of Western Misamis Oriental showing Moresco Line
C	Per Capita Income Distribution, Probability Sample, Western Misamis Oriental, 1975
D	Cumulative Per Capita Income Distribution, Total Sample By Use Category, Western Misamis Oriental, 1975
E	Distribution of Sample Households by Per Capita Income and by Use Category, Western Misamis Oriental, 1975
F	Distribution of Sample Households by Use Category, Western Misamis Oriental, 1975
G	Number and Type of Schools, Enrolment and Number of Teachers, Western Misamis Oriental, as of FY 1973-74
H	Distribution of Pre-School Children by Nutritional Status, Western Misamis Oriental, March-April, 1975
I	Health Statistics: Western Misamis Oriental
J	Summary Data on Annual Production of Main Crops Before and After Irrigation, based upon re-interviews of ALISA members
K	Estimate of Partial Annual Farm Expenses for ALISA Farmer
L	Responses to Questions on How Farm Income is Being Spent
M	Distribution of Domestic Electricity Users, by KWH Consumption, MORESCO Area as of August 1975

<u>Exhibit</u>	<u>T i t l e</u>
N	Distribution of Users by KWH Consumption by Use of Electrical Appliances
O	Number and Types of Establishments in the MORESCO Area Using Electricity as of September 1975
P	Employment Generated by Totally Electricity- Dependent Establishments, by Type and Number of Establishments and by Year Started Operations
Q	Number and Types of Water Systems Studied Using Electric-Powered Pumps, MORESCO Area
R	Types of Electrically-Operated Equipment Used in Health Units Studied, Western Misamis Oriental
S	Average Number of Electricity Users by Year, by Category of Users and Indexes of Growth
T	Average Annual KWH Consumption by Category of Users
U	Average Monthly KWH Consumption per-user-year by Category of User
V	Frequency of Respondents by Reasons for Increase in Electric Consumption
W	Frequency of Respondents by Reasons for Decrease in Electric Consumption
X	Distribution of Electric Users by Year of Exposure to Electricity
Y	Ownership of Electrically Operated Appliances and Equipment
Z	Major Use and Importance of Electricity for MORESCO Users
AA	Frequency of Disconnected by Perceived Advantages or Disadvantages of Electricity and Things Done with Electricity Not Done Now

<u>Exhibit</u>	<u>T i t l e</u>
BB	Frequency of Disconnected by Reason of Disconnection
CC	Distribution of Non-Adoptors, by Reason for not Having Electricity
DD	Alternative Household Energy Sources and Costs among Users, Before and After Electrification
EE	Alternative Household Energy Sources and Costs among Non-users
FF	Percentage Distribution of the Study Propulation by Age, Sex, and Areas of Residence, Western Misamis Oriental
GG	Average Household Size by Area and by Use Category
HH	Average Size of Family by Area and by use Category
II	Percent Distribution of Household Heads by Principal Income Related Activity and by Use Category
JJ	Percent Distribution of Household Heads by Highest Grade Completed and by Use Category
KK	Mean Scores in Level of Living Index (LEVEL) by Area and by Use Category
LL	Mean Scores in Electricity - Free Level of Living Index (LEVEL-EF) by Area and by Category
MM	Mean Scores of Respondents of Satisfaction with Life Situation Indexes, by Use Category
NN	Mean Scores of Respondents in Electricty-Free Mass Media Exposure Indes (MMEI-EF), by Area of Residence and by Use Category

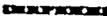
<u>Exhibit</u>	<u>T i t l e</u>
OO	Mean Scores of Respondent in Mass Media Exposure Index (MMEI) by Area of Residence and by Use Category
PP	Coverage of <u>MORESCO</u> Estimates Based on Sample Percentages
QQ	Background and Characteristics of Electricity Usage in Western Misamis Oriental

**MAP OF
WESTERN MISAMIS ORIENTAL
SHOWING ROAD NETWORK**



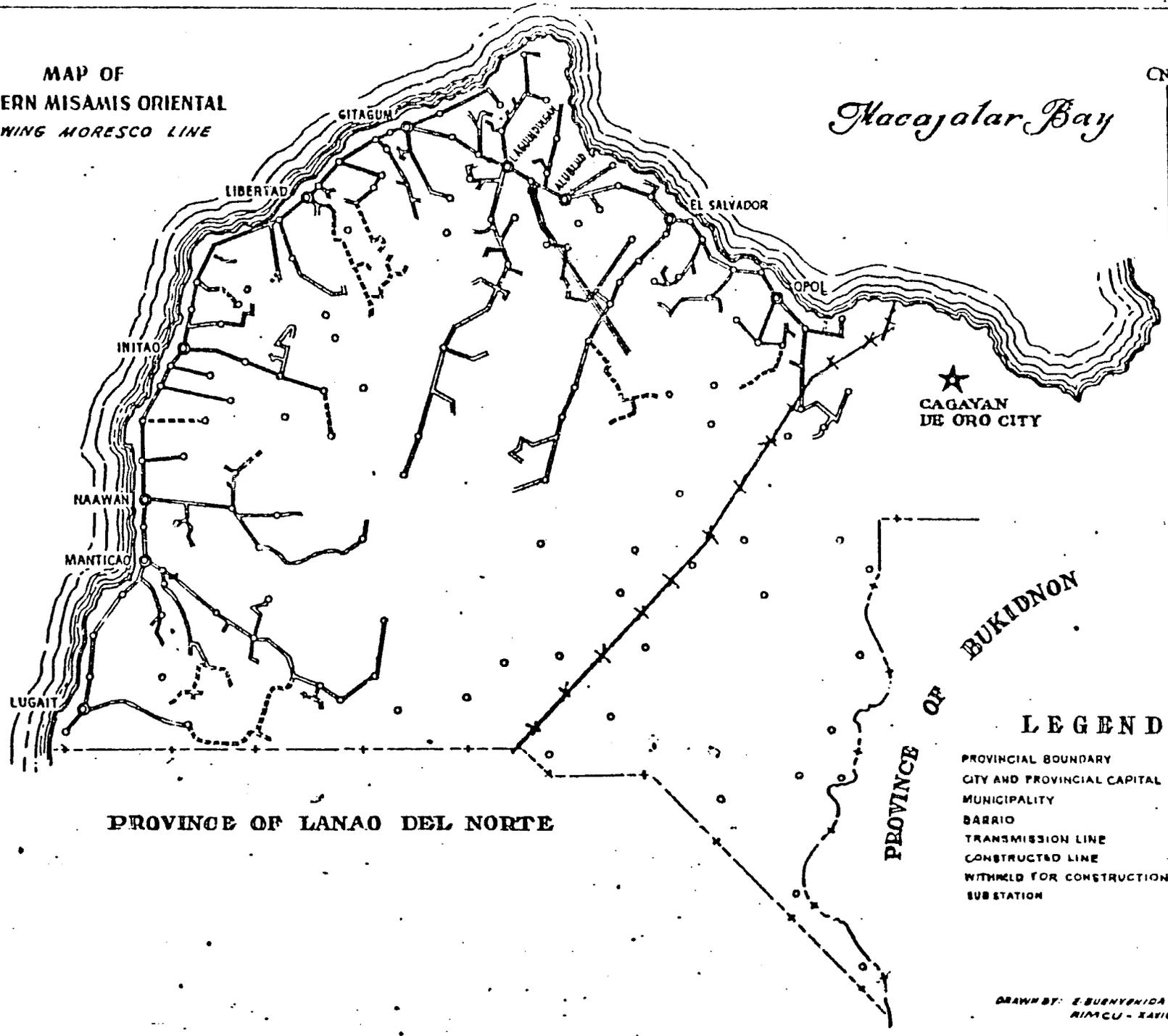
PROVINCE OF LANAO DEL NORTE

LEGEND:

- NATIONAL HIGHWAY 
- FIRST CLASS ROAD 
- SECOND CLASS ROAD 
- PROVINCIAL BOUNDARY 
- CITY AND CAPITAL 
- MUNICIPALITY 
- BARRIO 
- THIRD CLASS ROAD 



MAP OF
 WESTERN MISAMIS ORIENTAL
 SHOWING MORESCO LINE

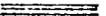


CAGAYAN DE ORO CITY

PROVINCE OF LANA DEL NORTE

PROVINCE OF BUKIDNON

LEGEND:

