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Technical Resources Project

SUSTAINABILITY OF DAK RESETTLEMENT PROJECTS IN REGION XII

A STUDY CONDUCTED FOR THE **REGIONAL DEVELOPMENT COUNCIL XII**

By the

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Chapter I

INTRODUCTION

BACKGROUND OF THE STUDY

The concept of sustainable development

Sustainable development is Central Mindanao's framework for development. The World Commission on Environment and Development (WCED), in its report "Our Common Future" defines sustainable development as "meeting the needs of the present generation without compromising the ability of the future generations to meet their own needs"

In the context of the Philippine Agenda 21, the essence of sustainable development is in the harmonious integration of a sound and viable economy, responsible governance, social cohesion/harmony and ecological integrity to ensure that development is a life-enhancing process. The ultimate aim of development is human development now and through future generations.

The Problem

The manner we use our natural resources, particularly, land, is a major sustainable development concern. Unsustainable forms of land use was depicted in the Regional Physical Framework Plan for Central Mindanao. Areas with slopes above 18% are supposed to be designated as forestlands and are best suited for trees. However, a substantial area of this category have been released as alienable and disposable, cut of its forest vegetation, and used for settlements and cash crop cultivation. This type of cropping system leads to a host of on- and off-site adverse environmental effects. This include soil erosion, climate disturbances, and decline in water levels of river systems, among others.

The Scope of Inquiry

The resettlement projects being implemented by the Department of Agrarian Reform is explored by this study as a possible source of unsustainable land use. The DAR has nine resettlement projects in Central Mindanao were selected as study sites, that is, one for each province. To define the scope and coverage of the study three resettlement projects were selected as study sites, that is, one for each province, to validate the existence of this problem. The three resettlement are: Alamada, Sapad, Colombio, for the provinces of Cotabato, Lanao del Norte and Sultan Kudarat ^{a/}, respectively. The basis for selection of sites include: levels of developments, availability of basic information and geographic accessibility.

The Department of Agrarian Reform and the Department of Environment and Natural Resources offices in the region realized the serious implication of the foregoing such that both agencies forge entered into a Memorandum of Agreement in to stop the titling of more lands within agrarian reform areas, including settlement projects, which have 18% slopes or higher.

Notwithstanding the enforcement of this stopgap measure, the problem on the encroachment of forest lands, is far from over. A number of issues pertaining to land use have to be resolved. Correspondingly, clear-cut actions have to be undertaken by all sectors of society, particularly the government. Necessarily, solutions and actions to address these issues have to be anchored on solid basis which this study hopes to provide.

OBJECTIVES

The general objective of the study is to assess the implication of resettlement projects on ecological and other relevant aspects of sustainability, such as: economic, socio-cultural, technological, political and institutional viability of the program. To achieve this, the study shall pursued the following specific objectives:

^{a/} The study adopted the pre-RA 7901 composition of Region XII

1. To trace the history of agrarian reform resettlement program from a regional perspective;
2. To come with a general profile of the communities in the resettlement sites using key socioeconomic indicators;
3. To document the present land management practices of settlers in the three sites;
4. To determine the nature of land use within the selected resettlement sites;
5. To assess the on- and off- site environmental effects of the presence of these settlements;
6. To identify other specific sustainable development issues confronting settlers and suggest corresponding policy options or measures to concerned authorities; and
7. To create public awareness through public consultations/meetings on issues identified and generate support for policy reforms in the agrarian reform and resettlement programs.

SIGNIFICANCE OF THE STUDY

The study provides empirical evidence, albeit on a limited scope, on the immediate and long-term effects of resettlement projects located in potential environmentally critical areas. Given such information, agencies mandated to implement programs on land use, classification, distribution and protection, such as the Department of Agrarian Reform (DAR), Department of Environment and Natural Resources (DENR) and the Department of Agriculture (DA), shall properly be guided of the result of the study particularly in designing projects for these areas, as well as, consider the likely implications of location decisions for their various programs.

The Local Government Units (LGU) specifically those at the municipal level could make use of the report as reference in area-based development planning, balancing both spatial and socioeconomic perspectives.

The experiences in the three study areas provide very valuable insights in planning for future resettlement projects. The study may also serve as benchmark for further research along sustainable development programs, agrarian reform, community-based resource management and related programs.

REVIEW OF RELATED LITERATURE

Resettlement had been adopted as one of the strategies for implementing the agrarian reform program in the Philippines. As a major government intervention, this area had been the subject of several studies conducted by various institutions.

A review was conducted on related studies undertaken by the Philippine Council for Resources Research and Development (PCARRD) since 1970's up to the late 1980's. The review revealed that the subject of inquiry focused on the socioeconomic conditions of settlers and the exploration of settler problems, among others. Among the past research works that contributed significantly to the conceptualization of the present study are the studies on: Tanay Resettlement (1976) in Rizal Province; Magalang Resettlement (1978) and Bagong Lipunan Settlement (1984), both in Tarlac Province. All three cited study areas are located in Luzon.

An attempt to look at sustainability issues was noted in the impact study on the Bagong Lipunan Settlement. The study revealed, among others, that land productivity declined after years of occupancy by settlers.

PCARRD conducted a study of 11 resettlement areas in the country in 1976. These studies basically looked at the problems encountered by settlers. The problems identified include

inadequate support services, lack of infrastructure projects, land allocation conflicts, the deterioration of peace and order situation, and lack of cooperation between and among the settlers, the personnel of different government agencies and even those from the local government units.

METHODOLOGY

This project is a research undertaking with advocacy as an add-on component. The research portion essentially consists of three major activities: (a) the socioeconomic survey, (b) the case study analysis and (c) the land-use analysis. Details of the research activities are described below:

RESEARCH COMPONENT

Socioeconomic Survey

A survey using a systematic random sampling method was conducted to generate the socioeconomic profile of settler-families in Alamada.

The survey in Alamada covered 400 respondents from two barangays: Kitacubong and Pigcawaran, who were interviewed using a survey schedule. The questionnaire was first pre-tested on 10 respondents.

The data collected was processed to generate basic information about the respondents, their socioeconomic condition, their farm management practices and their level of awareness on sustainable farm practices.

Case Study Analysis

The sampling methodology was not applied in other two resettlement sites: columbio

and Sapad. In the case of Columbio, the research team gathered from the Municipal Agrarian Reform Office that it is not really a resettlement area as defined in this study but was actually an area reserved for rice, corn and other crop production purposes, through a presidential proclamation and under the auspices of the National Resettlement and Rehabilitation Administration or NARRA. Sapad on the other hand, is a resettlement area but is no longer inhabited by original settlers under the EDCOR resettlement program. Thus, the case study approach was used in the latter two areas.

Key informants, ten from Columbio and six from Sapad, interviewed for the case study analysis. The MARO recommended to the research team the names of early settlers to serve as key informants. There was difficulty in tracking the location of original settlers in Sapad. Nevertheless, the team was able to interview six respondents. Most respondents are original settlers but had given up their farms.

Land-use Analysis

Land-use analysis was employed to determine the presence of conflicts in land use in resettlement sites and determine its nature and extent. Due to the difficulty in delineating the actual resettlement site, the research team adopted the entire land area of the host municipality in all the three study areas as the domain of the land-use analysis.

Base maps were collected from various agencies such as the DENR, the DAR and the Bureau of Soil and Water Management (BSWM) of the DA. Relevant thematic maps were overlaid with each other to come up with decision maps. The decision maps generated include the land capability map and the proposed land use map for all study areas..

ADVOCACY COMPONENT

The advocacy component of this study consists of the following activities: (a) one regional research utilization workshop, (b) six briefings/presentation of findings to Provincial and Municipal Development Councils, and (c) distribution of the final document to stakeholder groups which include, among others, the appropriate committees in Congress, the various National/Regional/Provincial Land Use Committees, national line agencies including their regional/field offices, the Provincial Governors' Offices and the Sangguniang Panlalawigan of the three provinces included in this study.

Chapter II

THE RESETTLEMENT PROGRAM IN THE PHILIPPINES

GENERAL BACKGROUND

Resettlement Defined. The study adopts the definition by Director Romeo Castaneda in his paper, "Land Resettlement: Status and Problems", which defines resettlement as an ***organized migration under government auspices***. In simple terms, it could mean public land distribution and development. Hence, the resettlement program involves the physical transfer of deserving landless farm workers from densely populated areas to settlement reservations of the public domain where they are allocated particular lots for them to own and cultivate.

Rationale of the Resettlement Program. In its early years of implementation, the Philippine government embarked on land resettlement as a tool to help address prevalent socioeconomic problems which included: slow growth of the agriculture sector, high unemployment and underemployment, high tenancy rate, uneven distribution of population, and stunted rural community development.

In the light of new trends in agrarian reform, resettlement is a means to a more equitable and systematic distribution and development of agricultural lands of the public domain.

Basic Principles of Resettlement. The implementation of the resettlement program in the Philippines follows certain basic principles. The first principle is that resettlement is an integral part of the agrarian reform program. The country's first attempt in implementing agrarian reform was not only pursued through the expropriation of big landed estates, but also through the resettlement of landless farm workers.

Secondly, it is a program of "land for the (deserving) landless". The late President Ramon Magsaysay instituted a vigorous program of land resettlement under the slogan "land for the landless".

Thirdly, the resettlement is a two-way proposition. This principle means that resettlement is a mutually beneficial undertaking between the government and the settler, as it address the socioeconomic development objectives of the government and the settlers' need for a secure income base.

Fourth, resettlement implies the building of new communities. New municipalities and even cities, were built because of the surge of communities inhabiting the resettlement. For instance, the City of General Santos and a number of municipalities in South Cotabato, were once districts of the settlement projects of Allah and Koronadal in the former Empire Province of Cotabato.

The Resettlement Process. Agricultural resettlement is a long tedious process. The process involves two principal elements: (1) land, and (b) settler. Under land concerns, the series of activities in their chronological sequence are: acquisition of the settlement reservation through a presidential proclamation, physical planning, land surveys, and infrastructure development.

The sequence of activities concerning the settlers include: processing and screening, approval of applications, movement of settlers, allocation of lots, settlers' assistance, agricultural development and community development.

HISTORY OF THE PHILIPPINE RESETTLEMENT PROGRAM

The government's earnest pursuit for the land resettlement program began in 1939. President Manuel L. Quezon signed Commonwealth Act No. 441 on June 3, 1939. This Act created the National Land Settlement Administration (NLSA) which was established to facilitate the acquisition, settlement and cultivation of the country's virgin lands, to provide an opportunity for landless farmers to own lands, and to encourage migration from congested areas to sparsely populated regions.

The NLSA started its activities with the opening of three major resettlement projects, namely; Koronadal Valley and Allah Valley in Cotabato, and Mallig Plains in Isabela. This ambitious program was however disrupted by World War II with the destruction of the settlement projects. While the effort was reactivated after the war, NLSA was abolished in 1950, after it had resettled 8,300 families at a cost of P11million.

Upon the liberation and the return to normalcy of the country, the government resumed its program of land resettlement with the passage of Commonwealth Act No. 694 on October 15, 1945, with the end in view of introducing mechanized farming in the Philippines. This Act created the Agricultural Machinery and Equipment Corporation (AMEC), which was mandated to supply farmers with agricultural machinery and implements at cost and on installment basis. This corporation was later absorbed by the National Development Company as its Machinery and Equipment Department.

On March 24, 1949, the Rice and Corn Production Administration (RCPA) was organized to promote and stimulate the production of Philippine staple crops. To implement its program, the RCPA was granted three land reservations, namely, Buluan in Cotabato, Maramag-Wao in Bukidnon and Lanao, and Panacan, Aborlan, Palawan. Colombio was part of the Buluan reservation.

The NLSA, MED (AMEC) and the RCPA, agencies with allied functions, were merged during the administration of President Quirino with the issuance of Executive Order No. 355 creating the Land Settlement and Development Corporation. (LASEDECO).

Republic Act No. 1160 was signed by President Ramon Magsaysay which created the National Resettlement and Rehabilitation Administration (NARRA) in place of LASEDECO. NARRA took control over the land reservation. The agency existed from 1954 to 1963. In this nine year period, it has resettled about 20,500 settler-families at a total cost of P44.9 million.

On August 8, 1963, the Agricultural Land Reform Code was signed into law by President Diosdado Macapagal. By virtue of this Code, the NARRA was abolished and a new instrumentality - the Land Authority - was created to implement the land reform. Under the Land Authority, about 2,400 settlers were resettled in a period of about 8 years, 1963 to 1971.

When the late Ramon Magsaysay was the Secretary of National Defense, he initiated the establishment of the Economic Development Corps Farms (EDCOR Farms). EDCOR was conceived by the government to combat the HUKBALAHAP movement. The program was successful in attracting the dissidents to lay down their arms and surrender to the government. The program concept was similar to the country's resettlement program except that the EDCOR Farms were under the administration and supervision of the Armed Forces of the Philippines.

On June 30, 1967, four EDCOR Farms, Peredo, Catanauan, Gallego and Arevalo, were turned over to the defunct Land Authority and on September 25, 1972, Barira and Genio EDCOR Farms were likewise turned over to the Department of Agrarian Reform. Genio Farm is now Alamada, while Arevalo Farm is the Sapad Resettlement Project. Buldon was known as the Gallego Farm.

On September 21, 1971, Republic Act No. 6389 was approved by President Ferdinand Marcos. This Act abolished the Land Authority and created the Department of Agrarian Reform (DAR). The Bureau of Resettlement was created within DAR and was directly charged of implementing the program of resettlement.

Table 1 summarizes the relevant laws which summarizes the historical account of the Philippine resettlement program.

Table 1

Laws and Legal Issuances Related to the Resettlement Program

| DATE | LAW | FEATURES/EVENTS |
|--------------------------------|-------------------------------|---|
| June 3, 1939 | Commonwealth Act No. 44 | Created the NLSA which was mandated to facilitate the acquisition, settlement and cultivation of the country's virgin lands |
| Oct 15, 1945 | Commonwealth Act No. 694 | Created the Agricultural Machinery and Equipment Corp (AMEC) |
| Mar 24, 1949 | | RCPA (Rice and Corn Production Administration) was created |
| Pres. Quirino's Administration | Executive Order No. 355 | Created the Land Settlement and Devt Corp (LASEDECO); merged the NLSA, MED (AMEC) & RCPA |
| Pres. Magsay-say's Adm | RA No. 1160 | Created the NARRA in place of LASEDECO (existed from 1954-1963) |
| August 8, 1963 | Agricultural Land Reform Code | Abolished the NARRA and created the Land Authority to implement the land reform |
| June 30, 1967 | | Four EDCOR Farms (Peredo, Catan-auan, Gallego and Arevalo Farms) were turned over to the Land Authority |
| Sept 21, 1971 | RA No. 6389 | Abolished the Land Authority and created the Department of Agrarian Reform (Bureau of Resettlement) |
| Sept 25, 1972 | | Barira and Genio EDCOR Farms were turned over to DAR |

Source: Castaneda, R, Land Resettlement Status and Problems

PRESENT STATUS OF THE RESETTLEMENT PROGRAM

The Bureau of Land Resettlement of the Department of Agrarian Reform administers a total of 24 settlement projects with 24,083 settler-families as beneficiaries. Seven of these settlement projects are in Luzon, including Palawan; four are in Visayas, including Masbate; and 13 are in Mindanao, including Sulu.

About 210,000 hectares of settlement reservations have been developed by DAR. "Developed areas" mean that DAR has constructed and installed basic infrastructures like roads and bridges, irrigation projects, warehouse and the like. Likewise, civic and political institutions have also been established and municipalities proclaimed.

Each of the settler-family is allocated a farm lot with sizes ranging from five to eight hectares but more commonly six hectares per settler. Home lots were also provided.

Problems of the Resettlement Programs. Like other government programs, the resettlement program is beset by a host of problems. First, financial support is virtually inadequate. Second, there is difficulty in acquiring reservations of the public domain for resettlement purposes. Third, the program has to contend with the assistance, cooperation and coordination that other agencies can render for the program. Lastly, issuance of patents is very slow.

THE RESETTLEMENT AREAS IN REGION XII

Central Mindanao has nine resettlement projects which are equally distributed in the three provinces. Cotabato Province has the biggest resettlement area. The specific location and other particulars of these settlements are shown in Table 2.

Table 2
Resettlement Projects, Region 12

| Name of Settlement | Proclamation Number | Date Proclaimed | Proclaimed Area (Has) | Municipal Coverage | Number of Original Settlers | Approved Survey Area |
|------------------------|---------------------|-----------------|-----------------------|---|-----------------------------|----------------------|
| <u>Lanao del Norte</u> | | | <u>65,114</u> | | | |
| Proc. Number 1 | 659 | 3-22-60 | 15,973 | Tangkal/Maligo/ Magsaysay/ Munai/Pantar | 1,142 | 19,223 |
| Proc. Number 2 | 395 | 3-10-53 | 3,057 | Sapad | 121 | 4,013 |
| Proc. Number 3 | 1495 | 11-11-75 | 23,901 | Karomatan/ Nunungan | 329 | 12,422 |
| <u>North Cotabato</u> | | | <u>128,398</u> | | | |
| No. 1, Phase 1 | 317 | 7-17-56 | 49,603 | Banisian | 1,856 | |
| No. 1, Phase 2 | 317 | 7-17-56 | 50,415 | Salama | | |
| Number 2 | 376 | 3-10-53 | 28,380 | Alamada | 1,991 | |
| <u>Sultan Kudarat</u> | | | <u>83,029</u> | | | |
| No. 1, Phase 1 | 189 | 6-29-50 | 32,023 | Columbio | | |
| No. 1, Phase 2 | 189 | 6-29-50 | 21,469 | Banayal- Tulunan | 903 | |
| Number 2 | 550 | 4-19-69 | 29,537 | Bagumbayan | 234 | |

Source: DAR XII, PAROs

CHAPTER III

SUSTAINABLE DEVELOPMENT FRAMEWORK

The framework used in analyzing the sustainability of selected DAR Resettlement Projects largely take-off from the preliminary, as well as the final work undertaken for the formulation of the Philippine Agenda 21.

Criteria for Sustainability

The framework for sustainable development is focused in the three dimensions of development : economic development, social development and environmental management. These dimensions are solidified by their corresponding pillars of sustainability which are: equity drive growth, social equity, and maintenance of ecological integrity.

These pillars can be operationalized simultaneously at the national policy level and the ground level, the latter exemplified by the programs and the projects within a specific ecosystem.

Patterned after the PA 21, seven tests for sustainability are adopted in the study. These tests or criteria are applicable to the resettlement program, the nature of the intervention being characterized as: area-based, community-based and resource-based development program. Failing in any one of these tests would render the program unsustainable.

The criteria for sustainability are categorized as follows : economic viability, ecological viability, socio-cultural viability, technological viability, political and institutional viability.

Economic viability is operationalized by maintaining a sustainable population and maintaining productivity and profitability of natural resources.

Ecological viability requires respect of the nature of ecosystem. It means, in operational terms, adopting management tools in policy and decision-making.

Socio-cultural viability respects beliefs and values. It means promoting resource access and upholding property rights; promoting environmental awareness, and inculcating environmental ethics.

Technological viability means managing residuals and adopting environment-friendly technologies.

Political viability is anchored on people participation. It means empowering people and maintaining peace and order.

Institutional viability means improving institutional capacity to manage sustainable development.

CHAPTER IV
FINDINGS OF THE STUDY

A. THE ALAMADA RESETTLEMENT

The legal basis of the Alamada Resettlement Project is Proclamation No. 376 signed by the then President Elpidio Quirino on March 10, 1953 which was titled: *Reserving for the Use of the Economic Development Corps (EDCOR) a Certain Parcel of then Public Domain Situated in the Municipality of Parang, Province of Cotabato, Island of Mindanao*. The EDCOR was then under the administration of the Armed Forces of the Philippines. It was officially opened for development on January 5, 1954. While the initiative was undertaken during the administration of President Quirino, it was more popularly associated with President Ramon Magsaysay, the latter then being the Secretary of National Defense. The Alamada Resettlement Project was popularly known as **Genio EDCOR Farm**.

Practically, the entire municipality of Alamada is covered by the resettlement reservation. The total area of Alamada is 78,750 hectares but the officially proclaimed area is only 34, 380 hectares.

General Information

Alamada was created into a municipality by Republic Act No. 5645 on June 21, 1961. It is 103 kilometers away from Kidapawan, the provincial capital and 74 kilometers away from the regional center. The municipality is bounded by the province of Lanao del Sur on the north, the municipality of Banisilan on the east, Libungan municipality on the south and Pigcawayan and Buldon municipalities on the west.

Alamada has a total area of 78,750 hectares consisting of 17 barangays. It is the largest municipality in the province of Cotabato. Its topography is generally mountainous. It is drained by Libungan, Macabasa, Malitubog, and Kitacubong rivers. Springs and creeks also abound in the area. Its rainfall used to be evenly distributed throughout the year but pronounced dry months are now observable.

A sizable portion, or about 68 percent of its land resource are forest lands while the remaining 32 percent were released as alienable and disposable.

Corn and upland rice are the principal products. Other products are coconut, banana and coffee.

THE SETTLER-RESPONDENTS

A sample survey conducted in Alamada, Cotabato generated 400 respondents which came from two barangays; Pigcawaran and Kitacubong.

General Demographic Characteristics

The ages of respondents range from 18 to 70 years old with a mean age of 46 years. Majority, or 82.25 percent are married with the mean age 48.18 (Table 3).

Table 3
Mean Age of Respondents

| Marital Status | Number | Percent | Mean Age |
|----------------|--------|---------|----------|
| Single | 49 | 12.25% | 32.24 |
| Married | 329 | 82.25 | 48.18 |
| Widowed | 20 | 5.00 | 58.00 |
| Others/NR | 2 | 0.50 | - |
| Total/Mean | 400 | 100.00% | 46.67 |

The respondents are of varied tribal affiliation or ethnic origin; the majority are Ilongos which constitute 38.5 percent of respondents. The next largest group are Iranons representing

31.2 percent of the respondents. Most Cebuanos are Catholics while Islam is practiced among three tribal groups - Maguindanao, Maranao and Iranon (Table 4).

Table 4
Religion and Ethnic Origin of Respondents
(Number)

| Ethnic Origin | RELIGION | | | | Total | Percent |
|---------------|----------------|------------|------------|-----------|------------|--------------|
| | Roman Catholic | Protestant | Islam | Others | | |
| Ilongo | 130 | 13 | | 11 | 154 | 38.5 |
| Cebuano | 49 | 1 | | 1 | 51 | 12.8 |
| Ilocano | 40 | | 1 | 8 | 49 | 12.3 |
| Maguindanao | | | 11 | | 11 | 2.8 |
| Maranao | | | 2 | | 2 | 0.5 |
| Iranon | | | 125 | | 125 | 31.3 |
| Tagalog | 2 | | | | 2 | 0.5 |
| Boholano | 4 | | | | 4 | 1.0 |
| Others | 1 | | | | 1 | .3 |
| TOTAL | 226 | 14 | 140 | 20 | 400 | 100.0 |
| Percent | 56.50 | 3.5 | 35.00 | 5.00 | 100.00 | - |

Majority of respondents have elementary undergraduates. A few, about 7.5 percent obtained college degrees. Thirteen respondents had no formal schooling at all.

Table 5
Highest Educational Attainment of Respondents

| Level of Schooling | Number | Percent |
|---------------------|--------|---------|
| None | 13 | 3.3 |
| Elem undergraduate | 139 | 34.8 |
| Elem graduate | 34 | 8.5 |
| High School Undergr | 83 | 20.8 |
| HS Graduate | 43 | 10.8 |
| College | 33 | 8.3 |
| College Graduate | 30 | 7.5 |
| Others | 25 | 6.0 |

The average household size is 4.88 with the highest frequency falling under the 2-4 household size category (Table 6).