- PROVINCIAL BOUNDARY 
- CITY AND PROVINCIAL CAPITAL 
- MUNICIPALITY 
- BARRIO 
- TRANSMISSION LINE 
- CONSTRUCTED LINE 
- WITHHELD FOR CONSTRUCTION 
- SUBSTATION 

DRAWN BY: E. BUENVIDA 10/55
 NIMCU - XAVIER UNIVERSITY

Exhibit C

Per Capita Income Distribution, Probability Sample,
Western Misamis Oriental, 1975

Per Capita Income Class (\$)	Number of Households	Per Cent of Households	Cumulative Percent of Households
Less 50	134	53.0	53.0
51 - 100	69	27.2	80.2
101-150	24	9.5	89.7
151 - 200	11	4.4	94.1
201 - 250	3	1.2	95.3
251 - 300	5	2.0	97.2
301 - 350	0	0.0	97.2
351 - 400	1	0.4	97.6
Over 400	6	2.4	100.0
Total	253	100.0	

Mean Per Capita Income	•	Pesos P 521	Dollars \$ 69
Standard Error	•	P 30	\$ 5
95% Confidence Limits	•	P500 - P576	\$64 - 74

Exhibit D

Cumulative Per Capita Income Distribution, Total Sample
By Use Category, Western Misamis Oriental, 1975

Per Capita Income \$	USER			NON-USERS		
	Total ^a	Current	Other	INACCESSIBLE ^b	NON-ADOPTER	
					Due to financial reasons ^c	Due to other reasons ^d
Less than 50	35.6	37.8	26.3	62.7	71.0	63.6
51 - 100	69.3	65.9	84.2	87.3	90.3	81.8
101 - 150	82.2	79.3	94.7	94.5	96.8	90.9
151 - 200	89.1	87.8	94.7	97.3	100.0	90.9
201 - 250	90.0	89.0	94.7	99.1		90.9
251 - 300	94.1	93.9	94.7	99.1		100.0
301 - 350	94.1	93.9	94.7	99.1		
351 - 400	94.1	93.9	94.7	100.0		
Over 400	100.0	100.0	100.0			
Total HH	101	82	19	110	31	11
Mean \$	\$ 96	\$100	\$78	\$ 53	\$41	\$54

^a Includes all current users plus 14 HH disconnected due to road widening and 5 HH who have applied for connection and awaiting MGR ESCC action. These latter households were reclassified as user (potential).

^b Includes those who responded not using electricity because no electric lines in neighborhood, difficult to extend lines from nearest electric post to house due to distance, and right of way problems.

^c Includes those who responded not using electricity due to expense of monthly bill and initial installation cost, and one disconnected due to expense.

^d Includes those who responded not using electricity because

Exhibit E

Distribution of Sample Households By Per Capita Income
and By Use Category, Western Misiones Oriental, 1975

Per Capita Income Class \$	USER			NON - USER			
	Total User	Current	Other ^a	Total Non-User	Inaccessible	Non-Financial	Financial Non-Adopter
Less than 50	36	31	5	98	69	7	22
51 - 100	34	23	11	35	27	2	6
101 - 150	13	11	2	11	8	1	2
151 - 200	7	7	0	4	3	0	1
201 - 250	1	1	0	2	2	0	0
251 - 300	4	4	0	1	0	1	0
301 - 350	0	0	0	0	0	0	0
351 - 400	0	0	0	1	1	0	0
Over 400	6	5	1	0	0	0	0
Total	101	82	19	152	110	11	31
Percent of HH	39.9	32.4	7.5	60.1	43.5	4.3	12.3
Total Sample Households = 253							

^aIncludes disconnects due to road widening (14) and those who have applied for connection but no action from MCRESCO yet. (5).

Exhibit F

Distribution of Sample Households By Use Category,
Western Misamis Oriental 1975

USE CATEGORY	Number of Household	Percent
USER	101	39.9
Current User	82	32.4
Applied for Connection	5	2.0
Requested disconnection due to road widening	14	5.5
INACCESSIBLE	110	43.5
No electric posts in neighborhood	96	37.9
Difficulty of extending lines/and right of way problems	14	5.5
NON-ADOPTER	42	16.6
Financially Related	31	12.3
Cannot afford monthly bills	15	5.9
Cannot afford installation costs	9	3.6
House not fit for installation	6	2.4
Disconnected, cannot afford monthly bill	1	0.4
Non-Financially Related	11	4.3
New in the area	6	2.4
Fear of electrification	2	0.8
Not asked reason for non-adopting	3	1.2
Total	253	100.0

Exhibit F

The original sample was an exploratory, deliberately distorted to include disproportionate numbers of disconnections and inaccessibles so that the reasons for these conditions could be more readily ascertained than would be possible with a strict probability sample. Therefore, these data should not be extrapolated to estimate proportions of these categories within the universe. The income sample, however, is a true probability sample and can be used with reasonable accuracy to determine proportions of various categories of users and non-users within the universe.

NOTE: For example, Exhibit F would indicate that 39.9 percent of the households in the area receive electricity or have applied for connection or temporarily request disconnection due to the road widening.

Exhibit G

Education

Number and Type of Schools, Enrolment and Number of
Teachers, Western Misamis Oriental, As of FY 1973-74

Type of Schools	: Number of Schools	: Number of Enrolment	: Number of Teachers
Public			
Primary	: 117	: 17972	: 457
Intermediate	: 55	: 5586	: 268
Secondary	: 8	: 2513	: 89
Private			
Elementary	: 1	: 94	: N.A.
Secondary	: 4	: 1398	: 33

Source: Bureau of Public Schools, Misamis Oriental as compiled
by the Provincial Development Staff, Misamis Oriental.

Exhibit H

Distribution of Pre-School Children By Nutritional Status^{a/} Western
Misamis Oriental March - April, 1975

Nutritional Status	Number in			Number in		
	Western Mis. Oriental	Per Cent Ind.	Cum.	Eastern Mis. Oriental	Per Cent Ind.	Cum.
3rd Degree Malnutrition	: 815	: 4.6	4.6	: 1522	: 5.7	5.7
2nd Degree Malnutrition	: 3949	:22.3	26.9	: 6700	: 25.3	31.0
1st Degree Malnutrition	: 8110	:45.9	72.8	: 12328	: 46.5	77.5
Overweight	: 1815	:10.3	83.1	: 2392	: 9.0	86.5
Normal	: 2984	:16.9	100.0	: 3585	: 13.5	100.0
Total Pre-Schoolers Surveyed	: 17673	:100.0	-	: 26527	:100.0	-

^{a/}Survey was conducted March - April 1975 under the "Operation Timbang" sponsored by the Provincial Health Office in cooperation with the Department of Education and Culture. Nutritional status determined by differential between weight of child and standard weight of children at given age in months.

Source: Provincial Health Office

Exhibit I

Health Statistics: Western Misamis Oriental

Distribution of Health Units and Personnel, Western Misamis Oriental

Type of Units	Number : of Units	Number and Types of Health Personnel				
		: Doctors	: Nurses	: Midwives	: Sanitary Inspector	: Med. Tech
Rural Health Units ^a	: 10	: 8	: 5	: 11	: 8	: -
Barrio Health Centers ^a	: 5	: N.A.	: N.A.	: N.A.	: N.A.	: N.A.
Medical Clinics ^b	: 4	: 4	: -	: -	: -	: -
Hospitals	: 2 [*]	: 3	: 1	: 3	: -	: 2

*
Bed Capacities: 10 and 26

Sources

^a Provincial Health Office

^b National Census and Statistics Office

^c Research Institute for Mindanao Culture

Exhibit J

Summary Data on Annual Production of Main Crops Before and
After Irrigation Based Upon 18 Re-interviews of
ALISA Members

<u>Items</u>	<u>Before Irrigation</u>	<u>After Irrigation</u>
Main Crop	<u>Corn</u>	<u>Rice</u>
Total Area Planted (Hectares)	16.5	14.75
Total Annual Harvest (Cavans)	353	1,983
Total Value of Annual Harvest (Pesos)	P 9,629	P 79,767
Total Share Going to Tenants (Cavans)	243	1,330.22
Value of Share in Pesos	P 6,622	P53,508.65
Quantity of Share Sold (Cavans)	19.76	459
Value of Share Sold in Pesos	P 273	P 17,875
Quantity of Share Consumed (Cavans)	223	871.22
Value of Share Consumed in Pesos	P 6,349	P 35,633.65
Yield Per Hectare Per Year (Cavans)	21.39	134.44
Yield Per Hectare Per Season (Cavans)	10.7	52.52
Average Number of Harvest Per Year	2	2.56
Average Area Per Farmer	0.92	0.82
Average Total Gross Value Generated Per Farm	P 534.94	P 4,431.50
Average Gross Value to Tenant	P 367.89	P 2,972.70
Average Gross Value to Landlord	P 167.06	P 1,458.80
Annual Expenses Per Farmer ^{a/}	Negligible	P 1,288.95 ^{b/}
Approximate Net Values		
Average Total Net Value Generated Per Farm	P 534.94	P 3,142.55
Average Total Net Value to Farmer	P 367.89	P 1,683.75
Average Total Net Value to Landlord	P 167.06	P 1,458.80

^aExcludes labor costs.

^bSee Exhibit K.

Exhibit K

Estimate of Partial Annual Farm Expenses for ALISA Farmer^a

Item	Rate	Total	Per Farmer
Payment of ₱8,000 loan from Nanticao Rural Bank ^b	₱150 per hectare/ harvest (150 x 14.75 x 2.56)	₱ 5664	₱ 314.67
Amortization of electric motors ^b	₱75/ha/harvest (75 x 14.75 x 2.56)	2832	157.33
Electric bill ^b	₱40/ha/harvest (40 x 14.75 x 2.56)	1510.40	83.91
ALISA Fund ^b	₱2/mo. (2 x 12)	-	24.00
Fertilizer ^c	₱160/ha/harvest (160 x 14.75 x 2.56)	6041.60	335.64
Chemicals ^c	₱178/ha/harvest (178 x 14.75 x 2.56)	<u>6721.28</u>	<u>373.40</u>
Total			₱ 1288.95

^aExcludes other expenses (e.g. labor) where data not available.

^bRates determined by ALISA organization and required of all members.

^cEstimated from average expenditures per hectare per season of 27 ALISA farmers interviewed earlier. The 18 re-interviews belong to these original 27.

Exhibit L

Responses to Questions on How Farm Income is Being Spent ^{a/}

Responses	Frequency
Paid ALISA Obligations ^{b/}	18
Built New House/Remodeled House	2
Bought Clothes for Children	7
Home Consumption (Rice)	16
Sent Children to School	3
Paid Installment on Loan ^{c/}	5
Bought Kitchen Utencils	2
Bought Chickens to be Raised	1
Paid for Physician's Service	1
Number of Respondents	18

^{a/} Based on 18 re-interviews of ALISA members.

^{b/} Include payments for loans obtained by ALISA, amortization of electric motors, share of electricity bill, and contribution to ALISA fund.

^{c/} Other than ALISA loan.

M

Exhibit M

Distribution of Domestic Electricity Users, By KWH
Consumption, MCRESCO Area^a as of
August 1975

KWH	Rural		Poblacion		All Areas	
	Number	Cumulative Percentage	Number	Cumulative Percentage	Number	Percent
0 - 5	440	10.9	153	7.1	593	9.6
6 - 10	809	33.0	306	21.2	1195	28.9
11 - 17	1309	65.5	505	44.5	1814	58.2
18 - 35	973	89.7	633	73.8	1606	84.2
36 - 50	127	92.8	159	81.1	286	88.8
51 - 75	109	95.6	119	86.6	228	92.5
76 - 100	64	97.1	95	91.0	159	95.0
100+	115	100.0	194	100.0	309	100.0
Total	4026	-	2164	-	6190	-

^a Includes 5 barrios of Cagayan de Oro City.

Exhibit N

Distribution of USERS By KWH Consumption, By Use of
Electrical Appliances

Use of Electrical Appliances	KWH Consumption									Total
	Low(0-17 KWH)			Medium(18-50KWH)			High(50+ KWH)			
	1st Year	Now	Increase	1st Year	Now	Increase	1st Year	Now	Increase	
radio	12	19	7	10	25	15	7	9	2	38
iron	7	12	5	10	13	3	12	16	4	39
sewing machine	1	1	0	0	0	0	2	2	0	3
stove	0	0	0	2	2	0	7	9	2	39
refrigerator	0	0	0	3	4	1	13	19	6	39
freezer	0	0	0	0	2	2	3	3	0	5
stereo	2	4	2	7	9	2	8	11	3	41
fan	0	0	0	2	4	2	7	7	0	39
television	0	0	0	4	4	0	6	6	0	39
pumps	0	0	0	0	1	1	4	4	0	9
others	0	0	0	0	0	0	3	0	0	3
Total	22	36	14	38	64	26	69	86	17	
Number of Respon- dents			81			88			32	201

Exhibit O

Number and Types of Establishments in the MORESCO Area
Using Electricity as of September 1975

Types of Establishments	Number Using Electricity from MORESCO Area as of September 1975	Number Interviewed
Large Establishments		
Lumber Industry	1	1
Agro-Industrial	1	1
Steel Corporation	1	1
Small Establishments		
Rice & Corn Mill	13	11
Clothier/Tailor Shops	9	7
Auto Repair Shops	7	6
Foundry Shop	1	1
Box Factory	3	3
Wood Manuf (Duckpins Furniture)	3	2
Sawmill	1	1
Logging & Repair	4	1
Lamberyard	2	1
Hollow Block Factory	5	2
Cookpot	7	2
Piggery	7	1
Theater	1	1
Copra & Tobacco Dealer	9	1
Barber Shop	3	0
Recreational Establishment	6	0
Photography	1	0
Poultry	3	0
Fish Ponds	2	0
Fishing	4	0
Gasoline Station	12	0
Agricultural Store	1	0
Gen. Merchandise (Rice & Corn Retail)	12	0
Carenderia/Eatery	6	0
Bakery	1	0
Rural Bank	4	4
Pharmacy	2	1
Radio Communications	7	0
Building/Construction Job	2	0
Warehouse	1	0
Home Appliances Dealer	1	0
Sari-Sari Stores	204	41
Total	346	89

Employment Generated by Totally Electricity Dependent Establishments,
By Type and Number of Establishments and by Year Started Operations

Type of Establishments	Number	Year Started Operations	Direct Employment Generated
Large Establishments			
Steel Manufacturing	1	1973	90
Agro-industrial	1	1973	105
Timber processing	1	1975	85
Small & Medium Scale Establishments			
Auto Repair Shops	2	1971	11
	3	1972	13
	1	1975	3
Theatre	1	1974	5
Hollow Block Factories	2	1971	11
Foundry	1	1975	30
Rice and Corn Mill	2	1971	6
	2	1972	8
	1	1973	5
	1	1975	2
Logging & truck contract	1	1973	15
Dualspin manufacturing	1	1973	3
Box factories	2	1972	14
	1	1976	13
Sawmill	1	1973	13
Total	25		430

Summary

Year	Number of Establishments		Number of Direct Employment Generated	
	By Year	Cumulative	By Year	Cumulative
1971	6	6	28	28
1972	7	13	35	63
1973	6	19	233	296
1974	2	21	20	310
1975	4	25	120	430
Total	25	-	430	-

Exhibit Q

Number and Types of Water Systems Studied Using
Electric-Powered Pumps, MORESCO Area

Ownership of System	Number	Number of HH Members Served	Types of Systems			
			Water Piped Directly to House	Water Supplied in Common Outlets	Converted Artesian Wells Only One Outlet	Water Pumped Into Pressure Tank
Public						
Municipal	9	908	8	1	-	-
Barrio	18	1440	2	1	15	-
Private						
Schools	6	6				6
Individual Households	10	10				10
Total	43	2364	10	2	15	16

Exhibit R

Types of Electrically-Operated Equipment Used in Health
Units Studied, Western Misamis Oriental

Types of Equipment	Type of User	
	Hospitals	RHU
Electric Suction	2	0
Electric Stove	2	4
Electric fans	2	0
Sterilizer	2	3
Operating Lamp	1	0
X-ray	1	0
Refrigerator	1	0
Water pump	1	0
Search Light	0	2
Total	12	9
Number of User	2	9

Exhibit S

Average Number of Electricity Users by Year,
By Category of Users and Indexes of Growth

Category of Users	Average Number of Consumers				Index (1972=100)			
	1972	1973	1974	1975 ^a	1972	1973	1974	1975 ^a
Residential-Poblacion	2,450	2,965	2,224	2,167	100	136	146	149
Residential-Rural	2,907	3,082	3,685	3,993	100	162	193	209
Schools/Churches Municipal Sales	193	245	268	271	100	127	139	140
Commercial-Small	273	332	355	345	100	122	130	126
Commercial-Large and Industrial	1	2	5	15	100	200	500	1500
Irrigation	2	11	17	15	100	550	850	750
Water System	4	12	14	25	100	300	350	625
Security Lighting	284	417	434	438	100	147	153	154
All Users	4,114	6,066	6,901	7,269	100	147	168	177

^a
For nine months only

The industrial users referred to are three in number. These are the saw mill (Timber Industries of the Philippines), the galvanized sheet steel plant and the sorghum cube plant. The three industrial users are lumped with large commercial users.