Table 6
Household Size

| Household Size Category | Number | Percent |
|--------------------------------|---------------|----------------|
| 0-1 | 23 | 5.8 |
| 2-4 | 147 | 36.8 |
| 5-6 | 81 | 20.2 |
| over 6 | 84 | 21.0 |
| Non response | 65 | 16.2 |
| TOTAL/MEAN | 400 | 100.0 |

Settlement Background

Majority of respondents inherited their farms from parents who were original settlers. There were 86 respondents who were original settlers and came to Alamada through the auspices of the government under its resettlement program for HUKBALAHAP (Table 7). These settlers came in the 1960s via the Philippine Navy boat. The original farm area awarded to original settlers was eight hectares on the average.

Table 7
Manner of Obtaining Farm
(Number)

| Manner of Obtaining Farm | Number | Percent |
|---------------------------------|---------------|----------------|
| Original Settler | 86 | 21.5 |
| Inherited from Settler Parents | 143 | 35.8 |
| Bought | 80 | 20.0 |
| Others | 91 | 22.3 |

Majority of the respondents came from the provinces of Pangasinan, Iloilo and Negros Occidental. Most of them (55 %) claimed that their life is much better in Alamada than their places of origin (Table 8) and as such they intent to permanently stay in the area. Evidence of land ownership is valued by almost all respondents. About 80 percent already possess titles of their farms. Most titles were acquired only in 1992. The others who do not have titles reported that their areas need to be resurveyed.

Farm Information

Farming is declared as the primary source of income by majority of the respondents. Corn is primarily the main crop cultivated either singly crop or in combination with rice, coconut or banana. (Table 8). The average corn yield reported by respondents ranges from one to five metric tons per hectare with 2.48 m.t. as mean yield for all the respondents with corn crops.

Table 8
Major Crops Cultivated

| Crop | Number | Percent |
|---------|--------|---------|
| | 384 | 96.0 |
| Corn | 71 | 17.8 |
| Rice | 89 | 22.3 |
| Banana | 67 | 16.8 |
| Coconut | 17 | 4.3 |
| Mango | 62 | 15.5 |
| Others | | |

Most respondents operate single farm parcels with an average farm size is of 5.53 hectares. Most farms are within the range of 2-5 hectares (Table 10). Most of the farmers are residing in the same barangay where their farm is located.

Table 9
Average Farm Size

| Farm Size Category | Number | Percent |
|--------------------|--------|---------|
| < 2 has. | 111 | 27.8 |
| 2 - 5 | 138 | 34.5 |
| over 5 has | 134 | 33.5 |
| No answer | 17 | 4.2 |

Respondents were asked to compare their levels of production during the reference period (January-June 1996) with the level of that of the previous cropping seasons. Majority of respondents reported declines in their crop production. (Table 11). The reason commonly given is prolonged dry season and receding water levels in rivers and streams.

Table 10
Comparison of Production Volume- Current Crop Year
vs. Previous Cropping Seasons
(Number Reporting)

| CROP | Increase | Decrease | Same Level |
|---------|----------|----------|------------|
| Corn | 20 | 353 | 2 |
| Rice | 6 | 48 | 2 |
| Banana | 7 | 26 | 4 |
| Coconut | 6 | 32 | 1 |
| Mango | 2 | 11 | 11 |

About 50 percent of respondents rely on credit to finance their farm operations. Traders are the usual source of capital (Table 11). Most reported that they find it difficult to repay their loans because of low production and high cost of inputs.

Table 11

Source of Financing Farm Operations

| Source | Number | Percent |
|--------------|--------|---------|
| Self-Finance | 199 | 49.8 |
| Loan | 201 | 50.2 |
| Relative | 13 | |
| Neighbor | 16 | |
| Trader | 168 | 82.4 |
| Bank | 1 | |
| Others | | |

Bringing the produce to the market center is a common practice among the respondents. The farmers want to assured that the price they are getting are the prices prevailing in the market. However, maintaining a "suki" is still practiced as a source of security in cases of crop failure.

Sustainable Farm Practices

Monocropping is the prevalent cropping system adopted among survey respondent, usually involving corn cultivation. Crop rotation is practiced in only 3.5 percent of respondents (Table 12).

Table 12

Cropping System Adopted

| Cropping System | Number | Percent |
|-----------------|--------|---------|
| Intercropping | 86 | 21.5 |
| Monocropping | 293 | 73.3 |
| Crop Rotation | 14 | 3.5 |
| Others | 1 | .3 |
| No answer | 6 | 1.5 |
| Total | 400 | 100.0 |

Sustainable farm technologies are not popular among respondents. The use of sloping agricultural land technology (SALT) is used in only 17.8 percent while Integrated Pest Management (IPM) is practiced in only 9.7 percent of respondent. Most respondents reported that they are not aware of these technologies. Crop rotation is practiced in only 3.5 percent of respondents (Table 13).

Table 13
Respondents Adopting Sustainable Practices

| Farm Technology | Number Adopting | Percent |
|---------------------------|-----------------|---------|
| SALT/HALT | 71 | 17.8 |
| Farm Waste Fertilizer | 187 | 46.8 |
| Comm'l Organic Fertilizer | 165 | 41.2 |
| IPM | 39 | 9.7 |
| Total | 400 | 100.0 |

Conversely, the use of chemical based inputs is the more common practice. About 91 percent of respondents use chemical fertilizers. A minor segment use insecticides and herbicides (Table 14).

Table 14
Prevalence of Use of Chemical-Based Inputs

| Input | Number Reporting | Percent |
|---------------------|------------------|---------|
| Chemical Fertilizer | 364 | 91.0 |
| Insecticide | 64 | 16.0 |
| Herbicide | 28 | 7.0 |
| Total | 400 | 100.0 |

B. THE SAPAD RESETTLEMENT

The Sapad Resettlement was the first EDCOR Farm. It was then known as the Arevalo EDCOR Farm. It was once part of then Barangay Buriasan of the municipality of Kapatagan. It was created through Presidential Proclamation 375 issued by President Elpidio Quirino on March 10, 1953. The proclamation covered 3,057 hectares and was one of the virgin public lands titled and surveyed by the military to become a resettlement site based on the recommendation of the District Land Officer of Kapatagan.

An inspection was conducted on October 1952 to find out existing occupants. There were three indigenous settlers who were Maranaos. A total of 118 move-in settlers from Luzon were transported via LST Navy Boat. This brought the total beneficiaries of the resettlement area to 121. The existing occupants were considered special settlers. The LST which transported the settlers also bought in farm equipment and household and farm supplies. The supplies were provided to settlers on loan basis. The settlers were transported in three batches.

Unlike Alamada, where settler beneficiaries got their land titles only in 1992, the settler - beneficiaries of Sapad got their titles very much earlier. In 1960's retired Sgt Felipe Tabafunda who is now residing in Sapad, was an administrative staff of the Arevalo EDCOR Farm. When EDCOR was pulled out from Sapad, he was detailed at the Land Authority where he facilitated the issuance of titles of the Sapad settlers.

General Information

Sapad was created into a municipality by virtue of Republic Act No. 5745 on June 1969. The municipality is located in the southern part of Lanao del Norte. It is bounded by the mountains of Nunungan in the east, the municipality of Salvador on the North, the municipality of Sultan Naga Dimaporo on the south and the municipality of Kapatagan on the west.

Sapad has a total land area of 3,250 hectares, consisting of 17 barangays. It is one of the smallest municipalities in the province of Lanao del Norte. The terrain of Sapad is generally flat. Its major crops are paddy rice, coconut and corn.

Profile of Settler-Respondents/Key Informants

Of the 118 move-in settlers, only one is still holding on the farmland awarded to him as EDCOR settler in the person of Mr. Sofronio Mueden who served as one of the key informants in the study. The other key informant was Sgt. Felipe Tabafunda who was connected with EDCOR.

The study team was able to interview five former settlers who have given up their farms and are now residing in the vicinity. These respondents were either original settlers or siblings of original settlers.

Age. Except for Mr. Mueden who is already 95 years old, the ages of the other respondents ranged from 48-54 years old.

Educational Attainment. The highest level of schooling varied. Two reached college, two were high school undergraduates and two have reached elementary grades.

Tribe and Religion. The respondents were either Ilongo or Ilocano. Correspondingly, their places of origin are Iloilo for the Ilongos and the provinces of Nueva Ecija, and Zambales for the Ilocanos. Their families were suspected members of the HUKBALAHAP movement. The respondents are all Roman Catholics.

Information on Abandoned Farms

The respondents got specific lot allocation by drawing of lots. The area of farmlots ranged from 5 to 7 hectares, with 6 hectares as the common farm size. The entire area awarded to them has to be gradually cleared with trees until ready for cultivation. Mostly narra and lawaan trees were either cut or burned.

The respondents reported that a wide variety of wildlife can be found while clearing the area. Wild animals included wild pigs, monkeys, eagle, fox and lizards. Exotic plants found were orchids, begonia, giant ferns and various types of vines. The area was cleared with its natural vegetation to give way to food crops like bananas, fruit trees, rice and corn.

Rice was the crop cultivated by three of the respondents. In the 1950's and early 1960s the respondents reported two cropping seasons in a year but this was reduced to only once a year in the 1970's. There was no need then to apply fertilizer and chemicals. Labor was the only major input used. The level of production largely depends on the extent of clearing undertaken in the farmplot.

After the EDCOR management was pulled out from Sapad in 1957, the settlers were confronted with harassed and threatened by the indigenous cultural community in the area. Their farms were sold to Maranaos from 1969 up to 1977. Two of them were able to buy farms in the nearby Christian community. Others are engaged in other economic activities mostly trading. Most settlers went back to their places of origin while others transferred to the neighboring provinces.

Farming Practices of the Lone Original Settler

Mr. Sofronio Mueden is the only original settler who still has title of his farm. However, his son-in-law is now managing the farm because of old age. The area is now being titled in favor of his daughter, the only sibling left in Sapad.

Mr. Mueden used to reside in his farm. With the rampant harassment and cattle rustling, he was forced to transfer his residence to the town proper.

Five of the seven hectares owned by Mr. Mueden are planted to coconut as main crop. The remaining two hectares are planted to annual crops such as mango, corn and ginger which are rotated in a crop year.

During the last two cropping season, the yield of corn was 35 cavans. This was very much lower than the usual 60 cavans that can be harvested from the area in the previous years.

The respondent identified a host of factors which caused the decline in their farm productivity: First, is the high cost of farm inputs, kaingin which has reduced the water level. The use of organic fertilizer is not popular since it is not readily available and is inconvenient to use. Second, are environmental related factors which include the reduction of water level in Lalanuan river due to kaingin, long dry spell, and soil erosion. Lastly, poor farm maintenance because of the volatile peace and order situation.

The following measures were adopted to sustain or regain the productivity of the land: the panubig and pangulilang method of cultivation, Integrated Pest Management through trichogramma cards introduced by the Department of Agriculture, and planting of bamboos along the river banks of Lalanuan river to prevent further soil erosion.

C. THE COLUMBIO RESERVATION

Columbio is an entirely different case from Alamada and Sapad. It is non-EDCOR farm. there was no organized movement of settlers from another area. Most of the residents and farmers in the area come from nearby areas. Others came on invitation by relatives and friends. Thus, it cannot be called a resettlement area based on the definition adopted by the study.

Columbio is originally part of Buluan, and was among the three land reservations set aside for food crop production, to be under the supervision of the Rice and Corn Production Administration (RCPA). The other two were Maramag- Wao in Bukidnon and Panacan, Aborlan in Palawan. It was designated as a special settlement under Presidential Proclamation No. 189 issued by President Elpidio Quirino on June 29, 1950 which was titled: Reserving for Rice, Corn and other Food Production Purposes Certain Parcels of the Public Domain Situated in the Municipalities of Dulawan and Buluan, Province of Cotabato, Island of Mindanao.

General Information

The municipality was created by virtue of Executive Order No 361 issued on August 6, 1961 from the vast territory of Buluan. The municipality has 16 barangays. It is located 48 kilometers east of the Provincial Capitol of Isulan. Columbio is located in the westernmost part of Sultan Kudarat and the southernmost part of Region XII. It is bounded Tulunan on the north, Davao del Sur on the east , Lake Buluan on the west and Quezon Mountain Range on the South.

General Profile of Respondents/Key Informants

Ten respondents from the Poblacion were interviewed for the case study. Most respondents came in the early and mid 1950's and came either on invitation of relatives or chanced upon advertisements on the opening of the area for settlement specifically for rice and corn cultivation.

Age. The ages of key informants ranged from 45-82 years old with a mean age of 63.3 years. Three of the respondents are already in their eighties and thus can be considered pioneer move-in settlers.

Religion. The respondents were either Roman Catholic (50%) or Protestant (40%). One claimed to have been baptized Roman Catholic but has no religion right now.

Educational Attainment. The highest level of schooling attained among respondents is high school level. Majority, or six of them, reached elementary grades while two had no formal schooling at all.

Tribe and Places of Origin. All of the informants are Ilocanos and came from either of these provinces: Pangasinan, Nueva Ecija, and Tarlac.

Farm Information

The respondents source of income depends on farming in the following forms: as owner-cultivator, as shareholder, and as farm worker. Seven of the respondents possess titles of the land they acquired when they first settled in the area. Their farm sizes ranged from 3-12 hectares. Most crops grown are palay, coconut, mungo, corn and peanut. Palay farms are irrigated. The other three respondents had sold their farms for the following reasons: death in the family, natural calamity, and unstable peace and order. These respondents used to plant the same crops currently cultivated by the owner-cultivators. Their farms were either plain or rolling.

Farm Management Practices

Cropping System. The cropping system adopted by respondent are either monocropping or intercropping. Intercropping is used for those cultivating a combination of crops which included: palay, mungo, corn, peanut and vegetables.

Most respondents reported decline in palay production in the recent cropping season compared to the previous years. The reasons given were pest infestation particularly rice borers and black bug and inadequate water supply.

Adoption of Sustainable Farm Practices. Most respondents are not familiar of the sloping agricultural land technology (SALT) since the technology is not applicable in their farms. Integrated Pest Management (IPM) is likewise not popularly used. Most of them had not heard of the technology, The technology is reportedly not effective with large number of pests.

The manner of disposing farm wastes such as rice hull and corn cobs is diverse. Some leave them to rot under coconut trees while others just burn them. The commercial use of organic fertilizer is also uncommon since there are no dealers or suppliers of organic fertilizer in the area.

Environmental/Ecological Changes in the Area. The respondents avail of the services of communal irrigation systems for their water requirements. However, most of them noted a decline in the source of irrigation water. As reported by key informants, their area experienced climate disturbances in the recent years. Flooding occurred in 1985 while drought was experienced in 1972, 1974 and 1983. Most of them agreed that these climate disturbances are directly related to deforestation.

The respondents observed that the settlement was full of trees when they came in the 1950's and was cleared by settlers for palay production. They also noted that the diverse flora and fauna they found when they arrived are no longer there. Monkeys, deer, wild pigs and python used to abound in the area.

LAND- USE ANALYSIS

The land-use analysis covers the entire municipality where the three resettlement sites are located. The existing land use was evaluated against the areas' physical attributes such as soil characteristics, slope, elevation, and erosion incidence.

Land Classification

The study areas largely classified as forestlands. Areas with slopes above 18% are already considered forest lands. Alamada is 68 percent forestland, and Sapad and Columbio both 81 percent forestland (Table 15). This excludes the areas which are forestland by technical description but are already released as alienable and disposable as an offshoot of the government program of land distribution.

Table 15
Land Classification

| CATEGORY | Alamada | | Sapad | | Columbio | |
|------------------------|---------|---------|---------|---------|----------|---------|
| | Hectare | Percent | Hectare | Percent | Hectare | Percent |
| Alienable & Disposable | 24,890 | 31.61 | 596 | 18.34 | 14,052 | 18.69 |
| Forestlands | 53,860 | 68.39 | 2,654 | 81.66 | 61,128 | 81.31 |
| Total | 78,750 | 100.00 | 3,250 | 100.00 | 75,180 | 100.00 |

Source: DENR

Present Land Use

In the present land use, forest vegetation is generally sparse. In Alamada, only 27,556 hectares are vegetated with forests. This represents only 51 percent of total area classified as forestlands. Grassland and shrubland vegetation comprise a sizeable portion in the percent land use of the two municipalities: about 45% in Alamada and approximately 57 percent in Columbio. (Table 16).

Table 16
Present Land Use

| CATEGORY | Alamada | | Sapad | | Colombio | |
|---------------------------|---------|--------|---------|--------|----------|--------|
| | Hectare | % | Hectare | % | Hectare | % |
| Agricultural Lands | 15,190 | 19.28 | 1,624 | 49.97 | 16,669 | 22.17 |
| 1.1 Paddy rice, irrigated | 818 | | 493 | | 7,742 | |
| 1.2 Paddy non-irrigated | 335 | | - | | 8,927 | |
| 1.3 Corn | 7,444 | | - | | | |
| 1.4 Coconut | 2,055 | | 1,131 | | | |
| 1.5 Pasture land | 4,538 | | | | | |
| Grassland/Shrubland | 35,884 | 45.57 | 482 | 14.83 | 41,067 | 54.68 |
| Forest Land | 27,556 | 34.99 | 1,104 | 33.97 | 16,844 | 22.40 |
| Miscellaneous | 120 | 0.15 | 40 | 1.23 | 600 | 0.80 |
| Total | 78,750 | 100.00 | 3,250 | 100.00 | 75,180 | 100.00 |

Source: BSWM

Elevation

Except for Sapad, the areas of study are generally located on high elevation, that is, from 500 to 2,000 meters above sea level. (Table 17). Alamada and Columbio have high slopes. About 68 percent of Columbio are very steep (Table 18.). Thus, it is more likely that these areas are prone to erosion especially if they areas are cleared of trees for cultivation purposes, as shown in Table 19.

Table 17
Elevation

| Category | Description | Alamada, Cot. | | Sapad, LDN | | Columbio, S.K. | |
|----------|-------------|---------------|-----|------------|--------|----------------|--------|
| | | Ha. | (%) | Ha. | (%) | Ha. | (%) |
| Total | | 78,750 | | 3,250 | 100.00 | 75,180 | 100.00 |

Unit: meters above sea level

Source: BSWM

Table 18
Slope Distribution

| Category | Description | Alamada | | Sapad | | Cumbio | |
|----------|------------------------------|---------|--------|-------|--------|--------|--------|
| | | Ha. | (%) | Ha. | (%) | Ha. | (%) |
| 0-3 | Level to nearly level | 5,735 | 7.28 | 1,495 | 46.00 | 7,095 | 9.44 |
| 3-8 | Gently sloping to undulating | 7,863 | 9.98 | 235 | 7.23 | 4,541 | 6.04 |
| 8-18 | Undulating to rolling | 10,464 | 13.29 | 20 | 0.61 | 1,890 | 2.51 |
| 18-30 | Rolling to moderately steep | 21,348 | 27.11 | 631 | 19.42 | 5,831 | 7.76 |
| 30-50 | Steep | 16,619 | 21.11 | 452 | 13.91 | 5,945 | 7.91 |
| >50 | Very steep | 16,721 | 21.23 | 417 | 12.83 | 49,878 | 66.34 |
| Total | | 78,750 | 100.00 | 3,250 | 100.00 | 75,180 | 100.00 |

Source: BSWM

Table 19
Erosion Distribution

| Category | Alamada | | Sapad | | Cumbio | |
|----------------------|---------|--------|-------|--------|--------|--------|
| | Ha. | % | Ha. | % | Ha. | % |
| No apparent erosion | 21,801 | 27.68 | 1,730 | 53.33 | 12,475 | 16.59 |
| Slight erosion | 28,663 | 36.40 | 1,243 | 38.25 | 23,184 | 30.84 |
| Moderate erosion | 17,095 | 21.71 | 246 | 7.57 | 7,712 | 10.26 |
| Severe erosion | 11,118 | 14.12 | 31 | 0.95 | 31,809 | 42.31 |
| Unclassified erosion | 73 | 0.09 | -- | -- | -- | -- |
| Total | 78,750 | 100.00 | 3,250 | 100.00 | 75,180 | 100.00 |

Table 20
Soil Type/Characteristics

| Category/ Description | Alamada | | Sapad | | Cumbio | |
|--------------------------|---------|---------|---------|---------|---------|---------|
| | Hectare | Percent | Hectare | Percent | Hectare | Percent |
| Tupi Fine Sandy Loam | - | - | - | - | 6,840 | 9.10 |
| Loam Silty Clay Loam | - | - | 1,403 | 43.17 | 0 | 0 |
| Undifferentiated | 78,750 | 100.0 | 1,847 | 58.82 | 68,340 | 90.90 |

Source: Soil & Land Qualities, BSWM

Land capability

Land capability for agricultural purposes is assessed on the basis of the above-cited physical attributes including the soil characteristics. Very good lands have level topography, well drained, fertile and could be cultivated safely. Alamada has 1,252 hectares or 1.59 percent of its land area which has this characteristics.

On the other hand, 46 percent of the land area of Sapad are very good lands for agriculture. Good lands can also be cultivated safely but should be accompanied with erosion control measures and good farm management practices to sustain productivity. These are susceptible to erosion.

Table 21
Land Capability

| CATEGORY | Alamada | | Sapad | | Cumbio | |
|---|---------|---------|---------|---------|---------|---------|
| | Hectare | Percent | Hectare | Percent | Hectare | Percent |
| Very Good Land | 1,252 | 1.59 | 1,495 | 46.00 | 7,095 | 9.44 |
| Good Land | 9,446 | 11.99 | 235 | 7.23 | 4,541 | 6.04 |
| Moderately Good A | 14,996 | 19.04 | 20 | 0.61 | 1,890 | 2.51 |
| Moderately Good B | 21,174 | 26.89 | 631 | 19.42 | 5,831 | 7.76 |
| Very Steep Land | 27,526 | 34.96 | 869 | 26.74 | 55,823 | 74.24 |
| Level to nearly level but rocky surface | 4,354 | 5.53 | | | | |
| Total | 78,950 | 100.00 | 3,250 | 100.00 | 75,180 | 100.00 |

Proposed Land Use

The land use opportunity in Table 23 shows that Alamada has the biggest area for rehabilitation, both in percentage and absolute area. The proposed land use in Table 24 recommends an expansion of agricultural areas in Sapad and Columbio but a reduction of the same in Alamada. Since Alamada is mountainous, about 80 percent of its area is recommended for forest use.

Table 22
Land Use Opportunity

| Category | Alamada, Cot. | | Sapad, LDN | | Columbio, S.K. | |
|-------------------|---------------|---------------|--------------|---------------|----------------|---------------|
| | Ha. | (%) | Ha. | (%) | Ha. | (%) |
| Agriculture Areas | 10,271 | 13.04 | 1,761 | 54.19 | 23,262 | 30.94 |
| Expansion | 4,803 | 6.10 | 617 | 18.98 | 10,747 | 14.29 |
| Rehabilitation | 38,592 | 49.01 | -- | -- | 26,676 | 35.48 |
| Preservation | 24,939 | 31.67 | 872 | 26.83 | 14,495 | 19.28 |
| Wetland | 0 | 0 | -- | -- | -- | -- |
| Miscellaneous | 145 | 0.18 | -- | -- | -- | -- |
| Totals | 78,750 | 100.00 | 3,250 | 100.00 | 75,180 | 100.00 |

Source: BSWM

Table 24
Proposed Land Use

| CATEGORY | Alamada | | Sapad | | Columbio | |
|-----------------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | Hectare | Percent | Hectare | Percent | Hectare | Percent |
| 1. Agricultural Areas | <u>13,170</u> | <u>16.72</u> | <u>1,910</u> | <u>58.78</u> | <u>28,094</u> | <u>37.38</u> |
| 1.1 Rice | 1,506 | | 544 | | 4,809 | |
| 1.2 Corn | 4,392 | | 724 | | 2,527 | |
| 1.3 Rubber | 5,868 | | 544 | | 6,711 | |
| 1.4 Coconut | 1,404 | | 98 | | 14,047 | |
| 2. Pasture Land | 2,306 | 2.93 | 909 | 27.97 | 15,797 | 21.01 |
| 3. Fishing Grounds | 76 | 0.10 | 15 | 0.46 | 360 | 0.48 |
| 4. Forestlands | <u>63,154</u> | <u>80.20</u> | <u>391</u> | <u>12.09</u> | <u>44,736</u> | <u>59.50</u> |
| 4.1 Agro-Forestry | 25,262 | | | | 28,421 | |
| 4.2 Protection | 37,892 | | 391 | | 16,315 | |
| 5. Built up Areas | 44 | 0.05 | 25 | 0.76 | 240 | 0.32 |
| Total | 78,700 | 100.00 | 3,200 | | 75,180 | 100.00 |

CHAPTER IV

SUSTAINABLE DEVELOPMENT ISSUES AND RECOMMENDATIONS

A. SUSTAINABLE DEVELOPMENT ISSUES

The land resettlement program was successful in giving land for government dissidents, particularly in Alamada. Many settler beneficiaries and their siblings are still living in Alamada and majority of respondents intend to stay for good claiming that their life is much better compared to their places of origin. However, a holistic view of the EDCOR resettlement program reveals that, sustainable development was not attained.