Exhibit T

Average Annual KWH Consumption By
Category of Users

User Category	Average Annual KWH Consumption :				Index (1972=100)			
	1972	1973	1974	1975 ^a	1972	1973	1974	1975
Residential-Poblacion	42,173	55,253	75,681	86,692	100	131	179	206
Residential-Rural	43,157	60,911	81,339	95,479	100	141	188	221
Schools/Churches Municipal sales	12,158	9,616	12,866	16,078	100	79	106	132
Commercial-small	41,601	54,522	69,087	65,321	100	131	166	157
Commercial-large and Industrial	5387	31,943	50,220	93,882	100	593	945	1743
Irrigation	411	5,017	7,842	10,256	100	122	191	250
Water System	1321	7,942	10,634	20,652	100	601	805	1563
Security Lighting	15,749	24,082	25,106	24,939	100	153	159	158
All Users	161,957	249,885	332,776	413,299	100	154	205	255

^a
For nine months only

The industrial users referred to are three in number. These are the saw mill (Timber Industries of the Philippines), the galvanized sheet steel plant and the sorghum cube plant. The three industrial users are lumped with large commercial users.

Exhibit U

Average Monthly KWH Consumption Per-User-Year
By Category of User

User Category	Average Annual KWH Consumption :				Index (1972=100)			
	1972	1973	1974	1975 ^a	1972	1973	1974	1975
Residential-Poblacion	29	28	36	40	100	97	124	138
Residential-Rural	23	20	22	24	100	87	96	104
Schools/Churches Municipal Sales	63	39	48	59	100	62	76	94
Commercial-Small	152	164	195	189	100	108	128	124
Commercial-large and Industrial	5337	15971	10044	6259	100	296	186	116
Irrigation	225	463	464	669	100	207	206	297
Water System	299	666	788	837	100	223	264	280
Security Lighting	55	58	58	57	100	105	105	104
All Users	8028	21655	34387	20021	100	257	428	349

^a
For nine months only

The industrial users referred to are three in number. These are the saw mill (Timber Industries of the Philippines), the galvanized sheet steel plant and the sorghum cube plant. The three industrial users are lumped with large commercial users.

Exhibit V

Frequency of Respondents By Reasons For
Increase in Electric Consumption

Reasons	Number of Respondents	Percent
Use of new appliances	24	26.1
Additional lamps	14	16.3
Use of Water pump	2	2.2
Night time work in agriculture	4	4.3
Night time work in HH chores	22	23.9
Leaving light overnight, security	16	17.4
Others	6	6.5
No response	4	4.3
Total Number of Respondents	92	100.0

Exhibit W

Frequency of Respondents By Reasons For
Decrease in Electric Consumption

Reasons	: Number of Respondents :	Percent
Stopped leaving lights overnight	: 5 :	
Decrease Number of bulbs	: 4 :	
None (not asked) Don't know	: 0 :	
Total Number of Respondents	: 9 :	

Exhibit X

Distribution of Electric Users by Year of Exposure to Electricity

Year Exposed	Numbers of Users	Percent	Cumulative Percent
1975	11	5.4	100.0
1974	24	11.8	94.6
1973	93	45.8	82.8
1972	42	20.7	37.0
1971	33	16.3	16.3
Total	30	100.0	
Average Exposure 2.61 years			

Exhibit Y

Table 2. Ownership of Electrically Operated Appliances and Equipment.

Appliance/ Equipment	Number Owning During First Year of Connection	Percent	Number Owning as of Inter- view date	Percent	Total Increase in Number Owning
Radio	29	14.3	53	26.1	24
Iron	29	14.3	41	20.2	12
Stereo	17	8.4	24	11.8	7
Refrigerator	16	7.9	23	11.3	7
Stove	9	4.4	12	5.9	3
Fan	9	4.4	11	5.4	2
Television	10	4.9	10	4.9	0
Water pump	4	2.0	5	2.5	1
Freezer	3	1.5	5	2.5	2
Sewing machines	3	1.5	3	1.5	0
Others	0	0.0	0	0.0	0
Total Number of Items	129	-	187	-	58

Total Number of Respondents = 203

Exhibit Z

Major Use and Importance of Electricity for FORASCO Users

Things done with electricity that cannot be done without it	Percentage of RSP Mentioning ^a	Major Problem if electricity fails for a month	Percentage of RSP Mentioning ^a	Most Important Uses of Electricity	Percentage of RSP Mentioning ^a
Night-time agricultural processing and other productive work	18.7 (38)	Lighting Problem	82.8 (168)	Lighting	97.5 (198)
Night-time work doing household chores	39.4 (80)	Inability to do agricultural processing and other work at night	1.0 (2)	Allows doing household chores at night	22.7 (46)
Reading/Studying	10.6 (22)	Inability to do household chores at night	5.4 (11)	Allows doing agricultural processing and other work at night	4.9 (10)
Lighting of house	17.7 (36)	Security	2.0 (4)	Allows use of electric appliances	25.1 (51)
Use and enjoyment of entertainment facilities (radio, stereo, etc.)	18.2 (37)	Water problem	12.3 (25)	Use of entertainment facilities	11.8 (24)
Use of Household appliances	11.8 (24)	Inconvenience	6.4 (13)	Water supply	16.3 (33)
Adequate water supply	3.7 (7)	Others	4.9 (10)	Others	1.5 (3)
Lighting of farm buildings	3.0 (6)	No response	4.9 (10)	No response	0.5 (1)
Others	3.9 (8)	-	-	-	-
No response	7.4 (15)	-	-	-	-

Total Number of Respondents = 203

^aNumbers in parenthesis indicate number of respondents.

Exhibit AA

Frequency of Disconnected by Perceived Advantages or Disadvantages
of Electricity and Things Done with Electricity not Done Now

A. <u>Advantages</u>	Number of Replies	Per Cent of Respondents Replying
Better lighting	30	60.0
Use of electric appliances	3	6.0
Convenience	17	34.0
Cheaper	7	14.0
No Response	3	6.0
Total Respondents	50	-
B. <u>Disadvantages</u>		
Cannot Afford the monthly Bill	3	6.0
Others	1	2.0
No Response	46	92.0
Total Respondents	50	-
C. <u>Things Done with Electricity Not Done Now</u>		
Night time Agriculture work and other productive activities	17	34.0
Night time doing household chores	10	20.0
Use of Electric appliances	9	18.0
Reading/Study	6	12.0
Lighting	4	8.0
No Response	4	8.0
Total Respondents	50	-

Exhibit BB

Frequency of Disconnected by Reason of Disconnection

Reasons	Percent
Delinquency	44.0
Personal request/voluntary	26.0
House being repaired or transferred	22.0
Others	8.0
Total Percent	100.0
Total Number of Disconnections	50

Exhibit CC

Distribution of Non-adopters, by Reason for not Having Electricity

Reasons	Percent of Replies
Too expensive	42.9
Could not afford installation cost	11.4
Difficult to extend electric lines	33.3
Houses not fit for installation	10.5
Not used to having electricity	0.9
Other (Dangerous)	0.9
Total Percent	100.0
Total Replies	105

Exhibit DD

Alternative Household Energy Sources and Costs Among Users,
Before and After Electrification

Before Electrification			
Energy Source	Percent Using	Average Monthly Cost for All Users	Per Cent of Total Cost
Candles	1.0	P 0.02	0.2
Kerosene	95.6	7.22	65.6
Gas (LPG)	10.3	1.31	11.9
Charcoal ^{a/}	10.8	0.43	3.9
Wood ^{a/}	2.0	0.06	0.5
Batteries	50.7	1.96	17.8
T o t a l	-	P11.00	100.00

After Electrification			
Energy Source	Percent Using	Average Monthly Cost for All Users	Percent of Total Cost
Candles	0.5	P 0.01	0.1
Kerosene	44.3	2.73	18.0
Gas (LPG)	6.9	1.27	8.4
Charcoal ^{a/}	6.9	0.28	1.8
Wood ^{a/}	0.0	0.00	0.0
Batteries	31.5	1.89	12.4
Electricity (Based on average Monthly KWH of 34.71 for all users)			
T o t a l	-	P15.18	100.0

^{a/} Includes only users incurring out of pocket cost.

NOTE: The "after electrification" average monthly costs for alternative energy sources have not been adjusted to show the actual increase in prices over the past average 2.5 years. In other words, the significance of the savings being expressed would appear much greater if the "before electrification" and "after electrification" costs were in constant prices. Xavier will recompute this table to more accurately reflect the real savings resulting from electrification and submit it at a later date.

Exhibit EE

Alternative Household Energy Sources and Costs Among Non-Users

Energy Source	Percent Using	Average Monthly Cost for all Users	Percent of Total Cost
Candles	1.9	70.04	0.4
Kerosene	94.2	6.56	69.1
Gas (LPG)	2.9	0.21	2.2
Charcoal ^a	21.6	0.06	0.6
Wood ^a	0.0	0.00	0.0
Batteries	45.7	2.63	27.7
Total	-	79.50	100.0

^aIncludes only users incurring out-of-pocket cost.

Exhibit FF

Percentage Distribution of the Study Population
By Age, Sex, and Areas of Residence,
Western Misamis Oriental

Age	All Areas			Poblacion			Rural Coastal			Rural Inland		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
0-9	29.7	30.8	28.7	28.4	31.5	25.5	29.9	28.8	31.0	30.8	31.8	29.8
10-19	27.8	26.5	29.1	26.4	23.3	29.3	27.4	27.7	27.1	29.2	28.1	30.2
20-29	14.3	13.7	14.8	17.3	15.6	18.7	12.8	13.8	11.8	12.9	12.3	13.6
30-39	10.7	11.1	10.4	9.3	10.6	8.2	12.5	12.7	12.4	10.5	10.2	10.8
40-49	7.4	7.4	7.3	7.3	6.9	7.7	6.1	6.3	5.9	8.3	8.6	8.0
50-59	5.2	5.4	4.9	5.4	6.3	4.6	6.1	4.9	7.1	4.4	5.0	3.8
60+	4.9	5.1	4.8	5.9	5.8	6.0	5.2	5.8	4.7	3.9	4.0	3.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Population	2478	1233	1255	794	378	416	686	347	339	998	498	500

Exhibit GG

Average Household Size By Area And
By Use Category ^a

AREA	USER	NON - USER			ALL HOUSEHOLDS	
	TOTAL	TOTAL	NON-ADOPTOR	INACCESSIBLE		DISCONNECTED
Poblacion	: 6.608	: 5.333	: 5.378	: -	: 5.214	: 6.108
	: (79)	: (51)	: (37)	: -	: (14)	: (130)
Rural, Coastal	: 6.000	: 5.585	: 5.281	: -	: 6.048	: 5.814
	: (65)	: (53)	: (32)	: -	: (21)	: (118)
Rural, Inland	: 6.441	: 5.942	: 5.388	: 6.125	: 7.267	: 6.123
	: (59)	: (104)	: (49)	: (40)	: (15)	: (163)
All Areas	: 6.365	: 5.702	: 5.356	: 6.125	: 6.180	: 6.029
	: (203)	: (208)	: (118)	: (40)	: (50)	: (411)

^aNumbers in parenthesis indicate number of households

Exhibit HH
Average Size of Family^a By Area And
By Use Category

AREA	USER, TOTAL	NON - USER				ALL FAMILIES
		TOTAL	NON-ADOPTOR	INACCESSIBLE	DISCONNECTED	
Poblacion	: 5.291	: 4.784	: 4.865	: -	: 4.571	: 5.092
	: (79)	: (51)	: (37)	: -	: (14)	: (130)
Rural, Coastal	: 4.969	: 5.038	: 4.906	: -	: 5.238	: 5.000
	: (65)	: (53)	: (32)	: -	: (21)	: (118)
Rural, Inland	: 5.576	: 5.471	: 4.714	: 5.825	: 7.000	: 5.509
	: (59)	: (104)	: (49)	: (40)	: (15)	: (163)
All Areas	: 5.276	: 5.192	: 4.813	: 5.625	: 5.580	: 5.233
	: (203)	: (208)	: (118)	: (40)	: (50)	: (411)

a Includes members of nuclear unit only.
a/ Includes members of nuclear unit only.

NOTE: In Exhibit "HH" and other places, a distinction should be made between terms "family" and "household." A "household" is all people domiciled in one residence. A "family" is restricted to father, mother and children within a particular household.

Exhibit II

Percent Distribution of Household Heads
By Principal Income Related Activity And By Use Category^{a/}

OCCUPATION	USER	NON - USER				ALL HOUSEHOLD HEADS
	TOTAL	TOTAL	NON-ADOPTOR	INACCESSIBLE	DISCONNECTED	
Agriculture	45.8	59.1	59.3	80.0	42.0	52.6
Fishing	12.8	12.1	12.7	0.0	20.0	12.4
Commerce	9.4	4.3	3.4	0.0	10.0	6.8
Transportation	4.4	2.9	3.4	5.0	0.0	3.6
Construction	5.4	4.3	5.9	5.0	0.0	4.9
Manufacturing	5.4	6.3	5.9	2.5	10.0	5.8
Business, Personal Service	2.5	4.8	5.1	5.0	4.0	3.6
Professional	10.8	1.9	0.8	0.0	6.0	6.3
Fixed Income	1.0	.5	0.0	2.5	0.0	0.7
Unemployed	2.5	3.8	3.4	0.0	8.0	3.2
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Total Household Heads	203	208	118	40	50	411

^{a/}Total percentages may not add up to 100.0 due to rounding.

Exhibit JJ

Percent Distribution of Household Heads
By Highest Grade Completed and
by Use Category

HIGHEST GRADE COMPLETED	USER	NON - USER			ALL HOUSEHOLD HEADS	
	TOTAL	TOTAL	NON-ADOPTOR	INACCESSIBLE		DISCONNECTED
0	: 3.9	: 15.4	: 16.1	: 15.0	: 14.0	: 9.7
1 - 6	: 51.8	: 61.5	: 62.7	: 70.0	: 52.0	: 56.7
7 - 10	: 22.2	: 10.6	: 10.2	: 10.0	: 12.0	: 16.3
11 - 14	: 16.7	: 11.0	: 11.0	: 2.5	: 18.0	: 13.9
15+	: 4.9	: 1.0	: 0.0	: 0.0	: 4.0	: 2.9
Unknown	: 0.5	: .5	: 0.0	: 2.5	: 0.0	: 0.5
Total Percent	:100.0	:100.0	: 100.0	: 100.0	: 100.0	: 100.0
Total Household heads	:203	:206	: 118	: 40	: 50	: 411
Median Year of Schooling	: 5.8	: 4.3	: 4.0	: 3.8	: 5.3	: 5.3

Exhibit KK

Mean Scores in Level of Living Index (LEVEL)
By Area and By Use Category ^a

AREA CATEGORY	USER,	NON - USER				ALL HOUSEHOLDS
	TOTAL	TOTAL	NON-ADOPTOR	INACCESSIBLE	DISCONNECTED	
Poblacion	: 4.139	: 2.451	: 2.189	: -	: 3.143	: 3.477
	: (79)	: (51)	: (37)	: -	: (14)	: (130)
Rural, Coastal	: 3.800	: 2.641	: 2.250	: -	: 3.238	: 3.280
	: (65)	: (53)	: (32)	: -	: (21)	: (116)
Rural, Inland	: 3.237	: 2.269	: 2.122	: 2.350	: 2.533	: 3.000
	(59)	(104)	(49)	(40)	(15)	(50)
All Areas	: 3.768	: 2.409	: 2.178	: 2.350	: 3.000	: 3.080
	: (203)	: (208)	: (118)	: (40)	: (50)	: (411)

^aNumbers in parenthesis indicate number of households.