Sustainable development issues generated from the result of the study are categorized according to the viability indicators discussed in the analytical framework.

ECONOMIC

The resettlement projects were generally not economically viable. It has not sustained the economic gains generated from the use of the land distributed under the resettlement program.

In the pursuit of economic gains for settlers, no safeguard for the protection of the ecosystem was put in place. There was massive and wanton destruction of forests in favor of settlement and crop cultivation.

The effects of the clearing of trees are now apparent in terms of declining crop yields, receding water levels in river systems, and changes in rainfall pattern, dry spell and soil erosion.

ECOLOGICAL

Biological diversity was destroyed. The wildlife found when the area was first settled are now extinct. There was no conscious attempt to integrate environmental management measures to conserve the natural landscape and biodiversity of the area.

The present land use is not in accordance with its sustainable use. Lands which are susceptible to erosion have been cultivated to crops without appropriate land management measures.

A sizeable portion of forestlands also need rehabilitation.

SOCIO-CULTURAL

Multi-ethnicity and cultural diversity was not anticipated in project planning. In Sapad, the existence of settlers was not sustained because of "resistance" from the indigenous community. A strategy for cultural integration should have been considered.

The settlers in Sapad were forced to give up their land and sold them at a low price due to harassment.

TECHNOLOGICAL

Environment-friendly farming techniques were not introduced with the project. Until recently, sustainable development technologies like IPM, SALT/HALT and organic farming are not imbibed among respondents.

INSTITUTIONAL

A mechanism to sustain the implementation of the program was absent. After EDCOR, the settlers were left on their own. There was no formal turn-over of program management and facilities.

There were bureaucratic inefficiencies. Issuance of patents was very slow. The land titles of farm lot in Alamada were issued only in 1992. In Sapad, titles have encumbrances due to the non-payment of loans on farm equipment and household provisions supplied to them in the first year of settlement. The homelots do not have titles yet because it was forgotten in the land distribution program.

The breakdown in institutional structures was a major factor contributing to sustainability problems. The structures implementing the resettlement program has undergone a series of dissolution, merger and reorganization.

B. POLICY RECOMMENDATIONS

To avert sustainable development issues of the project in particular and to avoid committing the same errors in future government undertakings, the following recommendations are put forward in this study:

- Incorporation of environmental management measures as a mandatory component in government programs and projects. The DAR for instance could incorporate the following activities in its land distribution program: agro-forestry plantation, fruit tree plantation, education on forest protection and conservation, construction of small water impounding structures and sustainable technology demonstration.

- Areas with slopes of 18% and above should no longer be released for human settlements and crop cultivation. In those areas which already have occupants, it should be made mandatory for settlers to plant agro-forest trees and to adopt appropriate land management measures. The proposed watershed development program in Alamada is towards this direction where title holders are required to allocate 80 percent of their farm area to tree crops.
- Institutionalization of the government's convergence thrust. Many of the lapses in the implementation of the program can be attributed to lack of coordination among agencies. Some of the problems that surfaced were delayed issuance of land titles, absence of environmental management measures, and non-implementation of programmed infrastructures development, among others.
- Appropriate land use and technology. This paradigm shift should be communicated and taught to settlers/beneficiaries accordingly.
- More active and direct Local Government Unit participation. The devolution policy should be built-in in all government initiatives including the management of settlements and/or agrarian reform communities to ensure ownership.
- Integration of existing occupants in planning for settlements in particular and project planning in general. This should be a primary consideration to ensure sustainable coexistence.

124°25' 30' 35' 40' 45' 124°50'

COTABATO PROVINCE MUNICIPALITY OF ALAMADA LAND CLASSIFICATION MAP

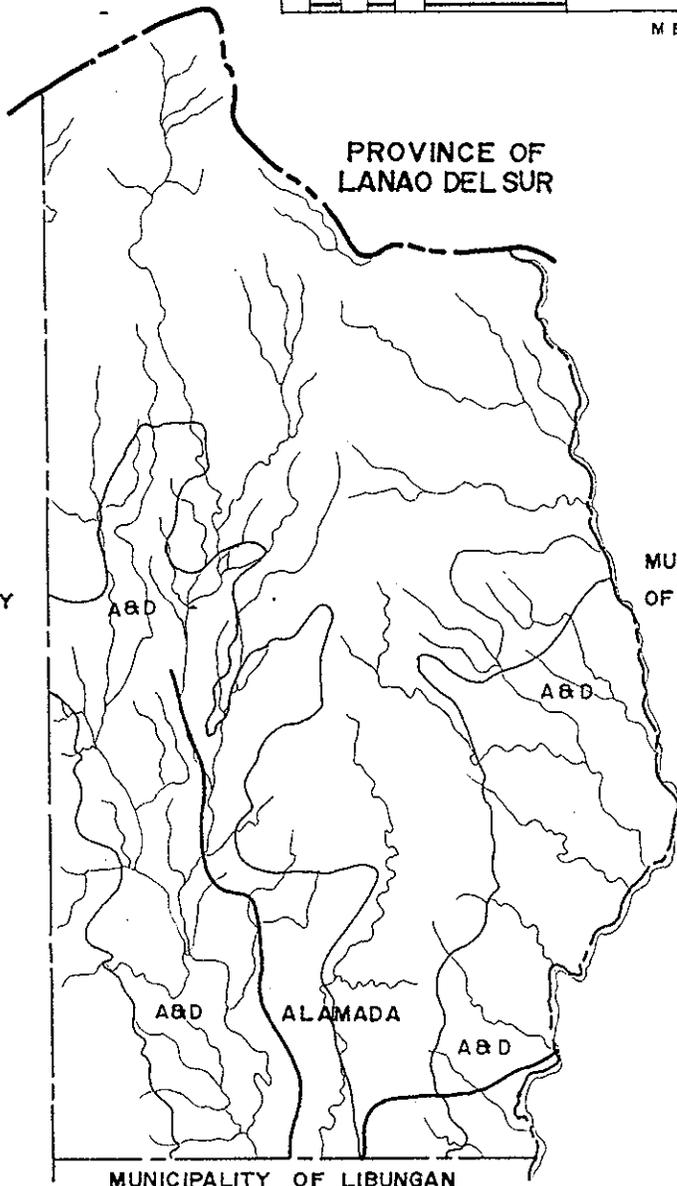
SCALE 1:250,000



CLASSIFICATION

7°40'
40'
35'
30'
25'
20'

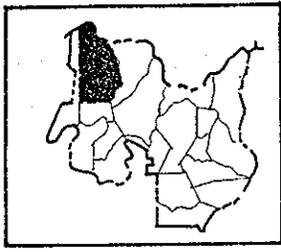
7°40'
40'
35'
30'
25'
20'



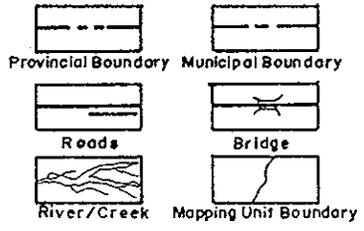
L E G E N D

| C A T E G O R Y | A R E A | |
|-------------------------------|---------|--------|
| | (Ha.) | (%) |
| A&D Alienable & Disposable | 24,980 | 100.00 |
| T O T A L | 24,980 | 100.00 |

LOCATION MAP

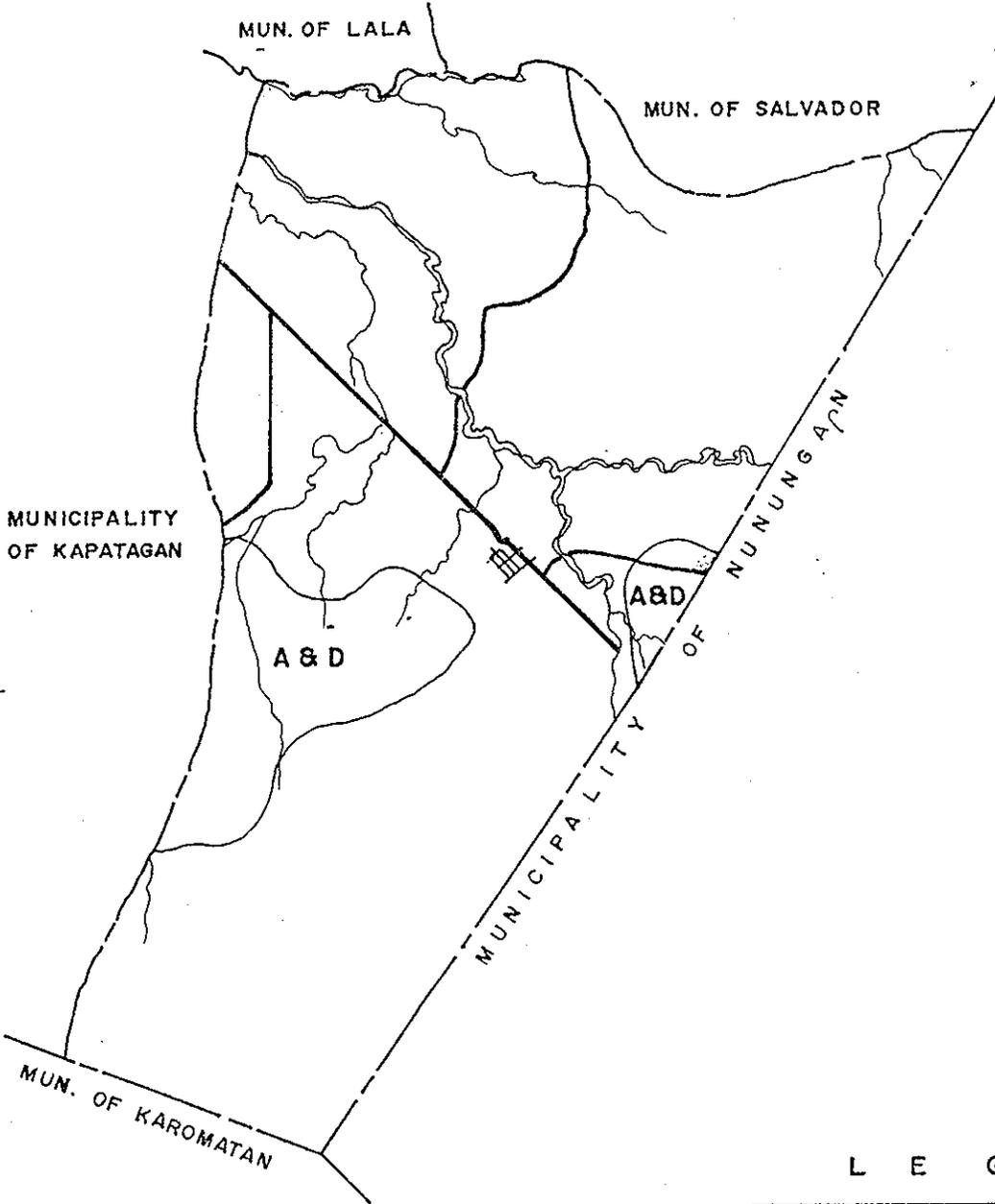
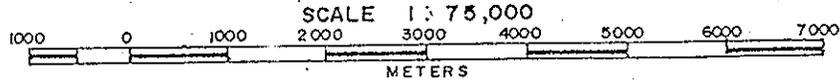


CONVENTIONAL SIGNS



124°25' 30' 35' 40' 45' 124°50'

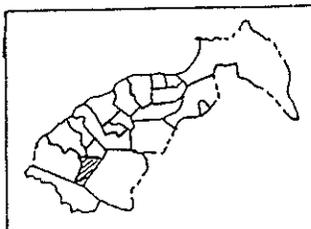
PROVINCE OF LANA O DEL NORTE MUNICIPALITY OF SAPAD LAND CLASSIFICATION MAP



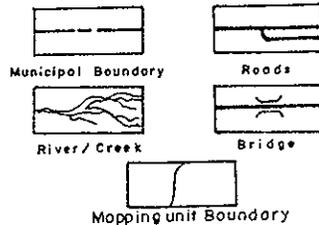
L E G E N D:

| C A T E G O R Y | A R E A | |
|------------------------------|---------|--------|
| | (Ha.) | (%) |
| A & D Alienable & Disposable | 596 | 100.00 |
| T O T A L | 596 | 100.00 |

LOCATION MAP

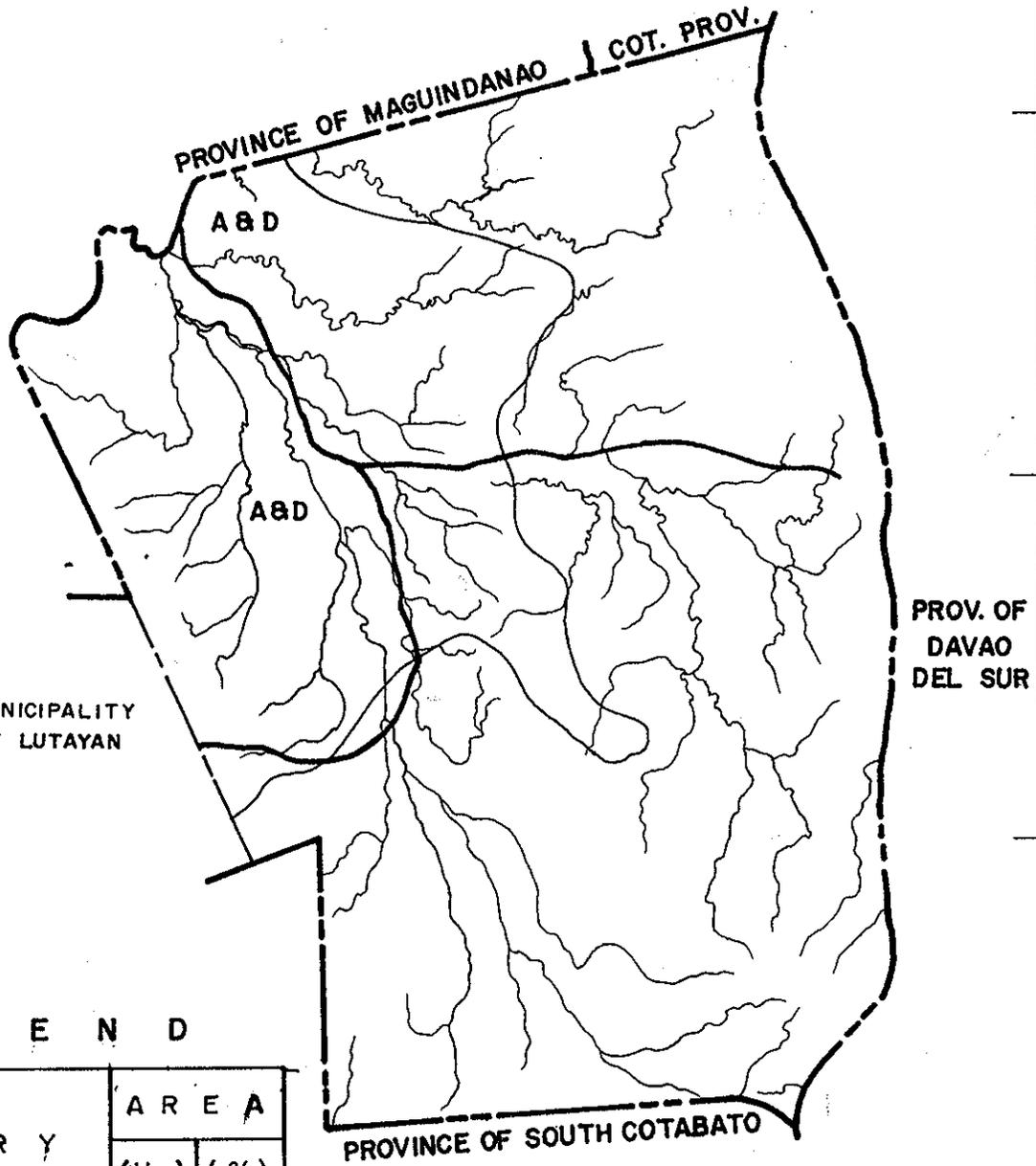


CONVENTIONAL SIGNS



PROVINCE OF SULTAN KUDARAT
 MUNICIPALITY OF COLUMBIO
 LAND CLASSIFICATION MAP

SCALE 1:175,000

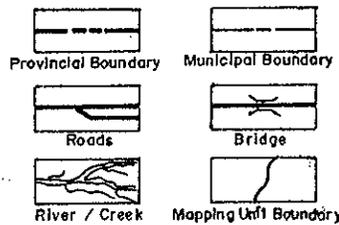


L E G E N D

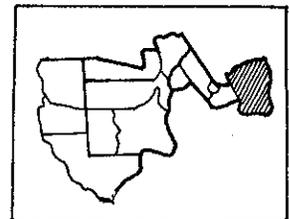
| C A T E G O R Y | A R E A | |
|------------------------------|---------|--------|
| | (Ha.) | (%) |
| A & D Alienable & Disposable | 14,052 | 100.00 |
| T O T A L | 14,052 | 100.00 |

PROVINCE OF SOUTH COTABATO

CONVENTIONAL SIGNS



LOCATION MAP



43

124°25'

30'

35'

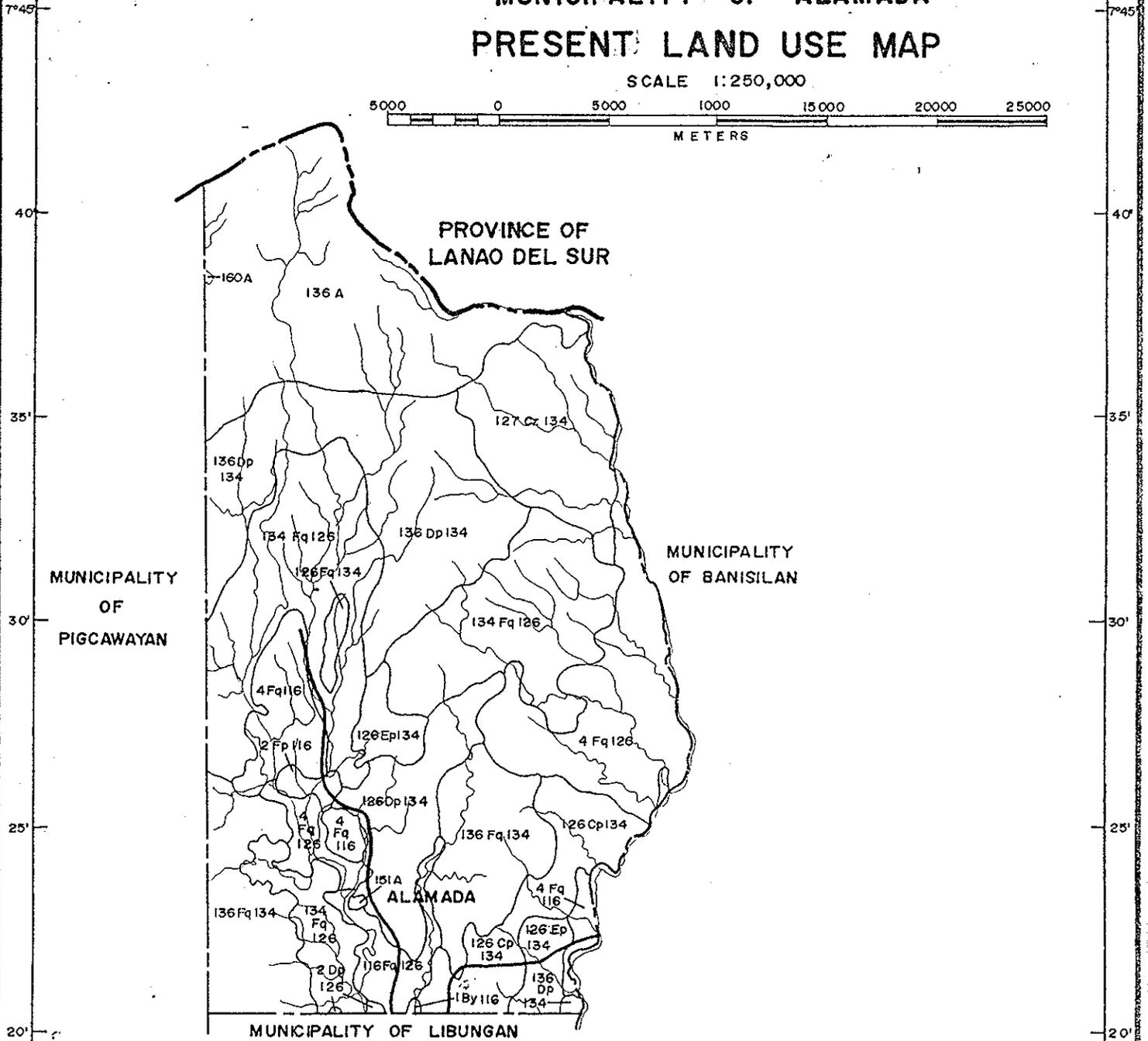
40'

45'

124°50'

COTABATO PROVINCE
 MUNICIPALITY OF ALAMADA
 PRESENT LAND USE MAP

SCALE 1:250,000

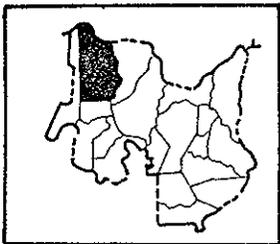


MUNICIPALITY OF PIGCAWAYAN

MUNICIPALITY OF BANISILAN

MUNICIPALITY OF LIBUNGAN

LOCATION MAP



CONVENTIONAL SIGNS

| | |
|---------------------|-----------------------|
| | |
| Provincial Boundary | Municipal Boundary |
| | |
| Roads | Bridge |
| | |
| River/Creek | Mapping Unit Boundary |

124°25'

30'

35'