Exhibit LL

Mean Scores in Electricity - Free Level of
Living Index (LEVEL - EF) By Area
and by Use Category ^a

AREA CATEGORY	USER, TOTAL	NON - USER				ALL HOUSEHOLDS
		TOTAL	NON-ADOPTOR	INACCESSIBLE	DISCONNECTED	
Poblacion	: 3.975	: 2.451	: 2.135	: -	: 3.285	: 3.377
	: (79)	: (51)	: (37)	: -	: (14)	: (130)
Rural, Coastal	: 3.800	: 2.642	: 2.344	: -	: 3.095	: 3.280
	: (65)	: (53)	: (32)	: -	: (21)	: (118)
Rural, Inland	: 3.220	: 2.240	: 2.041	: 2.325	: 2.666	: 2.595
	: (59)	: (104)	: (49)	: (40)	: (15)	: (50)
All Areas	: 3.699	: 2.394	: 2.153	: 2.325	: 3.020	: 3.039
	: (203)	: (208)	: (118)	: (40)	: (50)	: (411)

^aNumbers in parenthesis indicate number of households.

NOTE: Systematically excludes factors based on the use of electricity, such as lighting, refrigeration, etc.

Exhibit MM

Mean Scores for Respondents of Satisfaction
With Life Situation Indexes, By Use
Category

SATISFACTION WITH LIFE INDEXES	USER,	NON - USER				TOTAL RESPONDENTS
	TOTAL	TOTAL	NON-ADOPTOR	INACCESSIBLE	DISCONNECTED	
SIT PRES	: 3.187	: 2.971	: 2.923	: 3.100	: 2.980	: 3.078
SIT PAST A	: 3.202	: 2.885	: 2.873	: 2.925	: 2.880	: 3.011
SIT PAST B	: 3.315	: 2.976	: 2.966	: 2.975	: 3.000	: 3.118
SIT FUT A	: 3.305	: 3.130	: 3.076	: 3.175	: 3.220	: 3.217
SIT FUT B	: 3.222	: 3.154	: 3.127	: 3.225	: 3.160	: 3.187
SIT TOT	: 3.246	: 3.023	: 2.993	: 3.080	: 3.048	: 3.133

Exhibit NN

Mean Scores of Respondents in Electricity - Free
Mass Media Exposure Index (MMEI - EF),
By Area of Residence and By
Use Category ^a

AREA OF RESIDENCE	USER,	NON - USER				TOTAL RESPONDENTS
	TOTAL	TOTAL	NON-ADOPTOR	INACCESSIBLE	DISCONNECTED	
Poblacion	: 3.29	: 2.57	: 2.62	: -	: 2.43	: 3.01
	: (79)	: (51)	: (37)	: -	: (14)	: (130)
Rural, Coastal	: 2.95	: 2.70	: 2.50	: -	: 3.00	: 2.84
	: (65)	: (53)	: (32)	: -	: (21)	: (118)
Rural, Inland	: 3.24	: 2.71	: 2.71	: 2.85	: 2.33	: 2.90
	: (59)	: (104)	: (49)	: (40)	: (15)	: (163)
All Areas	: 3.17	: 2.67	: 2.63	: 2.85	: 2.64	: 2.92
	: (203)	: (208)	: (118)	: (40)	: (50)	: (411)

^aNumber in parentheses indicate number of respondents.

NOTE: Excludes ownership of televisions.

Exhibit 00

Mean Scores of Respondent in Mass Media
Exposure Index (MMEI) By Area of
Residence and by Use Category ^a

AREA OF RESIDENCE	USER,	NON - USER				TOTAL RESPONDENTS
	TOTAL	TOTAL	NON-ADOPTOR	INACCESSIBLE	DISCONNECTED	
Poblacion	: 3.33	: 2.57	: 2.62	: -	: 2.43	: 3.03
	: (79)	: (51)	: (37)	: -	: (14)	: (130)
Rural, Coastal	: 3.02	: 2.70	: 2.50	: -	: 3.00	: 2.87
	: (65)	: (53)	: (32)	: -	: (21)	: (118)
Rural, Inland	: 3.24	: 2.71	: 2.71	: 2.85	: 2.33	: 2.90
	: (59)	: (104)	: (49)	: (40)	: (15)	: (163)
All Areas	: 3.20	: 2.67	: 2.63	: 2.85	: 2.64	: 2.49
	: (203)	: (208)	: (118)	: (40)	: (50)	: (411)

^aNumber in parenthesis indicate number of respondents.

Exhibit PP

COVERAGE OF MORESCO ESTIMATES BASED ON SAMPLE PERCENTAGES

	<u>NO.</u>	<u>Percent</u>
Total est. HH connections (May 1, 1975)	20,750	100.0
Current Users	6,723	32.4
Temporarily Disconnected	1,148	5.5
Have Applied & Waiting for Con- nection	410	2.0
Inaccessible	9,026	43.5
Non-Adopter for Non-Financial Reasons	892	4.3
Non-Adopter for Financial Reasons	2,551	12.3

Exhibit QQ

BACKGROUNDS AND CHARACTERISTICS OF ELECTRICITY USAGE
IN WESTERN MICHIGAN

In this section, material is furnished upon three categories of households in terms of electricity consumption: users, former users now disconnected, and non-adoptors. Users are considered first.

USERS

As previously, this category is constituted by those households which had had connections installed to bring electric current into their houses from a MORESCO source, and which were using such power on the date of interview.

Duration of Use

Interviews were conducted with 203 heads of households using electricity. By interview date in 1975, the average person had been using electricity more than $2\frac{1}{2}$ years. Electric service in their homes from 1971 had been enjoyed by 16.3 per cent of these users. An additional 20.7 per cent were connected to the MORESCO line in 1972 when the backbone of the system was being completed. However, the largest number, 45.8 per cent, first obtained electricity in 1973. Of the remainder, 11.8 per cent, began to receive electric current in 1974, and 5.4 per cent in 1975, as Table E-1 shows.

Growth in Ownership of Electrical Devices

Table E-2 presents data upon growth in ownership of electrical devices, and consequently (if illumination is presumed to remain at least constant) in household consumption of electricity. Altogether, the User households interviewed had obtained and put into operation during their first year of electrification some 129 devices and appliances. Among these items were 29 flat irons, 3 electric sewing machines, 9 stoves, 16 refrigerators, 3 freezers, 4 electric

water pumps, 9 fans, 29 radios powered by electric current, not batteries, 17 stereo sets, and 10 television sets. Between the time when all these had been acquired and date of interview an additional 58 devices and appliances had been obtained: 12 flat irons, 3 stoves, 7 refrigerators, 2 freezers, an electric water pump, 2 fans, 24 electric radios, and 7 stereo sets.

Use of electrical appliances per household may seem very low in comparison to use levels of many city populations. For example, 3 electric sewing machines and 23 refrigerators for 203 households mean, that there were only 1.5 sewing machines and 11 refrigerators for every 100 households. Nevertheless these appliances have added appreciably to the level of comfort and to the productivity of these 203 households. Further, the trend is towards increasing use of such appliances and equipment, paving the way for higher levels of living.

Views Upon Uses and Importance of Electricity

The operation of electric equipment and appliances is but one aspect of electricity usage. Another and perhaps potentially more useful aspect is the determination of the major uses to which electricity has been put and the relative importance of these uses in the minds of respondents. Accordingly, household heads or their wives in 203 households were interviewed and asked: (a) what electricity had made possible for them which would not have been possible without electricity, (b) what were the most important uses of electricity from their own points of view, and (c) what their main problems would be if electric service should be interrupted for a month.

What had been made possible. As Table E-3 shows, more than one response was possible, and thus the percentage of each reply adds to more than 100%. One major response to the first question was that electricity had made possible longer and more efficient use of night hours for productive purposes.

Eighty, or 39.4 per cent, of all respondents said they were able to do much of their common household chores at night (housecleaning, washing, ironing, etc.), which freed them for taking jobs during daylight hours in business or on the farm. Another 18.7 per cent stated they could now continue processing agricultural products even to late hours of the evening. Among activities mentioned were shelling corn, manufacturing roofing material from nipa leaves, and classifying and bundling tobacco leaves for the market, repairing equipment like fishing nets, making minor repairs on homes and overtime work on small/^{family} businesses they might have, e.g., furniture. Another 10.8 per cent of the respondents mentioned being enabled to read, study, or make lesson plans for the next mornings' school classes. The convenience of electric lighting was the theme of another 17.7 per cent. Some recalled how their lamps kept blowing out on windy nights in the days before electrification and how this made illumination of their homes difficult.

Some 18 per cent of respondents (some of whom had also answered in terms of the above categories) mentioned relaxation. They said that electricity made feasible some facilities like the stereo and made possible longer use of other facilities like the radio, so that they were able to enjoy these facilities at night for entertainment and relaxation purposes for as long as they cared to.