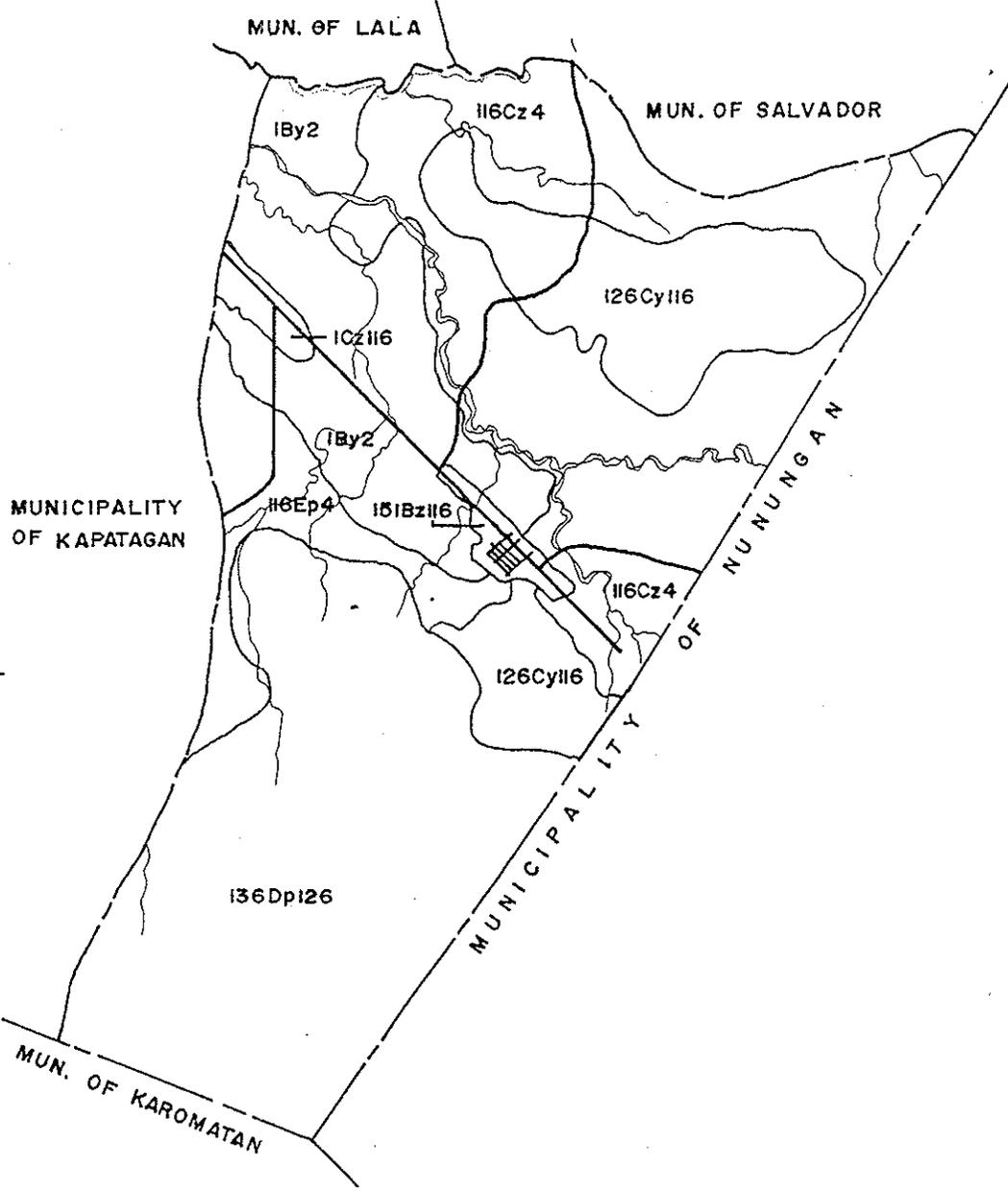
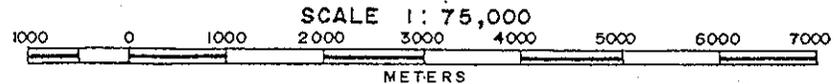
40'

45'

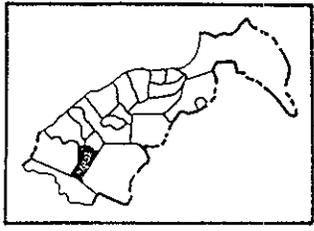
124°50'

123° 50' 123° 55'

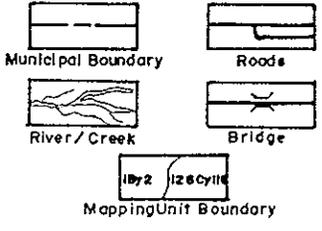
PROVINCE OF LANA DEL NORTE MUNICIPALITY OF SAPAD PRESENT LAND USE MAP



LOCATION MAP

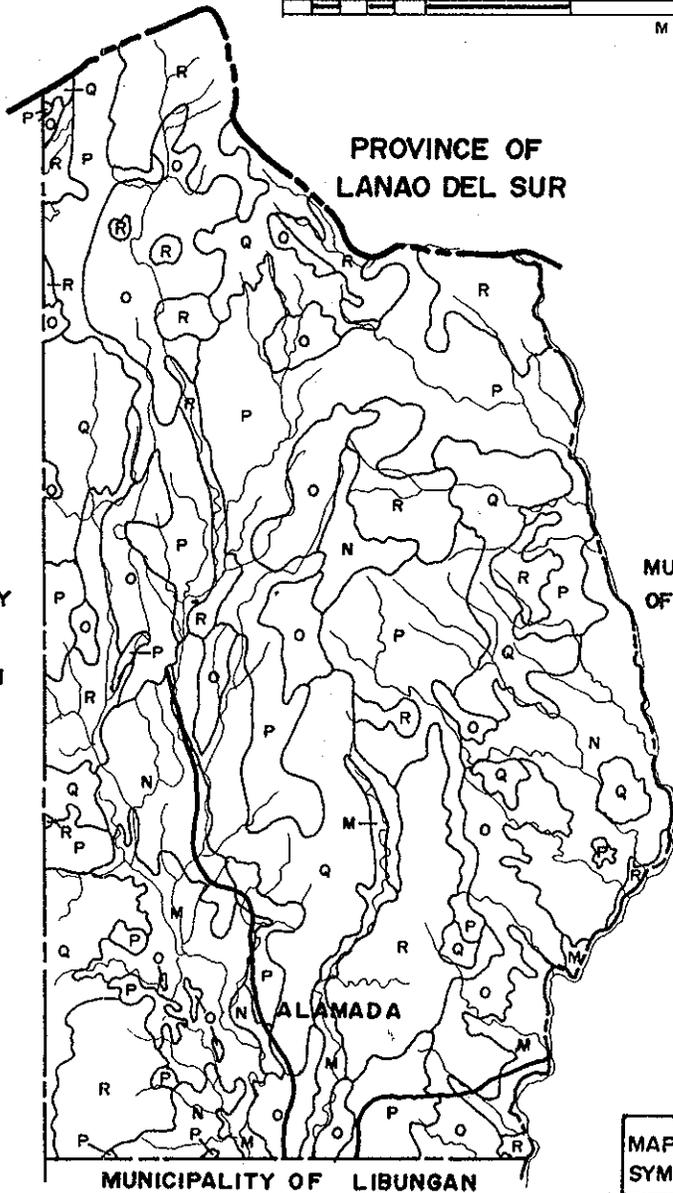


CONVENTIONAL SIGNS



COTABATO PROVINCE
MUNICIPALITY OF ALAMADA
SLOPE MAP

SCALE 1:250,000



MUNICIPALITY OF PIGCAWAYAN

MUNICIPALITY OF BANISILAN

ALAMADA

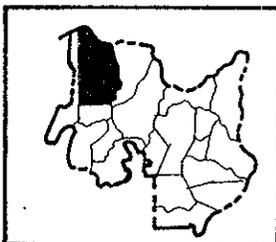
MUNICIPALITY OF LIBUNGAN

PROVINCE OF LANA DEL SUR

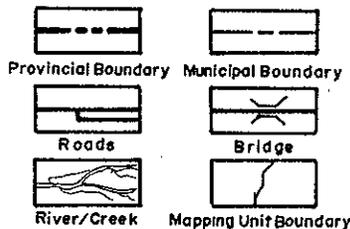
L E G E N D

| MAPPING SYMBOLS | RANGE (%) | DESCRIPTION | AREA | |
|-----------------|-----------|-------------------------------|--------|--------|
| | | | (Ha.) | (%) |
| M | 0-3 | Level to nearly level | 5,735 | 7.28 |
| N | 3-8 | Gently sloping to undulating. | 7,883 | 9.98 |
| O | 8-18 | Undulating to rolling. | 10,464 | 13.29 |
| P | 18-30 | Rolling to moderately steep. | 21,348 | 27.11 |
| Q | 30-50 | Steep. | 16,619 | 21.11 |
| R | > 50 | Very steep. | 16,721 | 21.23 |
| T O T A L | | | 78,750 | 100.00 |

LOCATION MAP

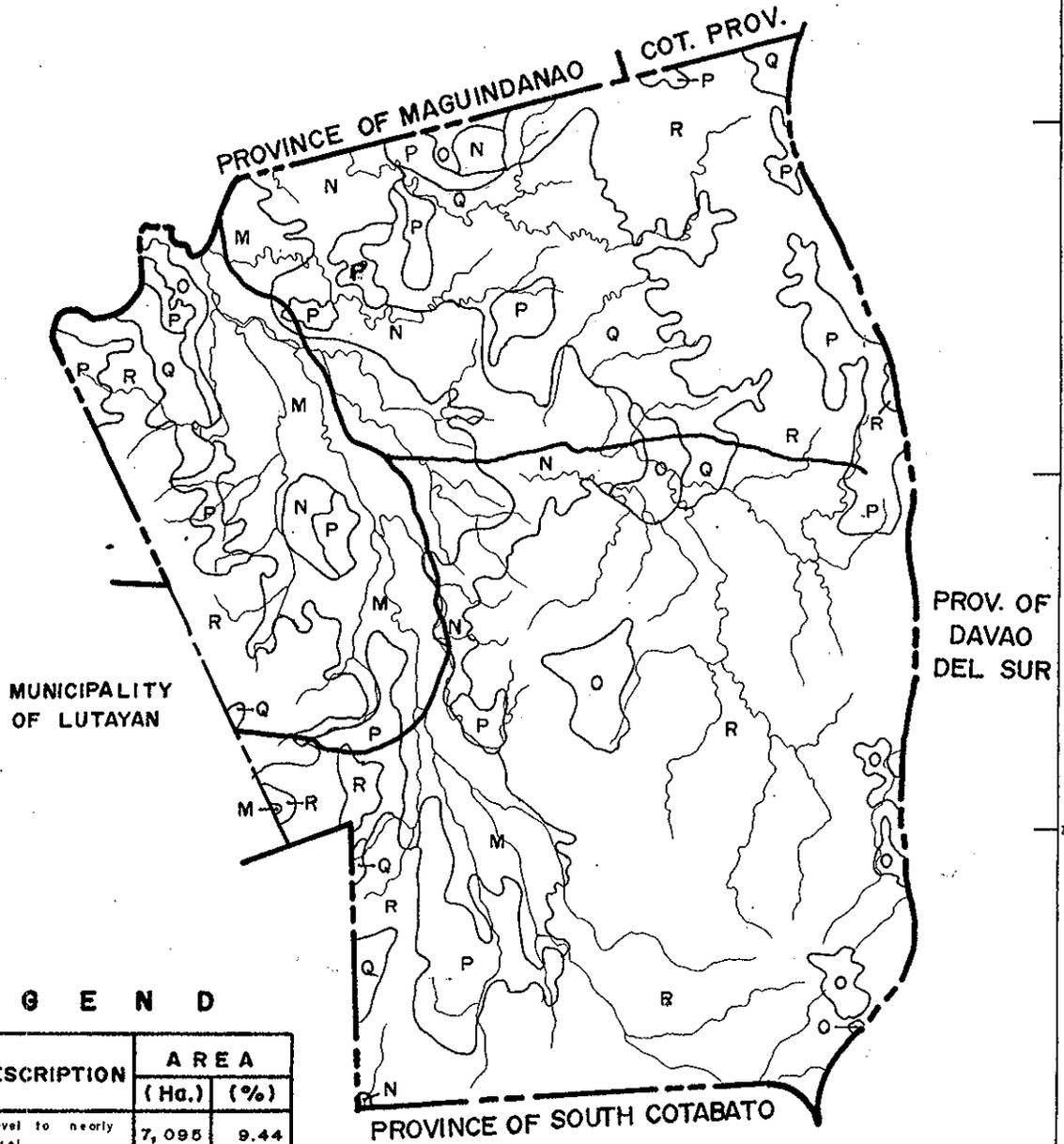


CONVENTIONAL SIGNS



PROVINCE OF SULTAN KUDARAT
MUNICIPALITY OF COLUMBIO
SLOPE MAP

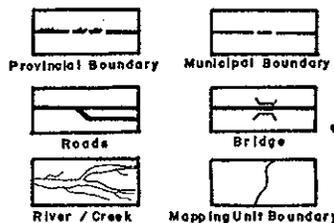
SCALE 1:175,000



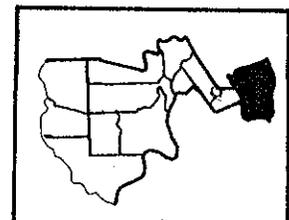
L E G E N D

| MAPPING SYMBOLS | RANGE (%) | DESCRIPTION | AREA | |
|------------------|-----------|-------------------------------|---------------|---------------|
| | | | (Ha.) | (%) |
| M | 0-3 | Level to nearly level. | 7,095 | 9.44 |
| N | 3-8 | Gently sloping to undulating. | 4,541 | 6.04 |
| O | 8-18 | Undulating to rolling | 1,890 | 2.51 |
| P | 18-30 | Rolling to moderately steep. | 5,831 | 7.76 |
| Q | 30-50 | Steep | 5,945 | 7.91 |
| R | >50 | Very steep... | 49,878 | 66.34 |
| T O T A L | | | 75,180 | 100.00 |

CONVENTIONAL SIGNS

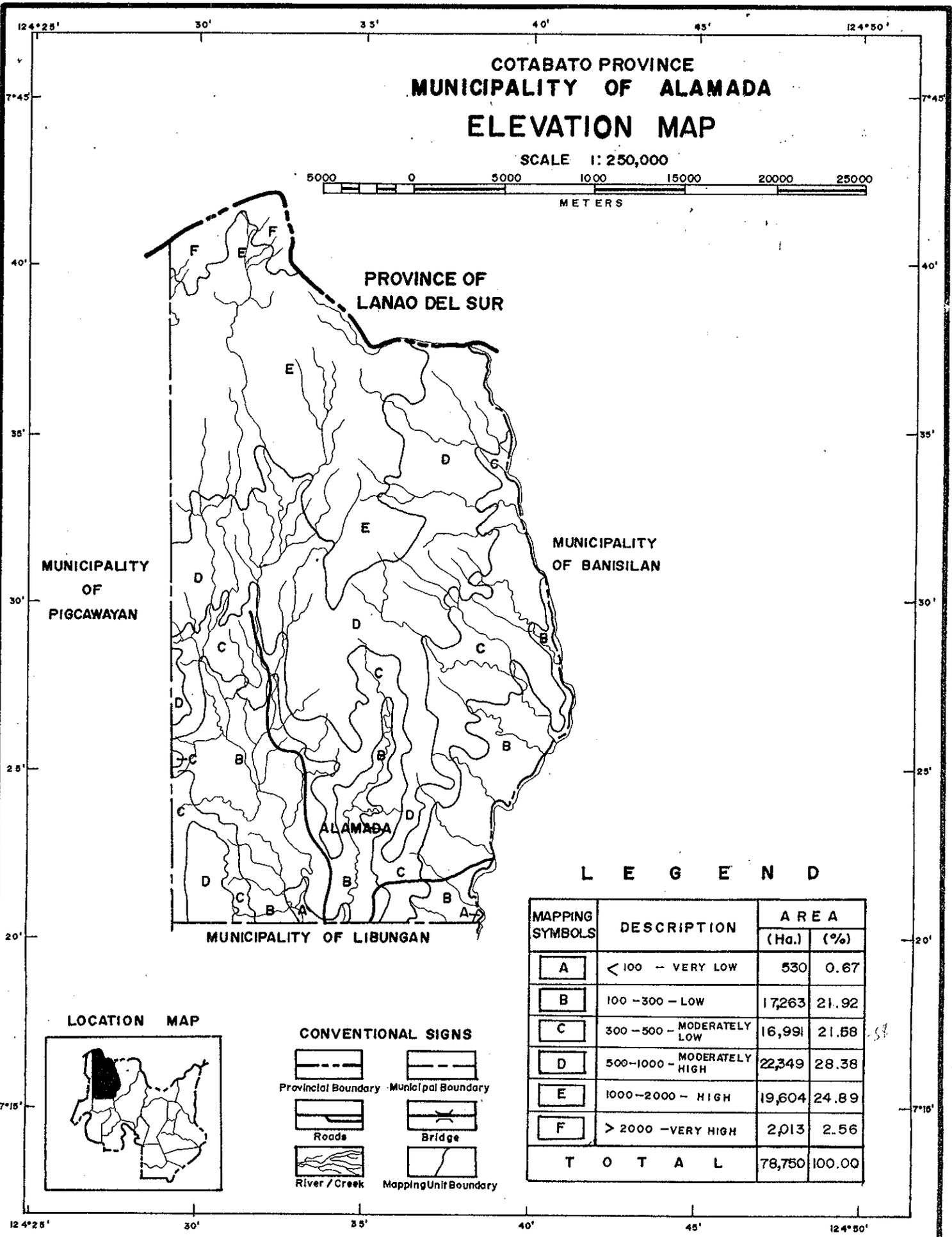


LOCATION MAP



COTABATO PROVINCE MUNICIPALITY OF ALAMADA ELEVATION MAP

SCALE 1:250,000



MUNICIPALITY OF BANISILAN

MUNICIPALITY OF PIGCawayan

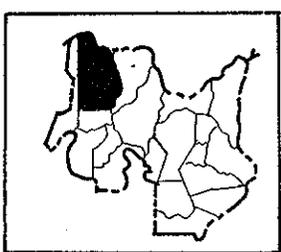
MUNICIPALITY OF LIBUNGAN

PROVINCE OF LANAo DEL SUR

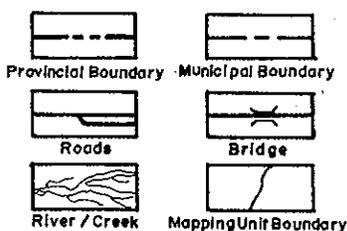
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|-----------------|------------------------------|--------|--------|
| | | (Ha.) | (%) |
| A | < 100 - VERY LOW | 530 | 0.67 |
| B | 100 - 300 - LOW | 17,263 | 21.92 |
| C | 300 - 500 - MODERATELY LOW | 16,991 | 21.58 |
| D | 500 - 1000 - MODERATELY HIGH | 22,349 | 28.38 |
| E | 1000 - 2000 - HIGH | 19,604 | 24.89 |
| F | > 2000 - VERY HIGH | 2,013 | 2.56 |
| T O T A L | | 78,750 | 100.00 |

LOCATION MAP



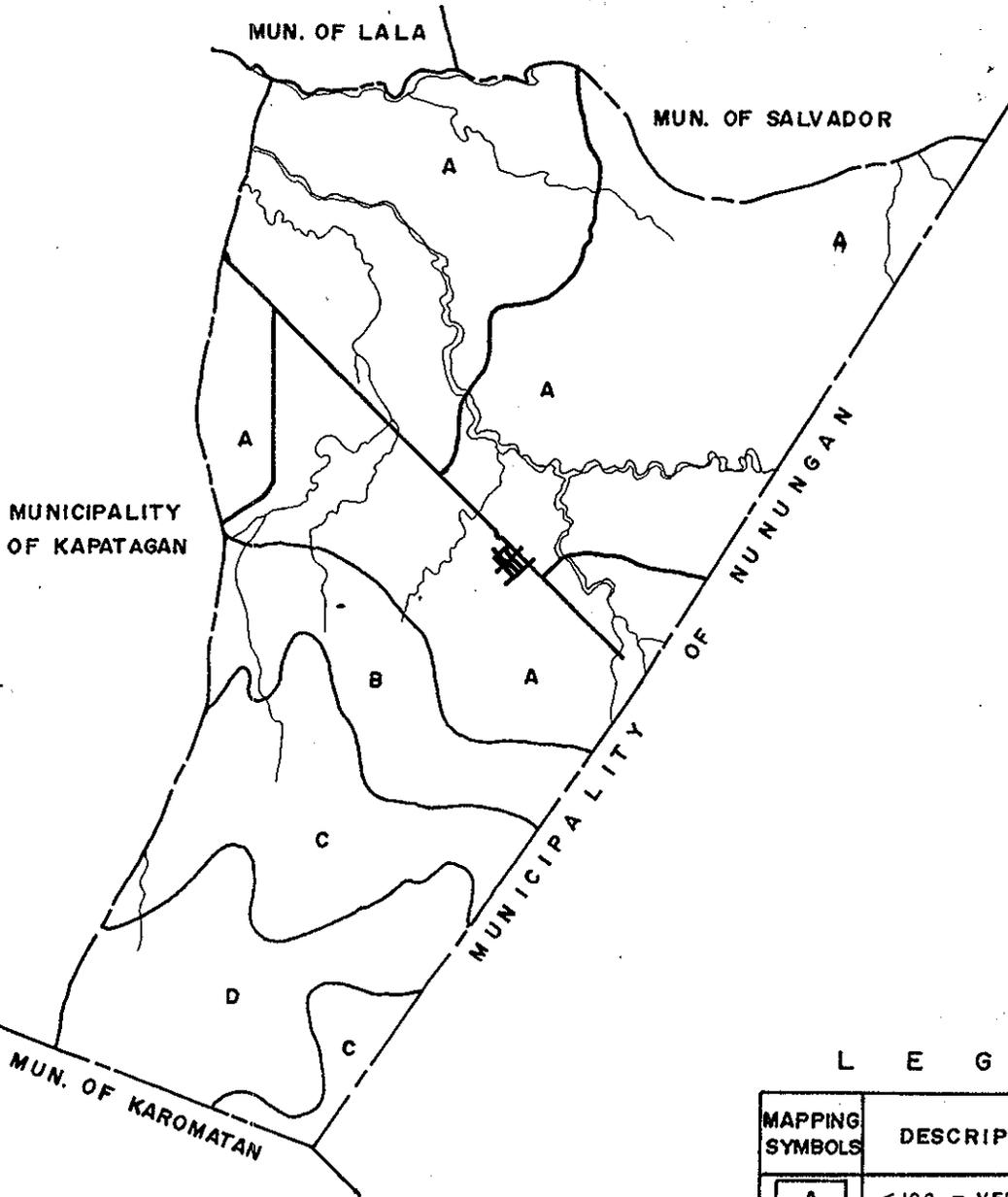
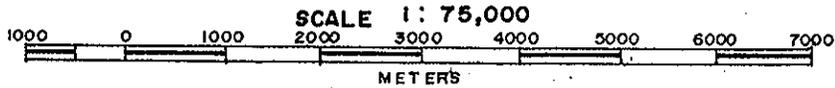
CONVENTIONAL SIGNS



123° 50' 123° 55'

7° 25' 7° 35'

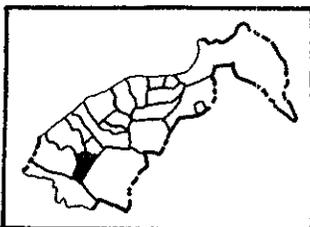
PROVINCE OF LANA O DEL NORTE MUNICIPALITY OF SAPAD ELEVATION MAP



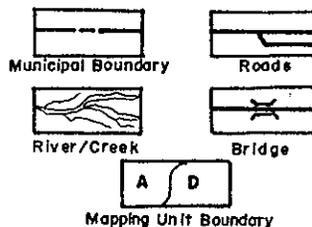
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|------------------|------------------------------|--------------|---------------|
| | | (Ha.) | (%) |
| A | < 100 - VERY LOW | 2,007 | 61.75 |
| B | 100 - 300 - LOW | 313 | 9.63 |
| C | 300 - 500 - MODERATELY LOW | 507 | 15.60 |
| D | 500 - 1000 - MODERATELY HIGH | 423 | 13.02 |
| E | 1000 - 2000 - HIGH | — | — |
| F | > 2000 - VERY HIGH | — | — |
| T O T A L | | 3,250 | 100.00 |

LOCATION MAP

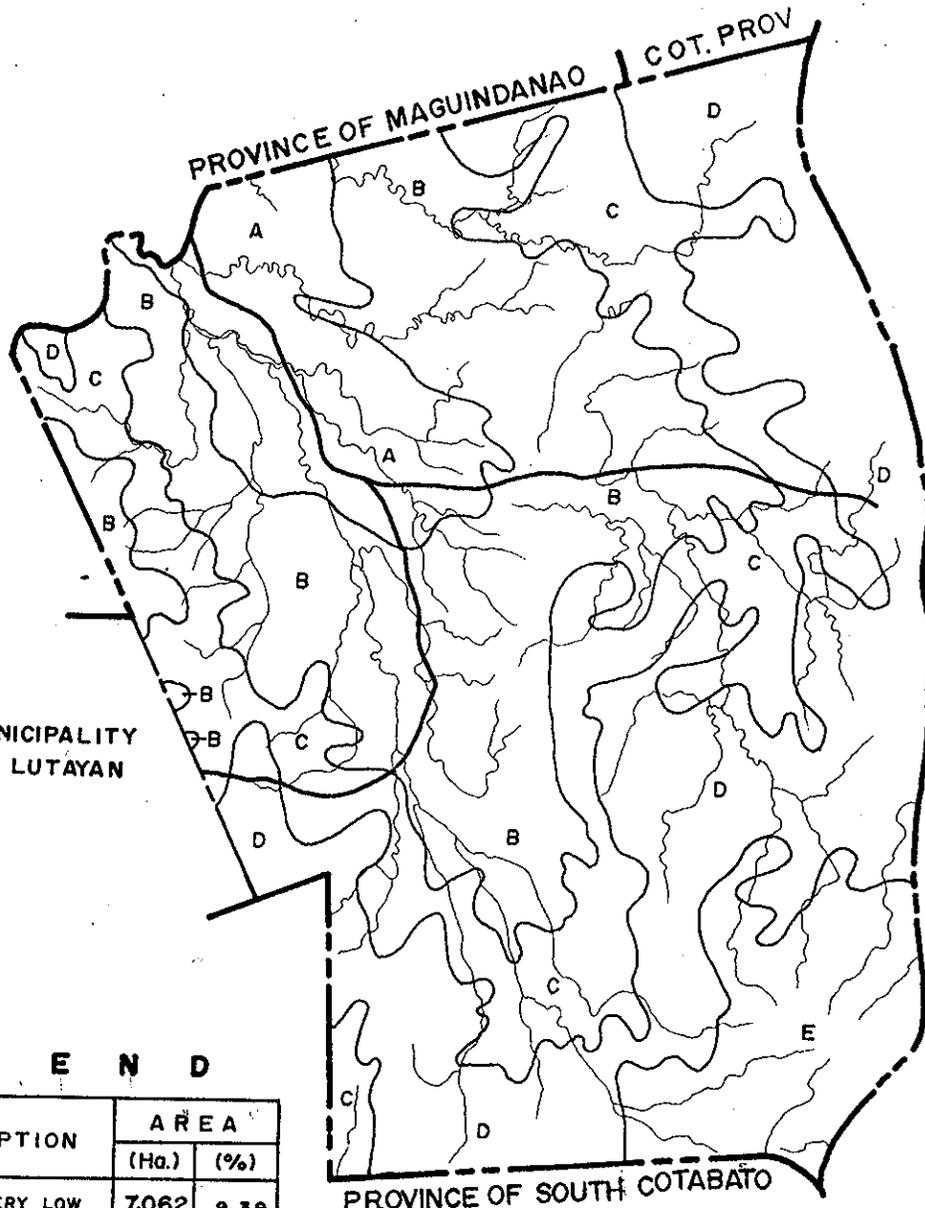


CONVENTIONAL SIGNS



PROVINCE OF SULTAN KUDARAT
MUNICIPALITY OF COLUMBIO
ELEVATION MAP

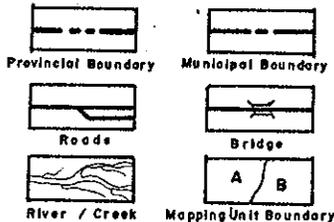
SCALE 1:175,000



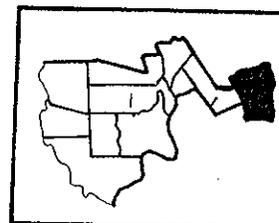
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|-----------------|------------------------------|--------|--------|
| | | (Ha.) | (%) |
| A | < 100 - VERY LOW | 7,062 | 9.39 |
| B | 100 - 300 - LOW | 21,555 | 28.64 |
| C | 300 - 500 - MODERATELY LOW | 17,213 | 22.90 |
| D | 500 - 1000 - MODERATELY HIGH | 22,901 | 30.46 |
| E | 1000 - 2000 - HIGH | 6,469 | 8.61 |
| F | > 2000 - VERY HIGH | — | — |
| T O T A L | | 75,180 | 100.00 |

CONVENTIONAL SIGNS

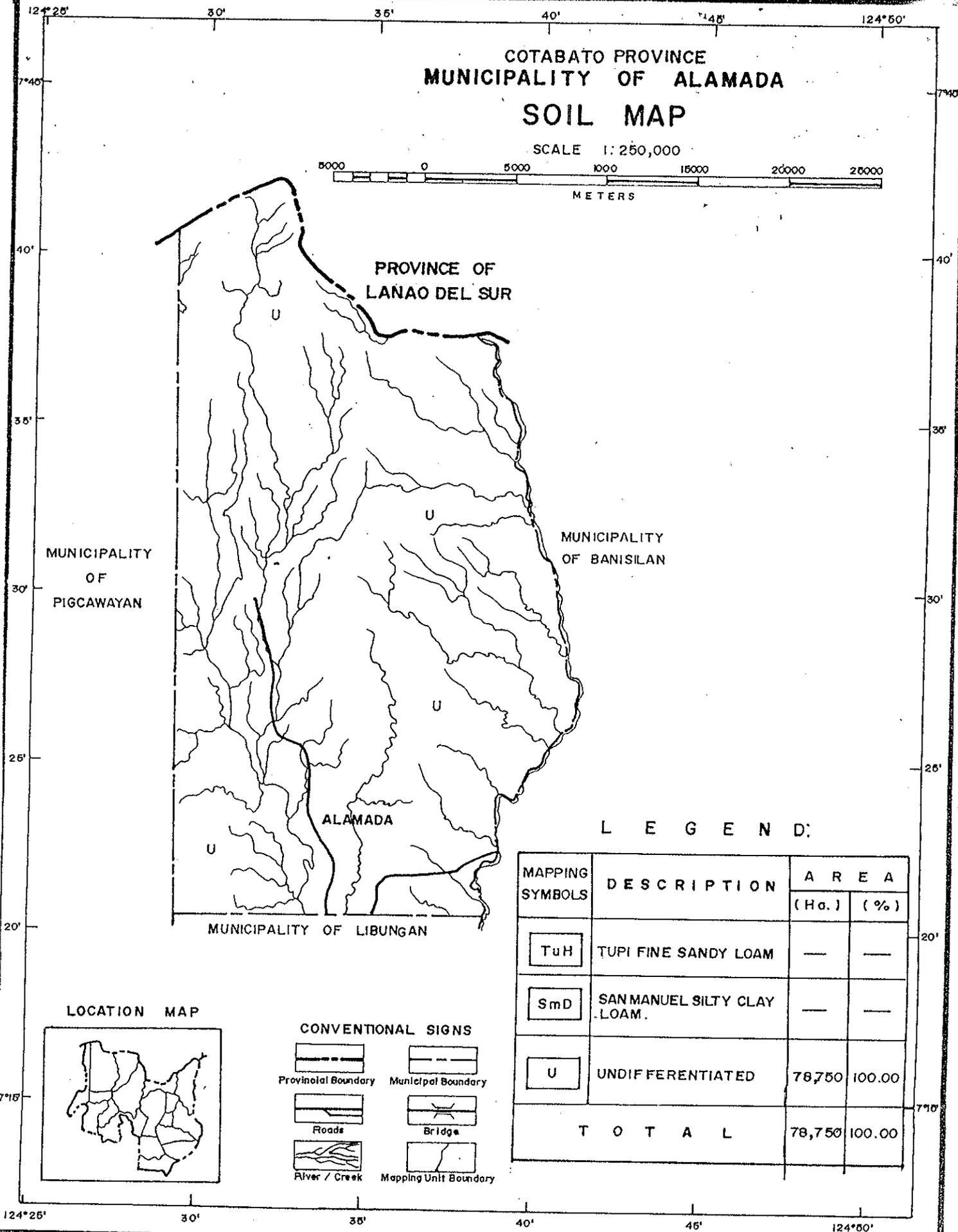
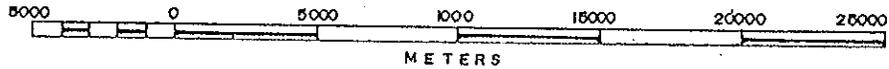


LOCATION MAP



COTABATO PROVINCE MUNICIPALITY OF ALAMADA SOIL MAP

SCALE 1:250,000



MUNICIPALITY OF
PIGCAWAYAN

PROVINCE OF
LANAO DEL SUR

MUNICIPALITY
OF BANISLAN

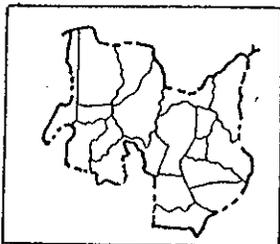
ALAMADA

MUNICIPALITY OF LIBUNGAN

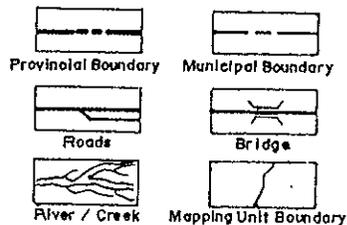
L E G E N D:

| MAPPING SYMBOLS | DESCRIPTION | A R E A | |
|--------------------|-----------------------------|---------|--------|
| | | (Ha.) | (%) |
| TuH | TUPI FINE SANDY LOAM | — | — |
| SmD | SAN MANUEL SILTY CLAY LOAM. | — | — |
| U | UNDIFFERENTIATED | 78,750 | 100.00 |
| T O T A L | | 78,750 | 100.00 |

LOCATION MAP



CONVENTIONAL SIGNS



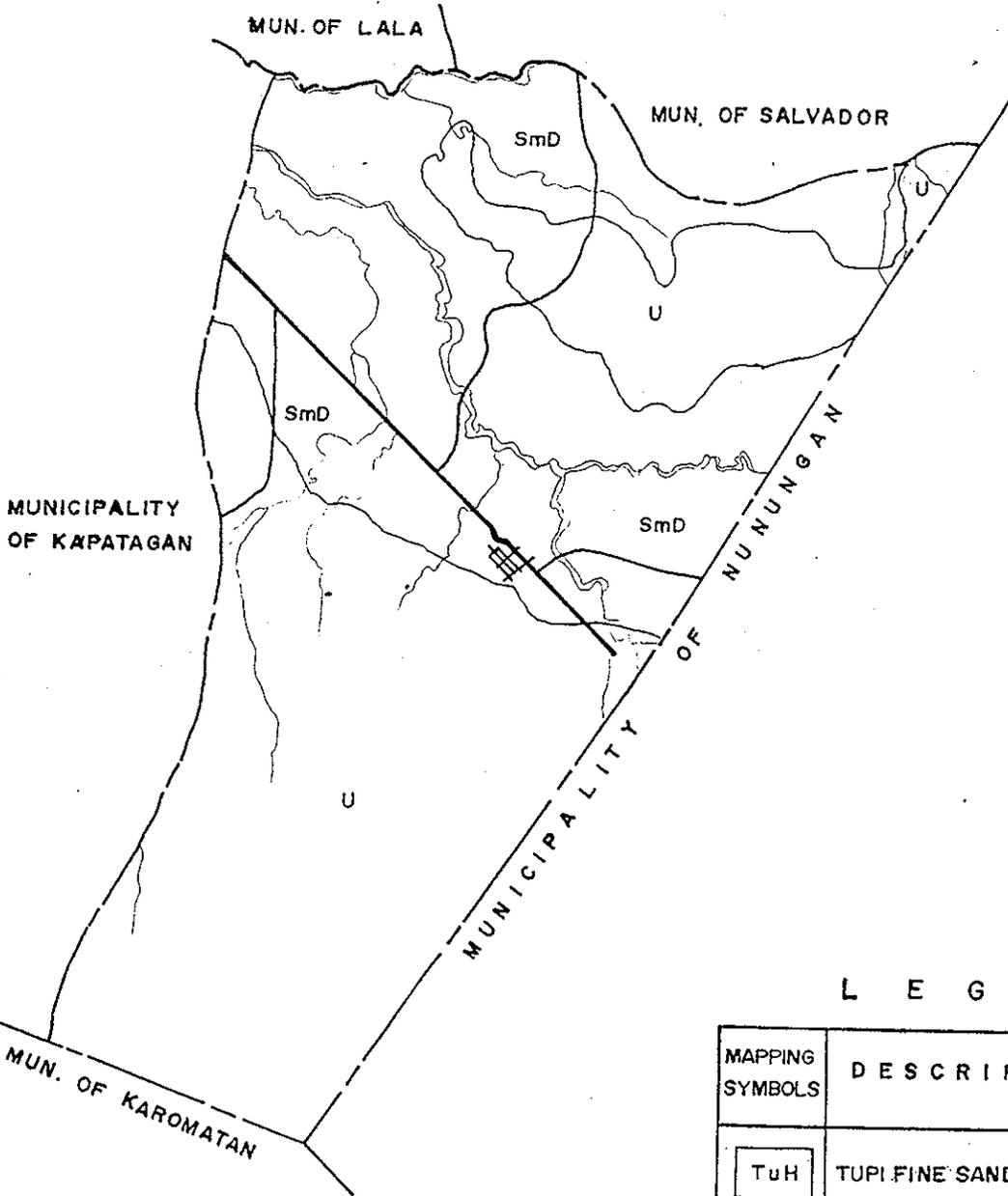
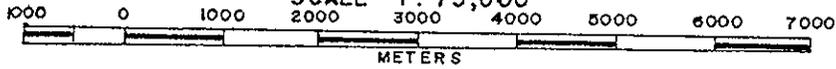
128° 50' 128° 55'

7° 55'

PROVINCE OF LANA O DEL NORTE
MUNICIPALITY OF SAPAD

SOIL MAP

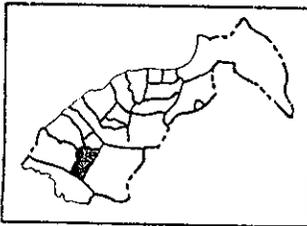
SCALE 1 : 75,000



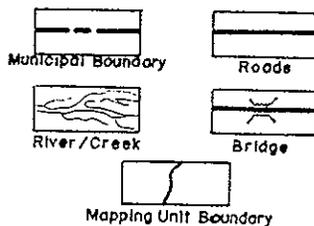
L E G E N D :

| MAPPING SYMBOLS | DESCRIPTION | A R E A | |
|-----------------|----------------------------|---------|--------|
| | | (Ha.) | (%) |
| TuH | TUPI FINE SANDY LOAM | — | — |
| SmD | SAN MANUEL SILTY CLAY LOAM | 1,403 | 43.17 |
| U | UNDIFFERENTIATED | 1,847 | 56.83 |
| T O T A L | | 3,250 | 100.00 |

LOCATION MAP



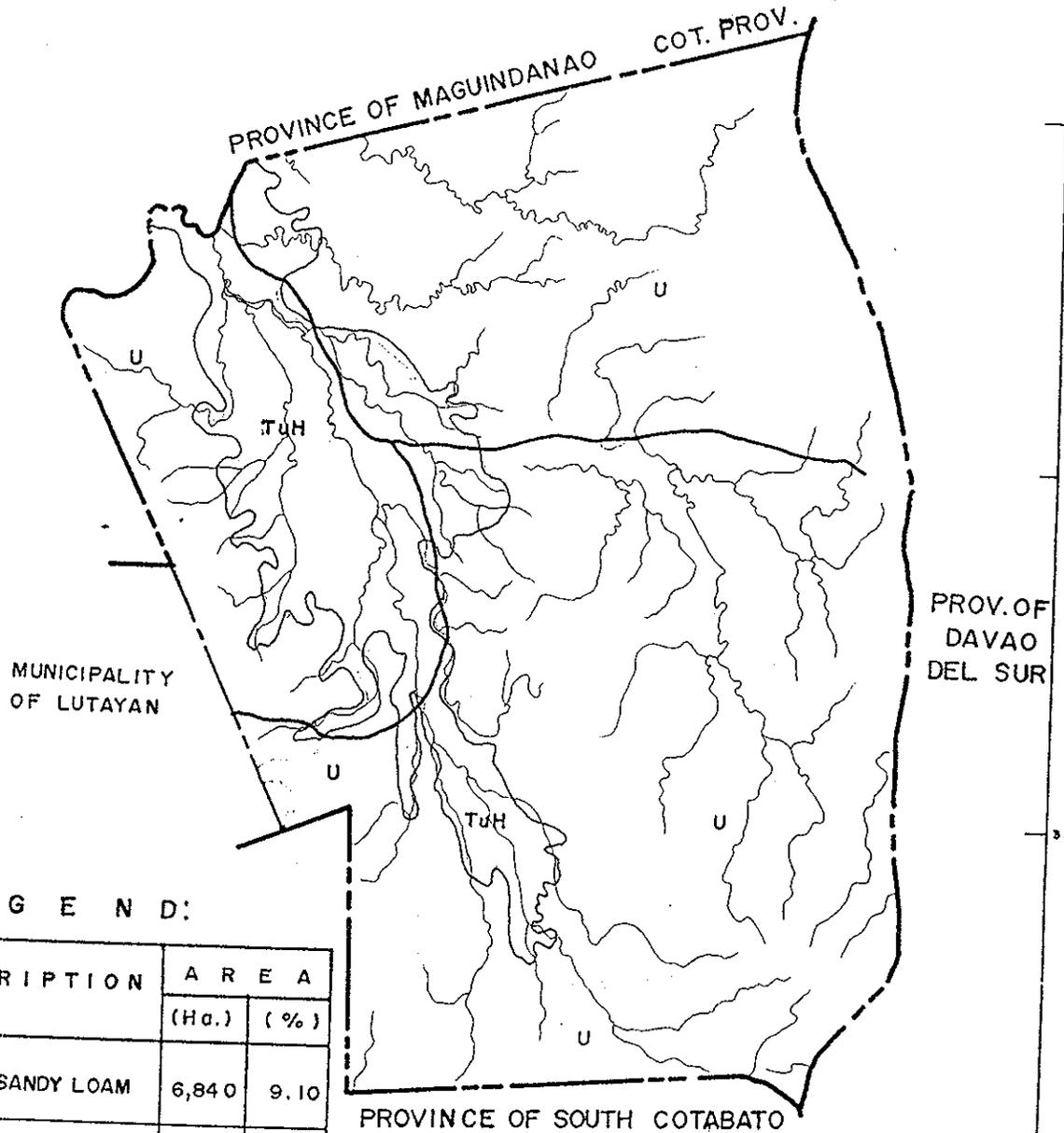
CONVENTIONAL SIGNS



PROVINCE OF SULTAN KUDARAT
MUNICIPALITY OF COLUMBIO

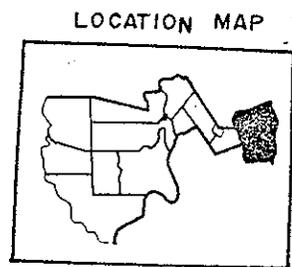
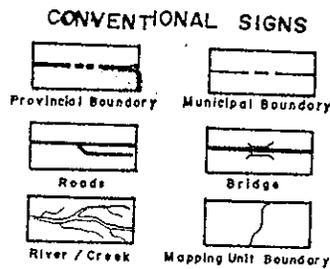
SOIL MAP

SCALE 1:175,000



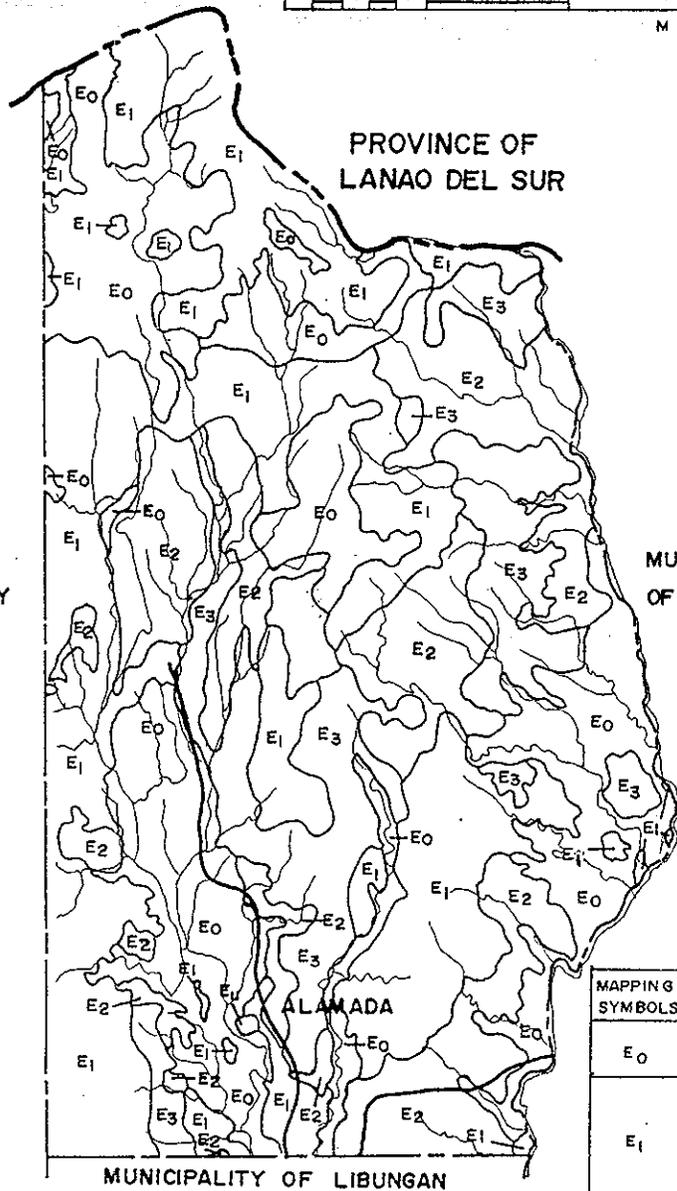
L E G E N D :

| MAPPING SYMBOLS | DESCRIPTION | A R E A | |
|-----------------|----------------------------|---------|--------|
| | | (Ha.) | (%) |
| TuH | TUPI FINE SANDY LOAM | 6,840 | 9.10 |
| SmD | SAN MANUEL SILTY CLAY LOAM | — | — |
| U | UNDIFFERENTIATED | 68,340 | 90.90 |
| T O T A L | | 75,180 | 100.00 |



COTABATO PROVINCE
MUNICIPALITY OF ALAMADA
EROSION MAP

SCALE 1:250,000



MUNICIPALITY OF PIGCAWAYAN

PROVINCE OF LANA DEL SUR

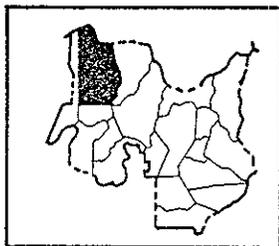
MUNICIPALITY OF BANISILAN

MUNICIPALITY OF LIBUNGAN

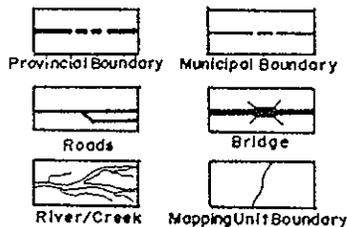
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|-----------------|--|---------|--------|
| | | (Ha.) | (%) |
| E ₀ | NO APPARENT EROSION—Less than 8% slope and mostly devoted to rice production. | 21,801 | 27.68 |
| E ₁ | SLIGHT EROSION—Mostly sloping areas (8–18% slope) that are not subjected to frequent cultivation (e.g. coconut land), and on steeply sloping areas with good vegetation (e.g. forest land). Less than 10% of the area is affected by hills. | 28,663 | 36.40 |
| E ₂ | MODERATE EROSION—On cultivated sloping areas. Formation of rills (10–50% of the area) and some gullies is noticeable and deposition of soil particles downslope is observed. Also, on grasslands with slope of less than 30% and less than 20cm soil depth. | 17,095 | 21.71 |
| E ₃ | SEVERE EROSION—Generally steeply sloping grassland areas (greater 30% slope) where conspicuous development of rills and gullies and some landslides is observed. Greater than 50% of the area is affected by rills. Agricultural production is practically unsuitable. | 11,118 | 14.12 |
| E _u | UNCLASSIFIED EROSION | 73 | 0.09 |
| T O T A L | | 78,750 | 100.00 |