A third category of answers pertained to use of such appliances as sewing machines, electric irons, refrigerators, and the like. These appliances would not be feasible in the absence of electricity. While 11.8 per cent of all respondents had replied in categories of such equipment, 3.7 per cent pointed to adequate water supply for drinking, cooking, and other purposes, and 3.0 per cent spoke of the illumination of farm buildings. Four per cent, finally, referred to various other facilities that could not be operated, or activities that could not be carried on without great difficulty in the absence of electricity.

Problems during power failures. To the question what their main problems would be in the event of electric service interruption, 82.8 per cent of the respondents replied in terms of illumination. For many users, night time electric lighting has apparently already become a way of life, and these state they would feel most inconvenienced at night by power interruptions. Relevant to this, a municipal mayor complained to our interviewer that during power interruptions his constituents had directed their complaints to him instead of to MORESCO, the responsible agent. The next largest group of respondents, 12.3 per cent, mentioned that power failures would mean no water because almost all municipal poblacions and many barrios ^{via} electric pumps now pipe water to public and private outlets. Other main problems mentioned included inability to do work at night upon agricultural tasks and upon household chores, security risks from robberies and muggings that darkness in the whole area may occasion, and inability or difficulty in using appliances.

Main uses of electricity. Respondents were also asked to indicate what they perceived as the main uses of electricity in the household. Illumination was mentioned as one of the most important uses by 96 per cent of all respondents. In addition, 27.6 per cent noted that lighting makes possible nighttime agricultural processing and/or other work like household tasks. Finally, 36.9 per cent spoke of the operation of household appliances and/or of entertainment devices such as radios, stereo sets, or television.

HOUSEHOLDS DISCONNECTED FROM MORESCO SOURCES

Views Upon Importance and Uses of Electricity of Disconnected Households

These are households which had previously been connected to the MORESCO electric current, but whose current had been cut off.

It seems appropriate to furnish some background information on these households which had had electric lines installed at some time since 1971 but

because of various circumstances had discontinued use of electricity. Table E-5 presents data on these circumstances. Among these was inability to pay monthly bills on time: 22 out of 50 interviewed had been disconnected for this reason. By MORESCO regulations, electric service will be disconnected if the consumer fails to pay his monthly bill for two consecutive months. In practice, however, MORESCO tends to be more lenient than this. The remaining group of households which disconnected, 28 in number, included those which had voluntarily requested discontinuance of service. Reasons for such requests included repair of houses, the movement of the house due to road widening, the transferral of the household (and sometimes the house) to another place. This group probably has more characteristics in common with current users than with those disconnected for default on bill payments. However, the delinquent and the voluntarily disconnected together represent households still in the process of transition into a more continuous use of electric service.

Respondents in this category were asked what advantages and what disadvantages they saw in having electric current connected to the house, and especially what things that they had done before with electricity which they were now unable to do in its absence.

Of 50 respondents interviewed, 50 per cent mentioned as advantages the better lighting provided by electricity, 34 per cent pointed to the convenience of electricity, 14 per cent stated that electricity was cheaper than kerosene illumination, and 6 per cent mentioned the opportunities for operation of appliances which electricity conferred. Of the 4 replies which noted disadvantages, 3 mentioned the recurrence of a monthly bill and indicated that electricity had become too expensive for them and/or that they could not afford to pay a monthly bill.

With regard to things which they had been able to do before that they were no longer able to accomplish without electricity, 34 per cent of the

replies singled out night processing of agricultural products and 20 per cent spoke of nighttime doing of household chores. The use of electric appliances was mentioned by 18 per cent, while 12 per cent noted inability to read and study at night, and 8 per cent simply indicated that the benefits of illumination from electric lamps in many ways could not be duplicated by kerosene lamps. No response to the question was made by 8 per cent of the respondents. These responses, as indicated in Table E-4, agree in general with the replies made by Users to the same questions.

Among the things that they had done before with electricity which they could not now do in the absence of electricity, 34.0 per cent of the respondents answered nighttime agricultural processing work; 20.0 per cent, reading and studying, 8 per cent lighting. Four made no response. These responses by the disconnected group corroborated the use and importance of electricity mentioned by the users. The data are shown in Table E-4.

HOUSEHOLDS NOT ADOPTING ELECTRICITY OR SITUATED IN LOCALITIES WHERE IT IS NOT AVAILABLE

To obtain further insight into use and importance of electricity among households in the area, non-adoptors were asked why they have not taken advantage of the opportunity for electric service. In addition, both non-adopter and inaccessible households were asked whether, if they had a practicable opportunity, they would use electricity in their homes.

Ninety-nine among non-adopter households were asked their reasons for not using electricity. There were 105 replies. Of these replies 43 per cent stated that electricity was too expensive for them to pay the monthly bills, and 11 per cent indicated that they could not afford the initial installation cost. Fifty-four per cent of the non-adoptors were therefore not adopting electricity because of financial constraints. Thirty-three per cent of the

remaining replies were from households which claimed that serious difficulties prevented the extension of lines to their homes, and 11 per cent stated that their homes were not apt for the installation of electricity. One of the remaining two replies said the household was not used to using electricity and the other stated that electricity was "dangerous". (These data are shown in Table E-6.)

When respondents were asked whether they would install electric lines into their homes, if they had a practicable opportunity, 95.0 per cent of the inaccessibles said they would, but only 77.7 per cent of the non-adoptors who responded, answered in the affirmative. The relatively low status of non-adoptors in terms of income, level of living, education and other factors, in comparison with that of other types of households, together with the high cost of electricity and the difficulties of installation which they perceive, make them see little net advantage to themselves in having electricity installed in their homes.

Alternative Energy Sources and Costs

The main alternative sources of energy to MORESCO power available to the people of Western Misamis Oriental are shown below by household function:

<u>Function</u>	<u>Non-MORESCO Energy Sources</u>
Lighting	Candles, kerosene, batteries
Cooking	Gas (LPG), kerosene, wood, charcoal
Refrigeration	Kerosene
Ironing	Charcoal
Entertainment (radio, record player)	Batteries

The main non-electrical source of energy is kerosene. It is used mostly for lighting, (as in simple kerosene lamps and in pressure lamps), used less

for cooking (kerosene stoves), and used least for refrigeration. However, with the availability of liquified petroleum gas (LPG), many households which were using kerosene stoves switched to gas stoves as being cleaner (less soot) and easier to operate. The main source of energy for cooking however is still wood and other items like coconut shells, husks, and leaves, and corn stalks and cobs. The ready availability of such items is the reason. In most cases these materials do not entail out-of-pocket costs on the part of the user. The only cost of wood is the opportunity cost of transforming such materials into a form apt for ready use. In most cases, this opportunity cost is nil, especially in rural farming areas. Charcoal, made from coconut shell or from wood, is used for heating irons to press clothes and for special types of cooking. Batteries are often used to supply power to flashlights, radios, and record players. Most radios in Western Misamis Oriental are still operated by batteries even though electricity is available. However radios operated on electric current are becoming more popular since owners are assured of economical and lasting use.

Information on costs of alternative energy sources was obtained by asking of respondents their average weekly expenditures for the above types of energy sources. These weekly expenditures were then transformed into monthly expenditures for comparison with the electricity costs expressed in monthly MORESCO bills. Electricity users were asked their expenditures upon alternative energy sources before and after electrification, to obtain some idea of the amount of energy they had been using before electrification, and how electrification had changed their energy consumption. Non-users were asked only about present energy expenditures. Results are presented in Tables E-7 and 8.

As Table E-7 shows, among users of electricity prior to electrification, the total average energy cost per month from traditional sources amounted to

₱11.00 or ₱1.47 (at ₱7.50 to ₱1). Of this, two-thirds was spent on kerosene, showing the relative importance of this energy source for households. Batteries and liquified petroleum gas were next in importance and accounted for 17.8 and 11.9 per cent of total energy costs, respectively. Candles, charcoal and wood together accounted for only about five per cent of the total. In a coconut producing area coconut shells are easily converted into charcoal, while wood and similar types of fuel (coconut husks, shells, leaves, corn stalks, cobs, and so forth) are easily obtained without direct monetary cost by many households.

The pattern of energy consumption changed after electrification, as might be expected. As Table E-7 also indicates, the availability of electricity resulted in a shift from traditional sources of energy to electricity. The traditional energy source most affected by electricity was kerosene. Prior to electrification, 95.6 per cent of the households studied here were using kerosene for various household functions. After electrification, the percentage of kerosene users declined to 44.3 per cent. Similarly, the number of households using batteries declined from 50.7 to 31.5 per cent. In addition, the numbers using gas and charcoal declined by 33.3 and 36.4 per cent, respectively.