LOCATION MAP



CONVENTIONAL SIGNS

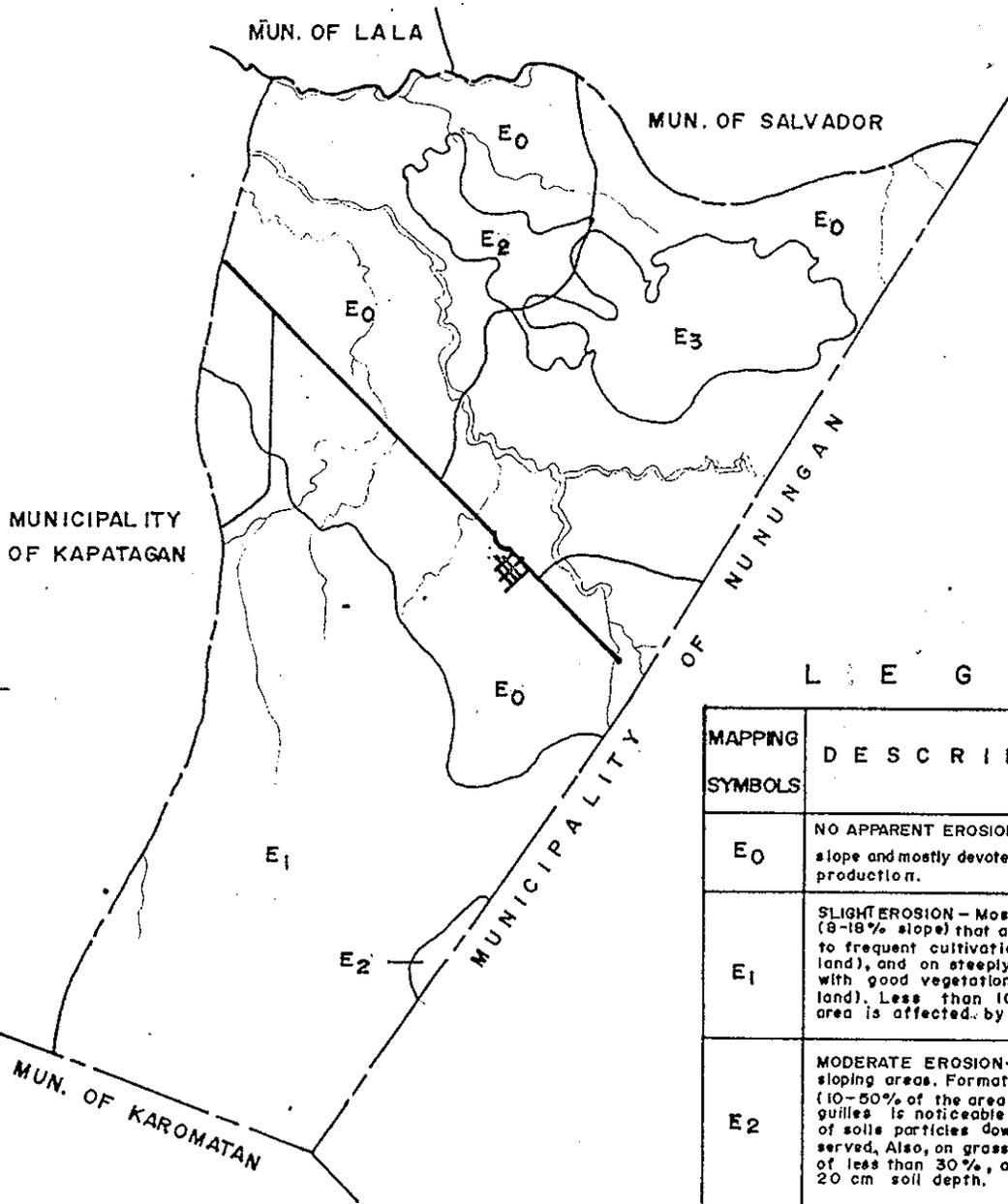


123° 50' 123° 55'

PROVINCE OF LANA O DEL NORTE
MUNICIPALITY OF SAPAD

EROSION MAP

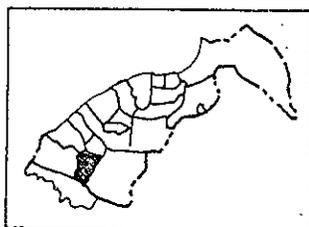
SCALE 1:75,000



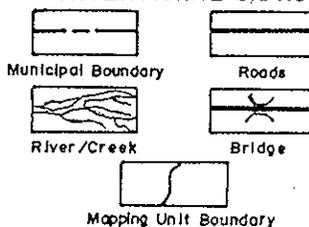
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|-----------------|--|-------|--------|
| | | (Ha.) | (%) |
| E ₀ | NO APPARENT EROSION - Less than 8% slope and mostly devoted to rice production. | 1,730 | 53.23 |
| E ₁ | SLIGHT EROSION - Mostly sloping areas (8-18% slope) that are not subjected to frequent cultivation (e.g. coconut land), and on steeply sloping areas with good vegetation (e.g. forest land). Less than 10% of the area is affected by hills. | 1,243 | 38.25 |
| E ₂ | MODERATE EROSION - On cultivated sloping areas. Formation of rills (10-50% of the area) and some gullies is noticeable and deposition of soil particles downslope is observed. Also, on grasslands with slope of less than 30%, and less than 20 cm soil depth. | 246 | 7.57 |
| E ₃ | SEVERE EROSION - Generally steeply sloping grassland areas (greater 30% slope) where conspicuous development of rills and gullies and some landslides is observed. Greater than 50% of the area is affected by rills. Agricultural production is practically unsuitable. | 31 | 0.95 |
| E _u | UNCLASSIFIED EROSION | — | — |
| T O T A L | | 3,250 | 100.00 |

LOCATION MAP



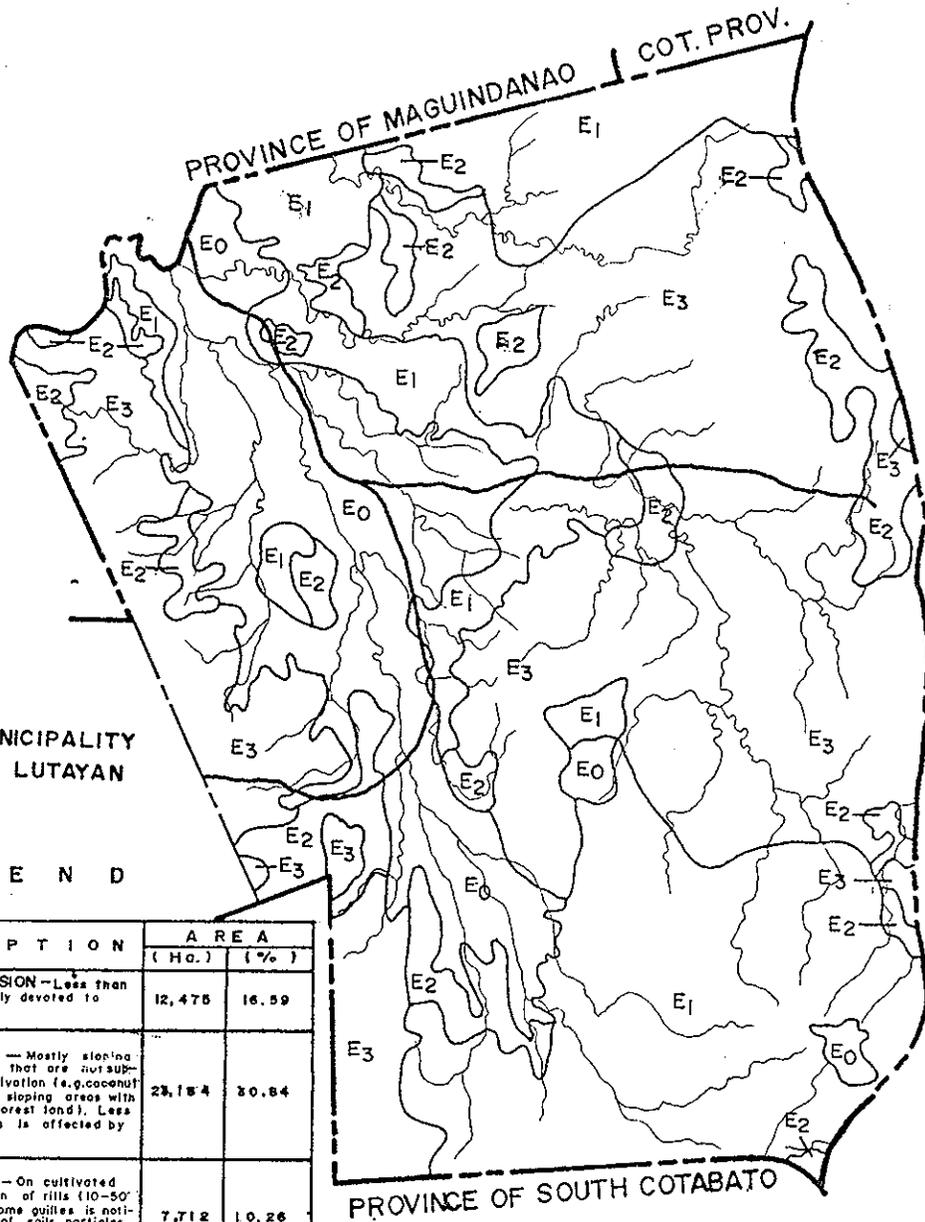
CONVENTIONAL SIGNS



SS

PROVINCE OF SULTAN KUDARAT
MUNICIPALITY OF COLUMBIO
EROSION MAP

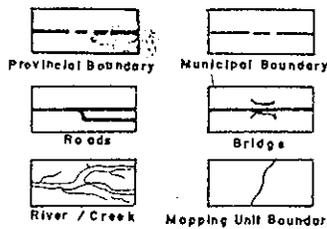
SCALE 1:175,000



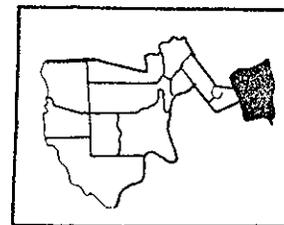
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|-----------------|--|--------|--------|
| | | (Ha.) | (%) |
| E ₀ | NO APPARENT EROSION—Less than 8% slope and mostly devoted to rice production. | 12,475 | 16.59 |
| E ₁ | SLIGHT EROSION—Mostly sloping areas (8-18% slope) that are not subjected to frequent cultivation (e.g. coconut land), and on steeply sloping areas with good vegetation (e.g. forest land). Less than 10% of the area is affected by rills. | 23,154 | 30.84 |
| E ₂ | MODERATE EROSION—On cultivated sloping areas. Formation of rills (10-50% of the area) and some gullies is noticeable and deposition of soils particles downslope is observed. Also on grasslands with slope less than 30%, and less than 20 cm soil depth. | 7,712 | 10.26 |
| E ₃ | SEVERE EROSION—Generally steeply sloping grassland areas (greater 30% slope) where conspicuous development of rills and gullies and some landslides is observed. Greater than 50% of the area is affected by rills. Agricultural production is practically unfeasible. | 31,609 | 42.21 |
| E _x | UNCLASSIFIED EROSION | — | — |
| T O T A L | | 75,180 | 100.00 |

CONVENTIONAL SIGNS



LOCATION MAP



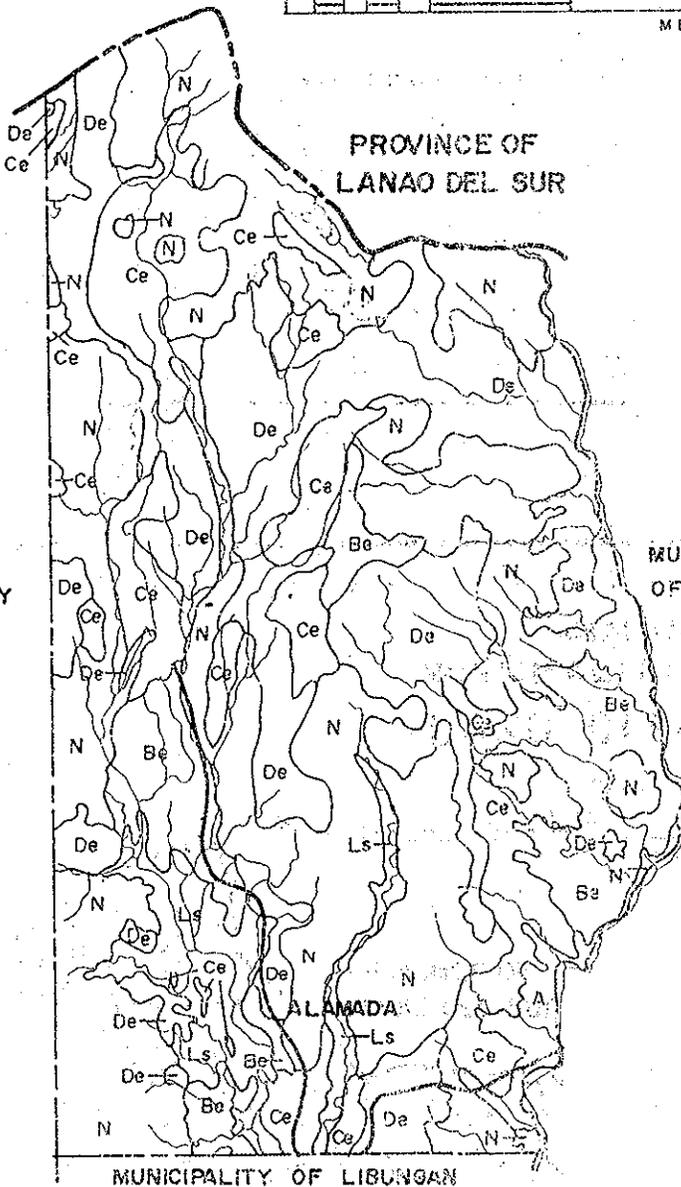
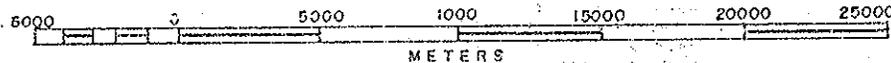
PROV. OF
**DAVAO
DEL SUR**

MUNICIPALITY
OF LUTAYAN

PROVINCE OF SOUTH COTABATO

COTABATO PROVINCE
 MUNICIPALITY OF ALAMADA
 LAND CAPABILITY MAP

SCALE 1:250,000



MUNICIPALITY OF PIGCAWAYAN

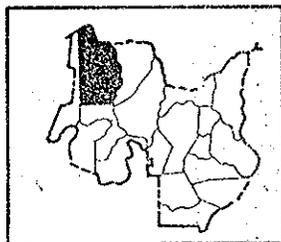
MUNICIPALITY OF BANISILAN

MUNICIPALITY OF LIBUNGAN

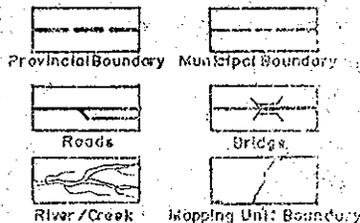
LEGEND

| MAPPING SYMBOL | DESCRIPTION | AREA | |
|------------------|--|---------------|---------------|
| | | (Ha.) | (%) |
| A | Very good land, level topography well drained, fertile and could be cultivated safely. | 1,262 | 1.59 |
| Be | Good land, can be cultivated safely, but needs erosion control measures, good farm management practices to maintain productivity. Susceptible to moderate erosion. | 9,446 | 11.99 |
| Ce | Moderately good, can be cultivated with extra care. It is susceptible to erosion. This best suited to permanent crop with erosion control measures & good farm management practices. | 14,988 | 19.04 |
| De | Moderately good land, can occasionally be cultivated with extra care due to it is highly susceptible to erosion. Suited to pasture and forest. | 21,174 | 26.89 |
| N | Very steep land, rough with unbroken hills. Best recommended for grazing and forestry. | 27,529 | 34.96 |
| Ls | Level to nearly level, but rocky surface, best recommended to agro-forest. | 4,354 | 5.53 |
| T O T A L | | 78,759 | 100.00 |

LOCATION MAP

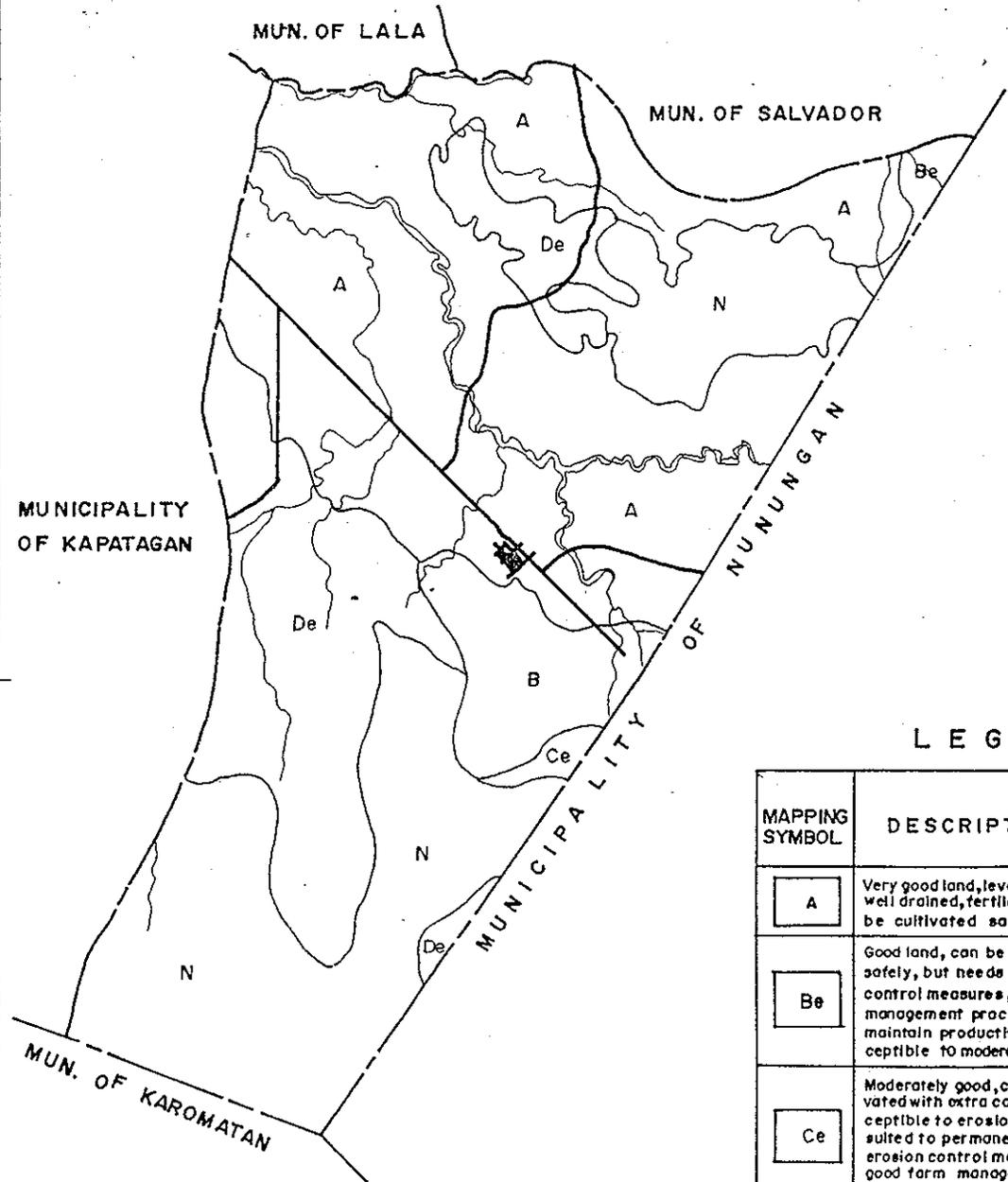
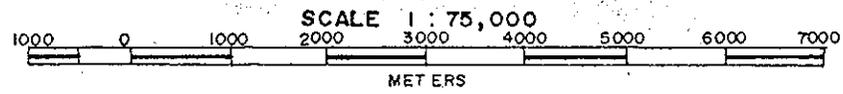


CONVENTIONAL SIGNS



123° 50' 123° 55'

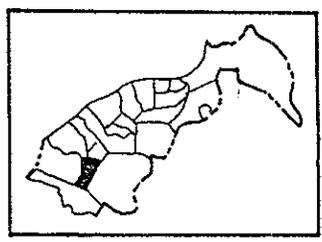
PROVINCE OF LANA O DEL NORTE MUNICIPALITY OF SAPAD LAND CAPABILITY MAP



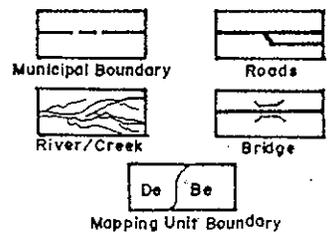
L E G E N D

| MAPPING SYMBOL | DESCRIPTION | AREA | |
|----------------|--|-------|--------|
| | | (Ha.) | (%) |
| A | Very good land, level topography well drained, fertile and could be cultivated safely. | 1,495 | 46.00 |
| Be | Good land, can be cultivated safely, but needs erosion control measures, good farm management practices to maintain productivity. Susceptible to moderate erosion. | 235 | 7.23 |
| Ce | Moderately good, can be cultivated with extra care. It is susceptible to erosion. This best suited to permanent crop with erosion control measures & good farm management practices. | 20 | 0.61 |
| De | Moderately good land, can occasionally cultivated with extra care due to it is highly susceptible to erosion. Suited to pasture and forest. | 631 | 19.42 |
| N | Very steep land, rough with shallow soils, best recommended for grazing and forestry. | 869 | 26.74 |
| T O T A L | | 3,250 | 100.00 |

LOCATION MAP

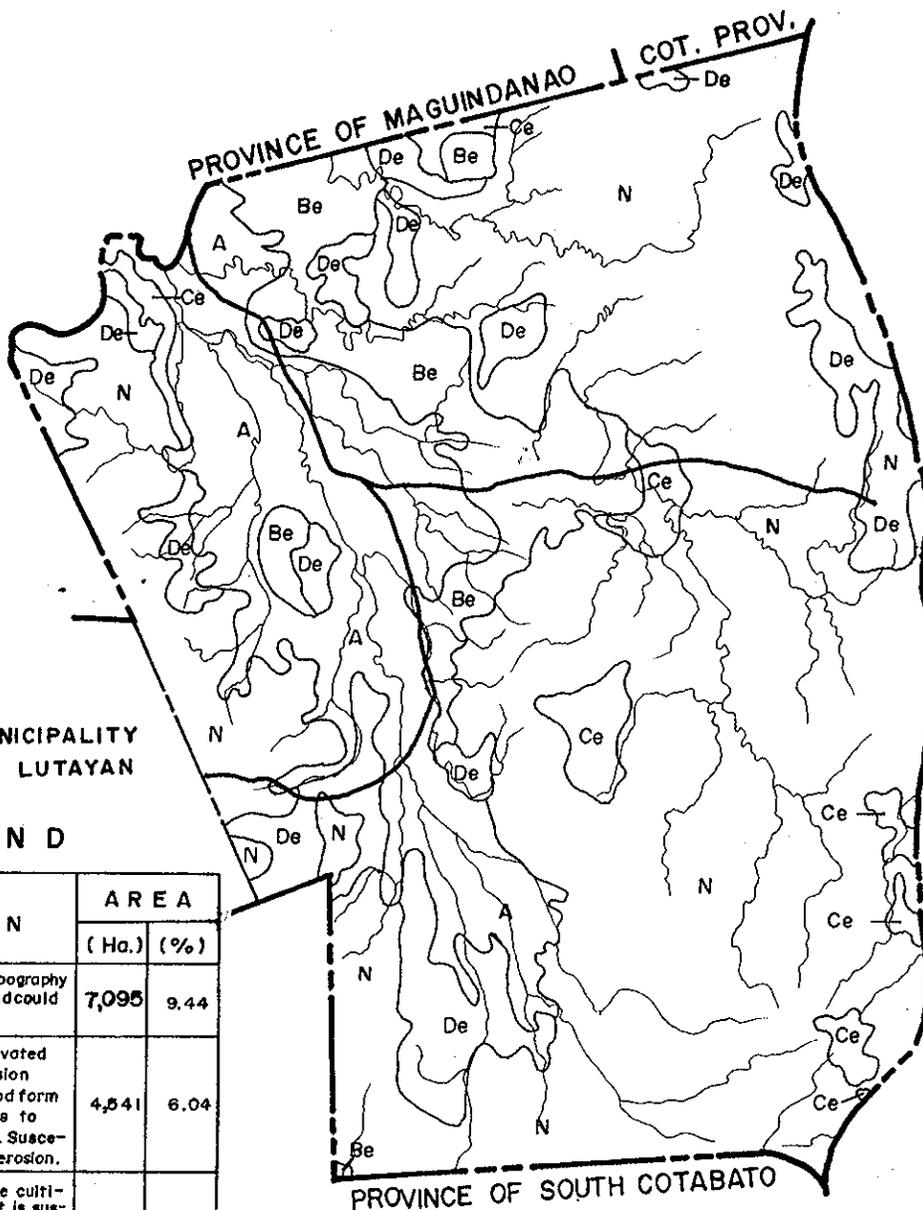


CONVENTIONAL SIGNS



PROVINCE OF SULTAN KUDARAT MUNICIPALITY OF COLUMBIO LAND CAPABILITY MAP

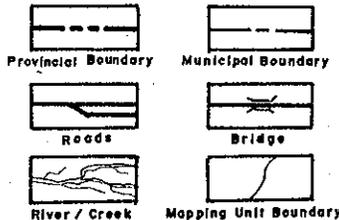
SCALE 1:175,000



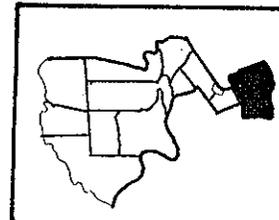
L E G E N D

| MAPPING SYMBOL | DESCRIPTION | AREA | |
|------------------|--|---------------|---------------|
| | | (Ha.) | (%) |
| A | Very good land, level topography well drained, fertile and could be cultivated safely. | 7,095 | 9.44 |
| Be | Good land, can be cultivated safely, but needs erosion control measures, good farm management practices to maintain productivity. Susceptible to moderate erosion. | 4,541 | 6.04 |
| Ce | Moderately good, can be cultivated with extra care. It is susceptible to erosion. This best suited to permanent crop with erosion control measures & good farm management practices. | 1,890 | 2.51 |
| De | Moderately good land, can occasionally cultivated with extra care due to it is highly susceptible to erosion. Suited to pasture and forest. | 5,831 | 7.76 |
| N | Very steep land, rough with shallow soils, best recommended for grazing and forestry. | 55,823 | 74.25 |
| T O T A L | | 75,180 | 100.00 |

CONVENTIONAL SIGNS

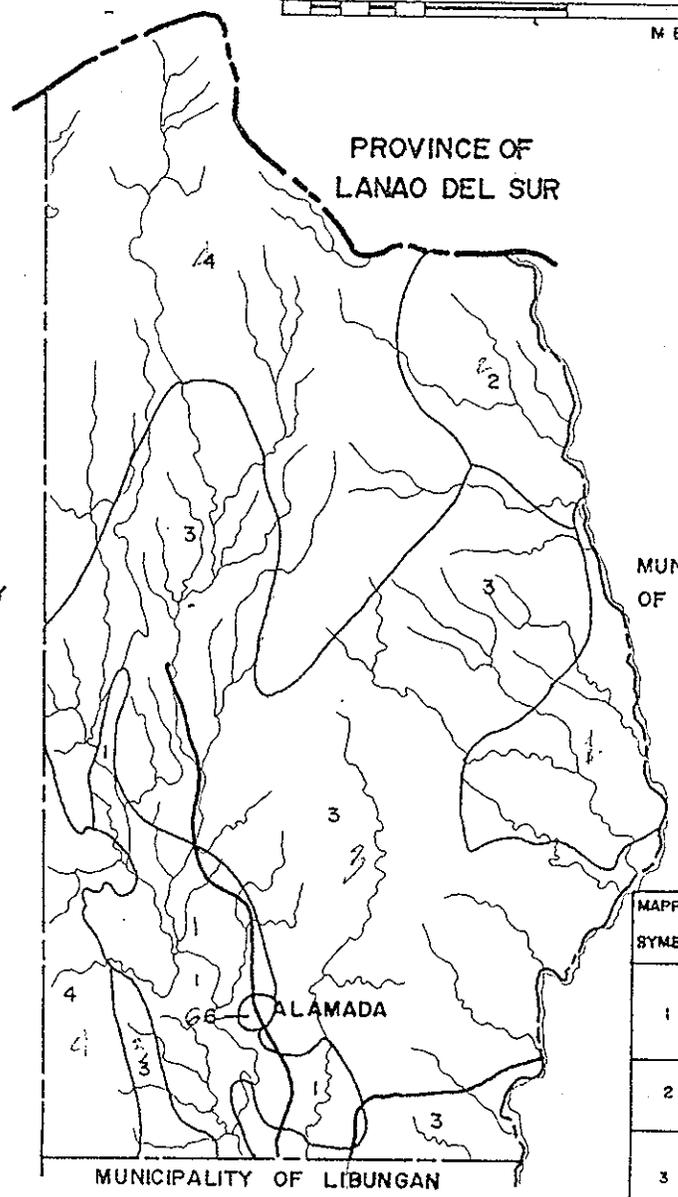


LOCATION MAP



COTABATO PROVINCE
MUNICIPALITY OF ALAMADA
LAND USE OPPORTUNITY MAP

SCALE 1:250,000



MUNICIPALITY OF BANISILAN

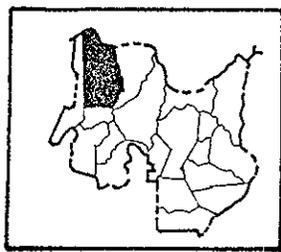
MUNICIPALITY OF PIGCAWAYAN

MUNICIPALITY OF LIBUNGAN

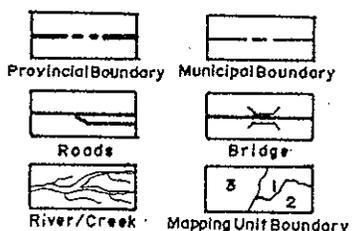
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|-----------------|---|--------|--------|
| | | (Ha.) | (%) |
| 1 | AGRICULTURAL AREAS - These are lands that are actively utilized for various agricultural activities. These also includes various development infrastructures such as roads, bridges, irrigation and humansettlemen areas. | 10,271 | 13.04 |
| 2 | EXPANSION AREAS - These are idle less utilized lands that have potential for various forms of and well managed agricultural uses. | 4,803 | 6.10 |
| 3 | REHABILITATION AREAS - These are areas primarily covered with trees or dominated by woody-type of vegetation. These represent areas that should be permanently retained forest enviloment. | 38,592 | 49.01 |
| 4 | PRESERVATION AREAS - These areas represent lands with in the critical watersheds seemingly subjected to various forms of land use abuses. Various forms of active and inactive erosional processes are very evident. For ecological reasons, these areas are of the moment best used for trees either forest or economic trees (but the former is preferred). Reverting these areas late to its former forest conditions is rather expensive both in time and labor requirements. | 24,939 | 31.67 |
| 6 | MISCELLANEOUS | 145 | 0.18 |
| T O T A L | | 78,750 | 100.00 |

LOCATION MAP



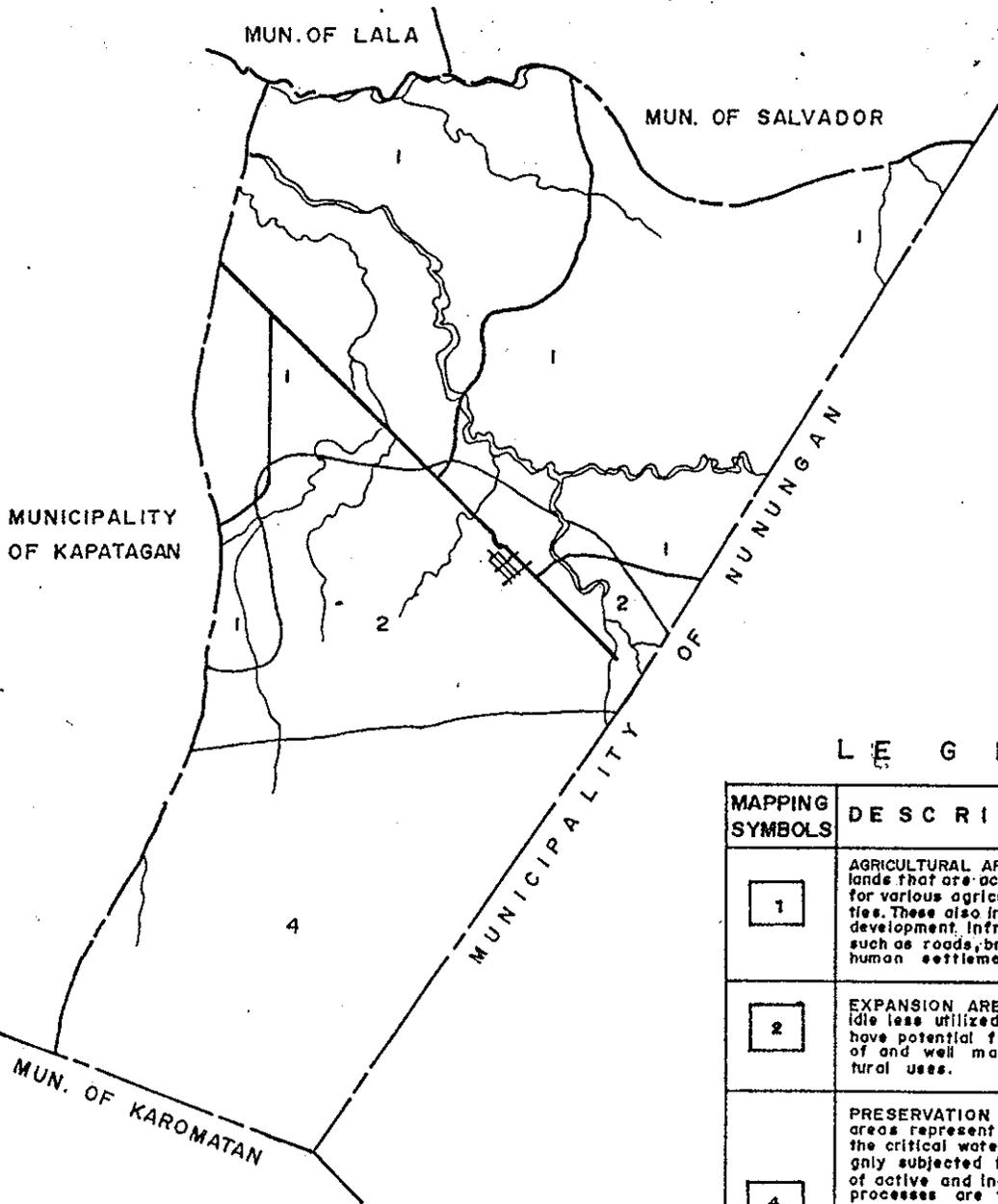
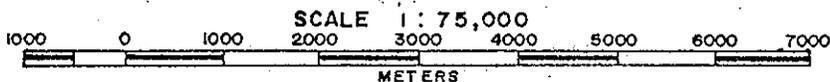
CONVENTIONAL SIGNS



124°25' 30' 35' 40' 45' 124°50'

123° 50' 123° 55'

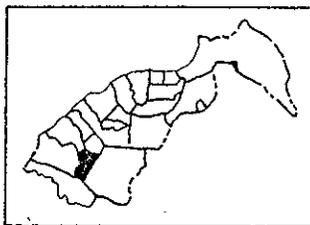
PROVINCE OF LANA O DEL NORTE MUNICIPALITY OF SAPAD LAND USE OPPORTUNITY MAP



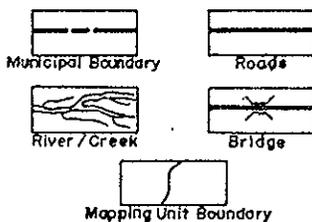
L E G E N D

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|------------------|--|--------------|---------------|
| | | (Ha.) | (%) |
| 1 | AGRICULTURAL AREAS—These are lands that are actively utilized for various agricultural activities. These also includes various development infrastructures such as roads, bridges, irrigation, human settlement areas. | 1,761 | 54.19 |
| 2 | EXPANSION AREAS—These are idle less utilized lands that have potential for various forms of and well managed agricultural uses. | 617 | 18.98 |
| 4 | PRESERVATION AREAS—These areas represent lands with in the critical watersheds seemingly subjected to various form of active and inactive erosional processes are very evident. For ecological reasons, these areas are at the moment best used for trees, either forest or economic trees (but the former is preferred). Reverting these areas into its former forest conditions is rather expensive both in time and labor requirements. | 872 | 26.83 |
| T O T A L | | 3,250 | 100.00 |

LOCATION MAP

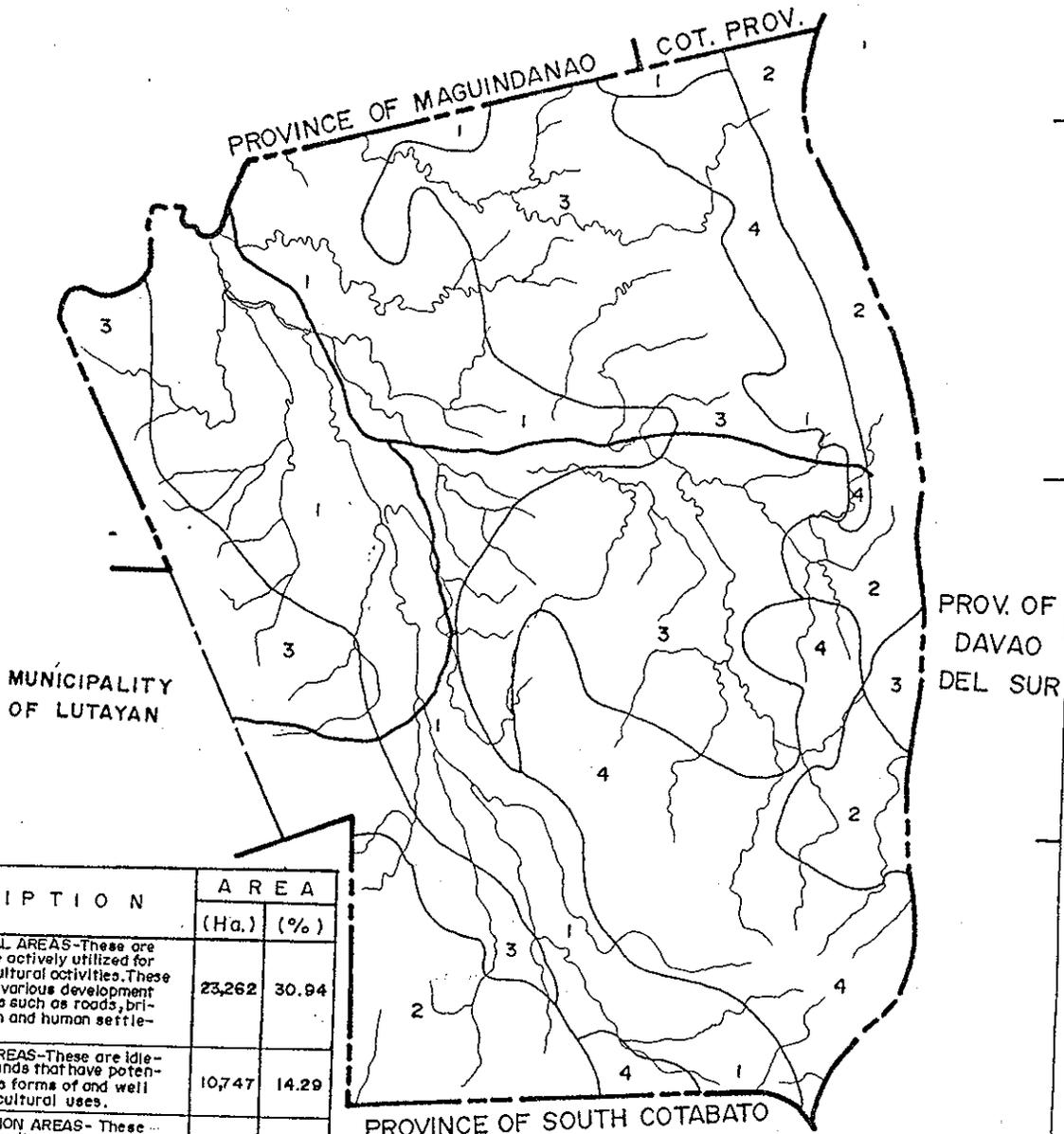


CONVENTIONAL SIGNS



PROVINCE OF SULTAN KUDARAT
MUNICIPALITY OF COLUMBIO
LAND USE OPPORTUNITY MAP

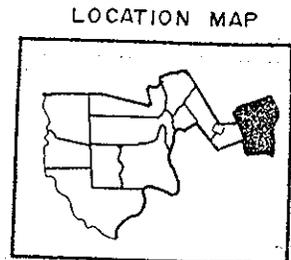
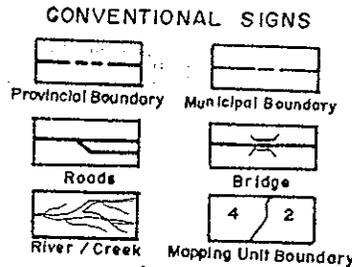
SCALE 1:175,000



LEGEND:

| MAPPING SYMBOLS | DESCRIPTION | AREA | |
|------------------|--|---------------|---------------|
| | | (Ha.) | (%) |
| 1 | AGRICULTURAL AREAS-These are lands that are actively utilized for various agricultural activities. These also includes various development infrastructures such as roads, bridges irrigation and human settlement areas. | 23,262 | 30.94 |
| 2 | EXPANSION AREAS-These are idle- less utilized lands that have potential for various forms of and well managed agricultural uses. | 10,747 | 14.29 |
| 3 | REHABILITATION AREAS- These are areas primarily covered with trees or dominated by woody-type of vegetation. These represent areas that should be permanently retained forest environment. | 26,676 | 35.48 |
| 4 | PRESERVATION AREAS-These are represent lands within the critical Watersheds seemingly subjected to various forms of land use abuses. Various forms of active and inactive erosional processes are very evident. For ecological reasons, these areas are at the moment best used for trees, either forest or economic trees (but the former is preferred). Reverting these areas into its former forest conditions is rather expensive both in time and labor requirements. | 14,495 | 19.28 |
| T O T A L | | 75,180 | 100.00 |

PROVINCE OF SOUTH COTABATO



124°50'

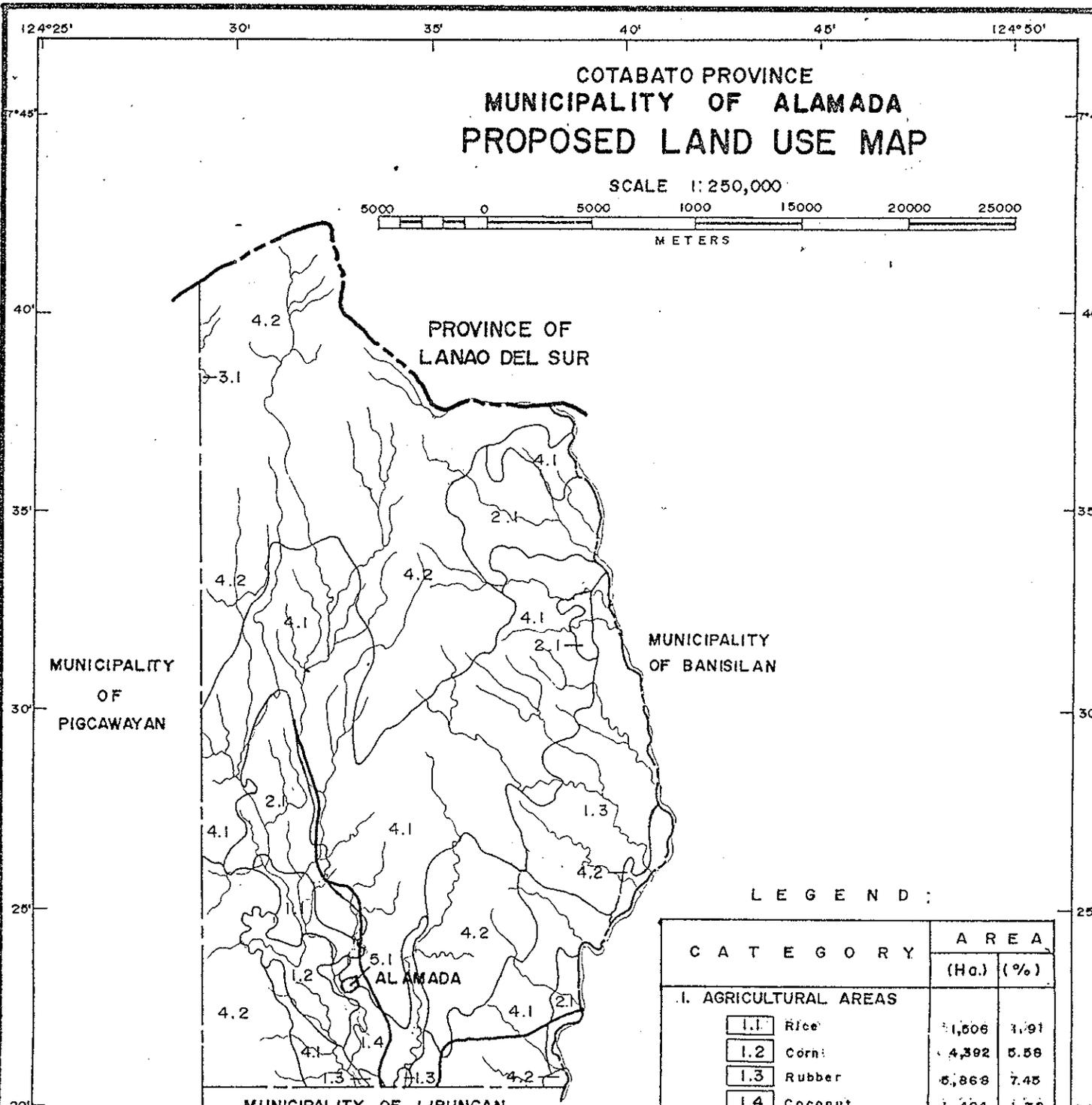
65'

125°00'

125°05'

COTABATO PROVINCE MUNICIPALITY OF ALAMADA PROPOSED LAND USE MAP

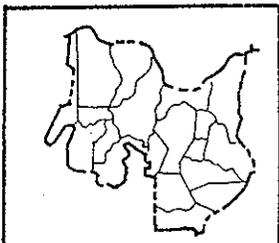
SCALE 1:250,000



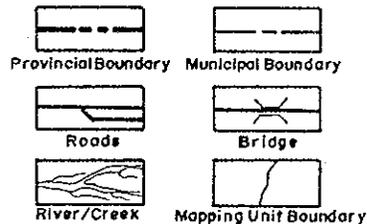
LEGEND :

| C A T E G O R Y | A R E A | |
|------------------------------|---------------------|----------------------|
| | (Ha.) | (%) |
| 1. AGRICULTURAL AREAS | | |
| 1.1 | Rice | 11,506 1.91 |
| 1.2 | Corn | 4,392 5.59 |
| 1.3 | Rubber | 6,868 7.45 |
| 1.4 | Coconut | 1,404 1.78 |
| 2. LIVESTOCK | | |
| 2.1 | Pasture: Livestock | 2,306 2.93 |
| 3. FISHING GROUNDS | | |
| 3.1 | Inland Water/Lake | 9 0.01 |
| 3.2 | Major Rivers | 67 0.09 |
| 4. FOREST LANDS | | |
| 4.1 | Agro-Forestry | 25,262 32.08 |
| 4.2 | Preservation Forest | 37,892 48.12 |
| 5. MISCELLANEOUS | | |
| 5.1 | Built-up Areas | 4.4 0.05 |
| T O T A L | | 78,750 100.00 |