Another way of looking at the change in energy consumption is to examine total average monthly expenditures upon alternative household energy sources. These are also shown in Table E-7.

Of the total average monthly energy cost for all consumers of ₱15.18 or \$2.02, after electrification traditional sources accounted for only 40.7 per cent of total energy costs. Correlatively, electricity accounted for 59.3 per cent of these costs. Among the traditional sources of energy, the importance of kerosene had declined most, from 65.6 per cent prior to electrification to only 18.0 per cent after electrification, a decline of 72.6 per

cent. The contribution of other sources to total costs also declined with the availability of electricity, but less sharply than kerosene: by 29.4 per cent, charcoal by 53.8 per cent, by 30.3 per cent, and batteries, respectively.

Of interest here is the fact that although total energy costs before and after electrification had increased by as much as 38.0 per cent from ₦11.00 to ₦15.18, the absolute difference of ₦4.18 is not much higher, and in fact may be lower than what one might expect total cost to be at current prices, if users now, instead of switching to electricity, had continued their level of traditional energy use as before. The price of kerosene for example increased in the last two and a half years (the average years of exposure of current users to electricity) by about 300 per cent. Furthermore, users now are probably requiring more energy than before as a result of a higher level of living. With the price of kerosene tripled, prices and level of use of all other sources remain^{ing} the same, the expected total cost of energy after electrification for users opting for only traditional sources would have been ₦25.44 per month. This^{is} 67.6 per cent higher than that which results when electricity is substituted for some of the other sources.

Looking at the total energy cost of non-users, one is impressed by the relatively low level of energy use by this group. The total energy cost of ₦9.50 per month is lower by 15.8 per cent than the level of current users prior to electrification. When price increases of traditional sources are taken into account, the actual (quantity) level of energy use by non-users would have been much lower in comparison with those of users even before electrification. This is consistent with the lower levels of living of non-users which are positively associated with energy use. Correlatively, users already had an advantage over non-users in terms of level of living and energy use prior to electrification.

Cost of installation. The other part of electricity costs aside from monthly current bills, is the initial investment made for the installation of electric lines. Installation costs, which in this report means all expenditures for house wiring, incandescent or fluorescent bulbs, and other electric accessories, varied from less than ₱50.00 to more than ₱450.00, with a mean of ₱192.00. The main sources of funds for financing installation costs were respondents' cash savings (64.0 per cent of all sources) and MORESCO, (25.6 per cent). The rest include sale of livestock, of household items, of secondary crops, and the like, and bank loans.

Table 1. Distribution of Electric Users by Year of Exposure to Electricity

Year Exposed	Numbers of Users	Percent	Cumulative Percent
1975	11	5.4	100.0
1974	24	11.8	94.6
1973	93	45.8	82.8
1972	42	20.7	37.0
1971	33	16.3	16.3
Total	30	100.0	
Average Exposure 2.61 years			

Table 2. Ownership of Electrically Operated Appliances and Equipments

Appliance/ Equipment	Number Owning During First Year of Connection	Percent	Number Owning as of Inter- view date	'Percent'	Total Increase in Number Owning
Radio	29	14.3	53	26.1	24
Iron	29	14.3	41	20.2	12
Stereo	17	8.4	24	11.8	7
Refrigerator	16	7.9	23	11.3	7
Stove	9	4.4	12	5.9	3
Fan	9	4.4	11	5.4	2
Television	10	4.9	10	4.9	0
Water pump	4	2.0	5	2.5	1
Freezer	3	1.5	5	2.5	2
Sewing machines	3	1.5	3	1.5	0
Others	0	0.0	0	0.0	0
Total Number of Items	129	-	187	-	58
<u>Total Number of Respondents = 203</u>					

Table 3. Major Use and Importance of Electricity for MORESCO Users

Things done with electricity that cannot be done without it	Percentage of RSP Mentioning ^a	Major Problem if electricity fails for a month	Percentage of RSP Mentioning ^a	Most Important Uses of Electricity	Percentage of RSP Mentioning ^a
Night-time agricultural processing and other productive work	18.7 (38)	Lighting Problem	82.8 (168)	Lighting	97.5 (198)
Night-time work doing household chores	39.4 (80)	Inability to do agricultural processing and other work at night	1.0 (2)	Allows doing household chores at night	22.7 (46)
Reading/Studying	10.8 (22)	Inability to do household chores at night	5.4 (11)	Allows doing agricultural processing and other work at night	4.9 (10)
Lighting of house?	17.7 (36)	Security	2.0 (4)	Allows use of electric appliances	25.1 (51)
Use and enjoyment of entertainment facilities (radio, stereo, etc.)	13.2 (37)	Water problem	12.3 (25)	Use of entertainment facilities	11.8 (24)
Use of Household Appliances	11.8 (24)	Inconvenience	6.4 (13)	Water supply	16.3 (33)
Adequate water supply	3.7 (7)	Others	4.9 (10)	Others	1.5 (3)
Lighting of farm buildings	3.0 (6)	No response	4.9 (10)	No response	0.5 (1)
Others	3.9 (8)	-	-	-	-
No response	7.4 (15)	-	-	-	-
Total Number of Respondents = 203					

^aNumbers in parenthesis indicate number of respondents.

Table 4. Frequency of Disconnected by Perceived Advantages or Disadvantages of Electricity and Things Done with Electricity not Done Now

A. <u>Advantages</u>	Number of Replies	Per Cent of Respondents Replying
Better lighting	30	60.0
Use of electric appliances	3	6.0
Convenience	17	34.0
Cheaper	7	14.0
No Response	3	6.0
Total Respondents	50	-
B. <u>Disadvantages</u>		
Cannot Afford the monthly Bill	3	6.0
Others	1	2.0
No Response	46	92.0
Total Respondents	50	-
C. <u>Things Done with Electricity Not Done Now</u>		
Night time Agriculture work and other productive activities	17	34.0
Night time doing household chores	10	20.0
Use of Electric appliances	9	18.0
Reading/Study	6	12.0
Lighting	4	8.0
No Response	4	8.0
Total Respondents	50	-

Table 5. Frequency of Disconnected by Reason of Disconnection

Reasons	Percent
Delinquency	44.0
Personal request/voluntary	26.0
House being repaired or transferred	22.0
Others	8.0
Total Percent	100.0
Total Number of Disconnections	50

Table 6. Distribution of Non-Adopters, by Reason for not Having Electricity

Reasons	Percent of Replies
Too expensive	42.9
Could not afford installation cost	11.4
Difficult to extend electric lines	33.3
House not fit for installation	10.5
Not used to having electricity	0.9
Other (Dangerous)	0.9
Total Percent	100.0
Total Replies	105

Exhibit QQ 18

Table 7. Alternative Household Energy Sources and Costs Among Users, Before and After Electrification

Before Electrification			
Energy Source	Percent Using	Average Monthly Cost for all Users	Per cent of Total Cost
Candles	1.0	₱ 0.02	0.2
Kerosene	95.6	7.22	65.6
Gas (LPG)	10.3	1.31	11.9
Charcoal ^a	10.8	0.43	3.9
Wood ^a	2.0	0.06	0.5
Batteries	50.7	1.96	17.8
Total	-	₱11.00	100.0
After Electrification			
Energy Source	Percent Using	Average Monthly Cost for all Users	Percent of Total Cost
Candles	0.5	₱ 0.01	0.1
Kerosene	44.3	2.73	18.0
Gas (LPG)	6.9	1.27	8.4
Charcoal ^a	6.9	0.28	1.8
Wood ^a	0.0	0.00	0.0
Batteries	31.5	1.89	12.4
Electricity (Based on average Monthly kWh of 34.71 for all users)	100.0	9.00	59.3
Total		₱15.18	100.0

^aIncludes only users incurring out of pocket cost.

Table 8. Alternative Household Energy Sources and Costs Among Non-Users

Energy Source	Percent Using	Average Monthly Cost for all Users	Percent of Total Cost
Candles	1.9	70.04	0.4
Kerosene	94.2	6.56	69.1
Gas (LPG)	2.9	0.21	2.2
Charcoal ^a	21.6	0.06	0.6
Wood ^a	0.0	0.00	0.0
Batteries	45.7	2.63	27.7
Total	-	79.50	100.0

^aIncludes only users incurring out-of-pocket cost.