LOCATION MAP



CONVENTIONAL SIGNS

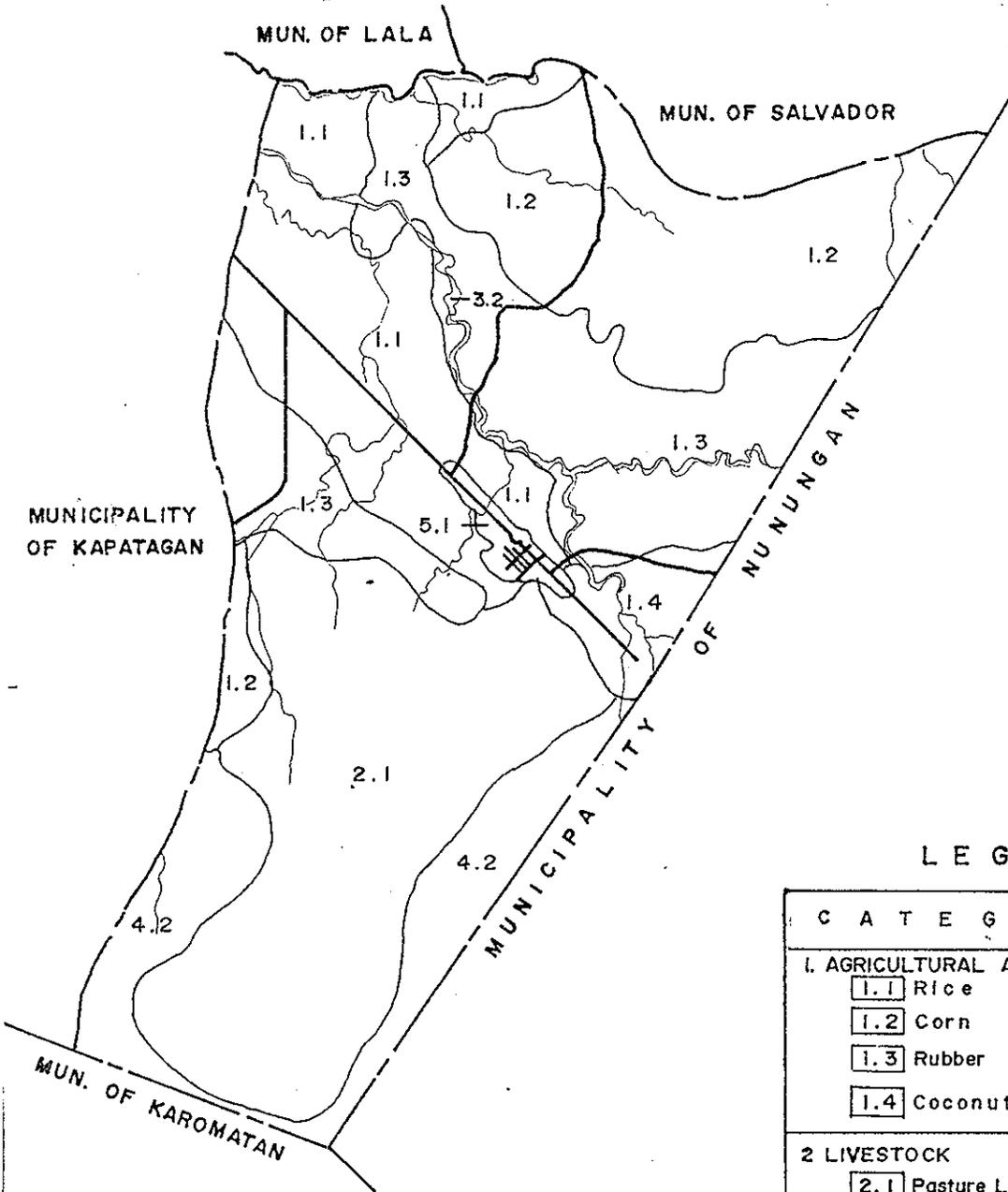


123°50'

123°55'

PROVINCE OF LANA O DEL NORTE MUNICIPALITY OF SAPAD PROPOSED LAND USE MAP

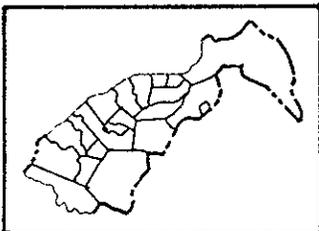
SCALE 1 : 75,000



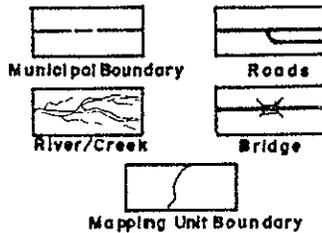
LEGEND:

| C A T E G O R Y | A R E A | |
|------------------------------|--------------|---------------|
| | (Ha.) | (%) |
| 1. AGRICULTURAL AREAS | | |
| 1.1 Rice | 544 | 16.74 |
| 1.2 Corn | 724 | 22.28 |
| 1.3 Rubber | 544 | 16.74 |
| 1.4 Coconut | 98 | 3.02 |
| 2 LIVESTOCK | | |
| 2.1 Pasture Livestock | 909 | 27.97 |
| 3 FISHING GROUNDS | | |
| 3.1 Inland Water Lakes | — | — |
| 3.2 Major Rivers | 15 | .46 |
| 4 FOREST LANDS | | |
| 4.1 Agro-Forest | — | — |
| 4.2 Preservation Forest | 391 | 12.03 |
| 5 MISCELLANEOUS | | |
| 5.1 Built-up areas | 25 | .78 |
| T O T A L | 3,250 | 100.00 |

LOCATION MAP



CONVENTIONAL SIGNS



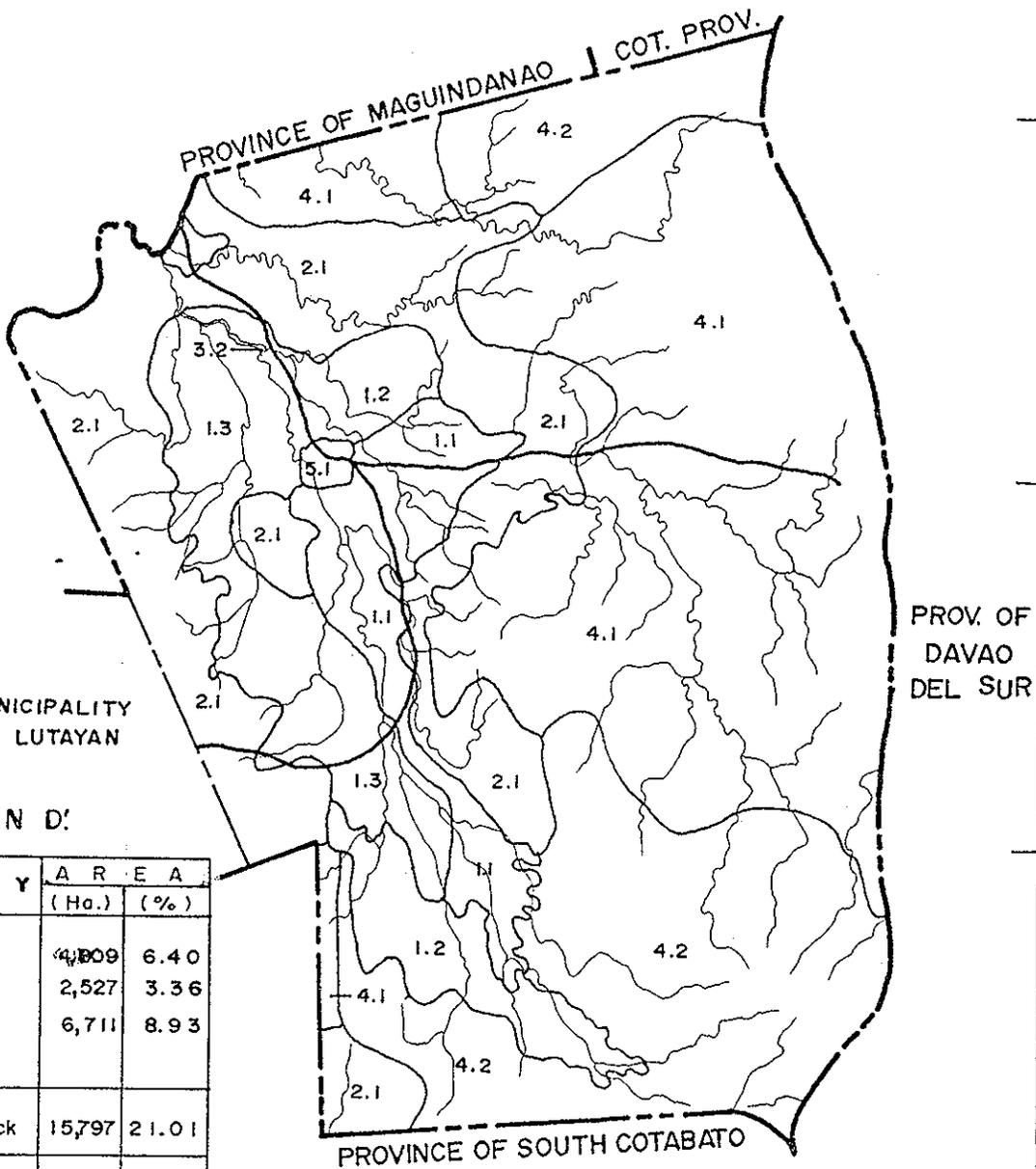
123°50'

123°55'

64

PROVINCE OF SULTAN KUDARAT MUNICIPALITY OF COLUMBIO PROPOSED LAND USE MAP

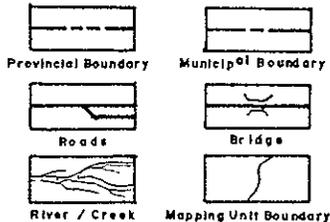
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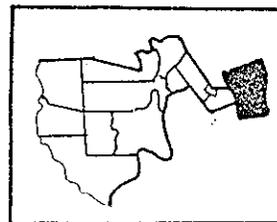
LEGEND

| C A T E G O R Y | A R E A | |
|-----------------------------|---------------|---------------|
| | (Ha.) | (%) |
| 1 AGRICULTURAL AREAS | | |
| 1.1 Rice | 4,809 | 6.40 |
| 1.2 Corn | 2,527 | 3.36 |
| 1.3 Rubber | 6,711 | 8.93 |
| 1.4 Coconut | | |
| 2 LIVESTOCK | | |
| 2.1 Pasture Livestock | 15,797 | 21.01 |
| 3 FISHING GROUNDS | | |
| 3.1 Inland Water Lakes | — | — |
| 3.2 Major River | 360 | 0.48 |
| 4 FOREST LANDS. | | |
| 4.1 Agro-Forest | 28,421 | 37.80 |
| 4.2 Preservation Forest | 16,315 | 21.70 |
| 5 MISCELLANEOUS | | |
| 5.1 Built-up areas | 240 | 0.32 |
| T O T A L | 78,180 | 100.00 |

CONVENTIONAL SIGNS



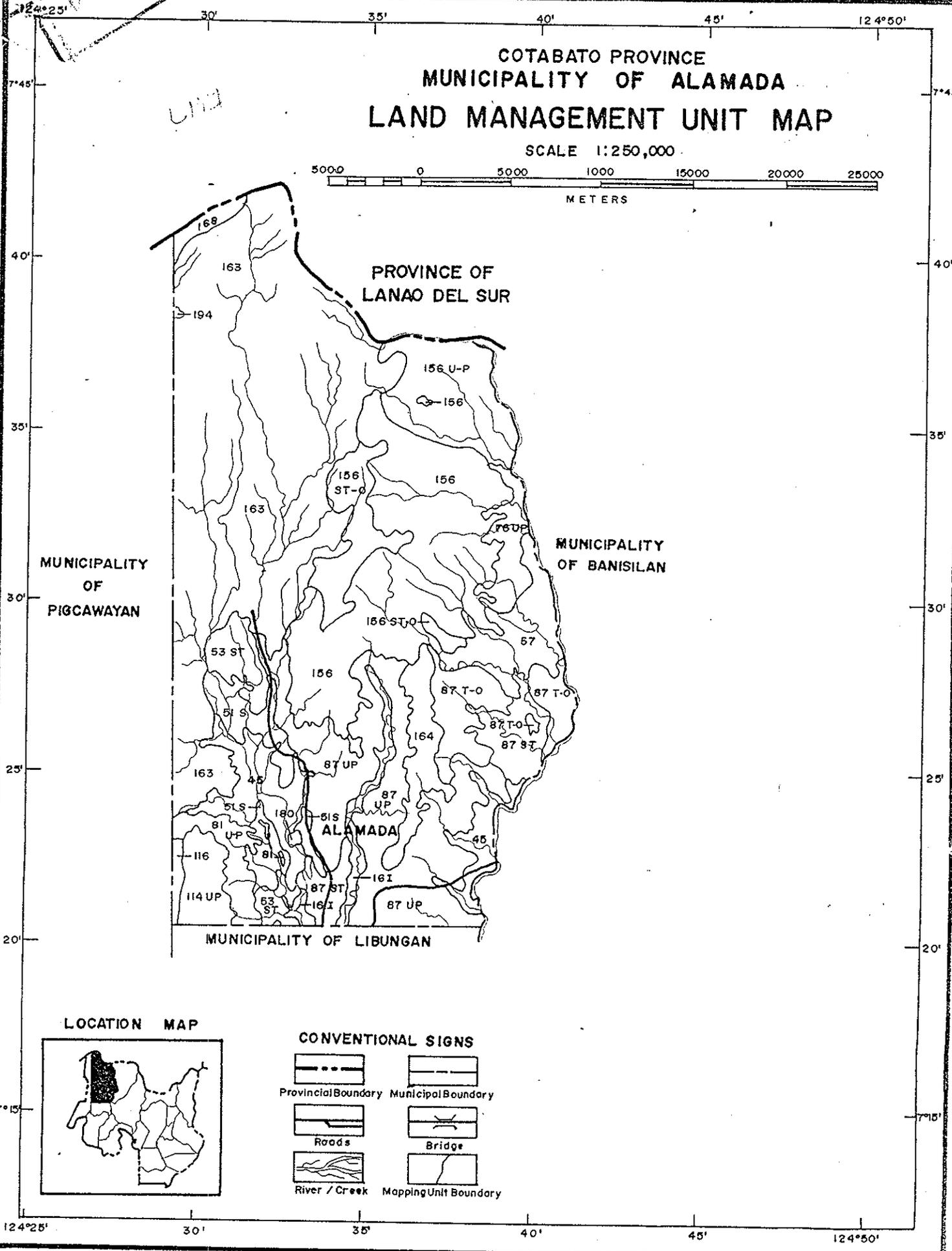
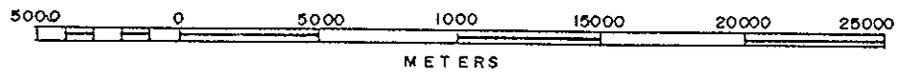
LOCATION MAP



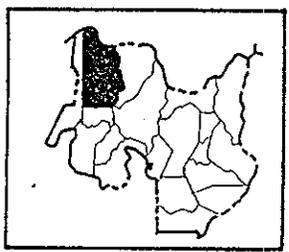
65

COTABATO PROVINCE
MUNICIPALITY OF ALAMADA
LAND MANAGEMENT UNIT MAP

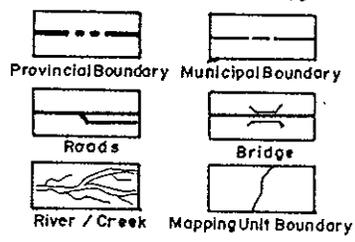
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LOCATION MAP



CONVENTIONAL SIGNS



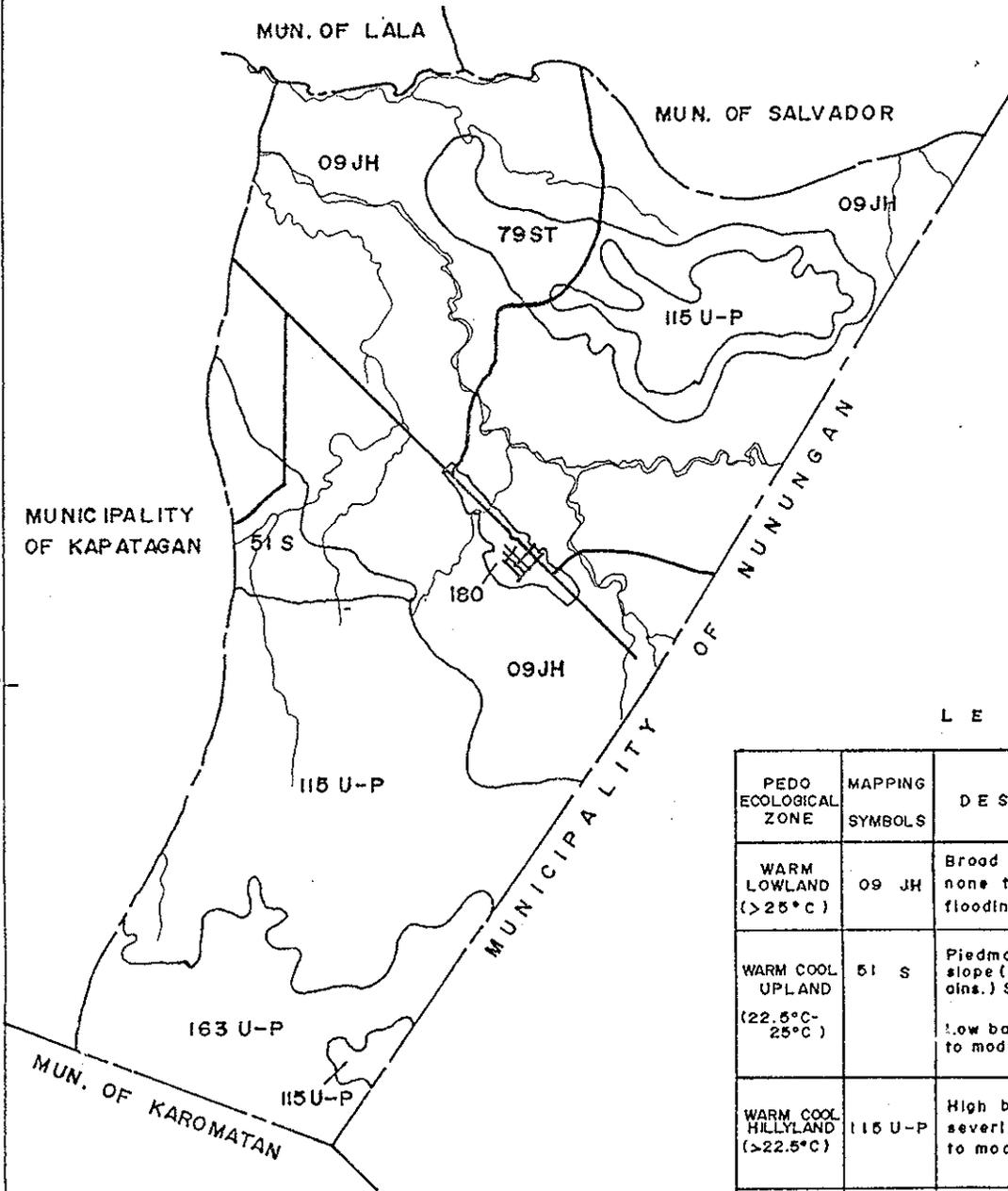
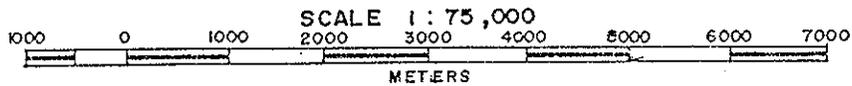
COTABATO PROVINCE
MUNICIPALITY OF ALAMADA
LAND MANAGEMENT UNIT MAP

L E G E N D

| PEDO ECOLOGICAL | MAPPING SMYBOLS | DESCRIPTION | A R E A | |
|---------------------------------------|--------------------|---|---------|--------|
| | | | (Ha.) | (%) |
| WARM LOW- LANDS (25°C) | 161 | Infilled/Localized valleys properly drained. | 1,226 | 1.56 |
| WARM-COOL UPLAND (22.5°C) | 45 | Inland/Stream/Enclosed Valleys. | 3,768 | 4.78 |
| | 51 S | Piedmont plains/footslopes (Volcanic hills or mountains), slightly dissected. | 2,168 | 2.75 |
| | 53 ST | Upper footslope (Volcanic hills or mountains) slightly to moderately dissected. | 1,815 | 2.30 |
| | 57 | Intermontane Valleys | 2,375 | 3.02 |
| | 76 U-P | Low shale/sandstone hills, severely dissected, rolling to moderately steep. | 1,259 | 1.60 |
| | 81 | Low volcanic agglomerate hills. | 117 | 0.15 |
| | 81 U-P | Low volcanic agglomerate hills severely dissected, rolling to moderately steep. | 1,497 | 1.90 |
| | 87 ST | Low meta-volcanic hills, slightly to moderately dissected. | 932 | 1.18 |
| | 87 TO | Low meta-volcanic hills, moderately dissected, undulating to rolling. | 2,789 | 3.54 |
| WARM-COOL HILLYLAND (>22.5°C) | 87 U-P | Low meta-volcanic hills, severely dissected, rolling to moderately steep. | 10,853 | 13.78 |
| | 114 U-P | High pyroclastic hills, severely dissected, rolling to moderately steep. | 1,482 | 1.88 |
| COOL HIGH LAND (<22.5°C) | 116 | High andesitic hills. | 346 | 0.44 |
| | 156 | Shale/sandstone mountains | 12,301 | 15.62 |
| | 156ST-0 | Shale/sandstone mountains, slightly to moderately dissected, undulating to rolling. | 2,500 | 3.17 |
| | 156 U-P | Shale/sandstone mountains, severely dissected, rolling to moderately steep. | 3,712 | 4.71 |
| | 163 | Basaltic mountains | 27,231 | 34.58 |
| | 164 | Andesitic mountains | 1,911 | 2.43 |
| MISC. | 168 | Complex volcanic mountains | 348 | 0.44 |
| | 180 | Built-up areas / urban lands | 44 | 0.06 |
| | 193 | Major Rivers | 67 | 0.09 |
| | 194 | Inland water lakes | 9 | 0.01 |
| T O T A L | | | 78,750 | 100.00 |

123° 50' 123° 55'

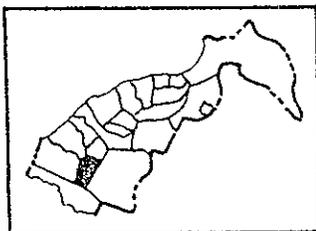
PROVINCE OF LANA O DEL NORTE MUNICIPALITY OF SAPAD LAND MANAGEMENT UNIT MAP



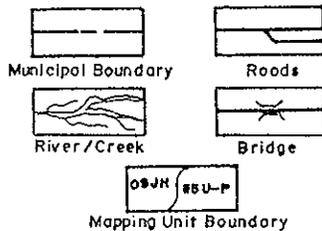
L E G E N D

| PEDO ECOLOGICAL ZONE | MAPPING SYMBOLS | DESCRIPTION | A R E A | |
|--------------------------------|-----------------|--|---------|--------|
| | | | (Ha.) | (%) |
| WARM LOWLAND (>25°C) | 09 JH | Broad alluvial plain, none to slight flooding. | 1,690 | 52.00 |
| WARM COOL UPLAND (22.5°C-25°C) | 51 S | Piedmont plains/foot-slope (Volcanic mountains.) Slightly dissected. | 114 | 3.51 |
| | | Low basaltic hills, slight to moderately dissected. | 231 | 7.11 |
| WARM COOL HILLYLAND (>22.5°C) | 115 U-P | High basaltic hills, severely dissected/rolling to moderately steep. | 843 | 25.94 |
| WARM COOL HIGHLAND (<22.5°C) | 163 U-P | Basaltic mountain severely dissected/rolling to moderately steep. | 332 | 10.21 |
| MISC. | 180 | Built-up areas/urban lands | 40 | 1.23 |
| T O T A L | | | 3,250 | 100.00 |

LOCATION MAP

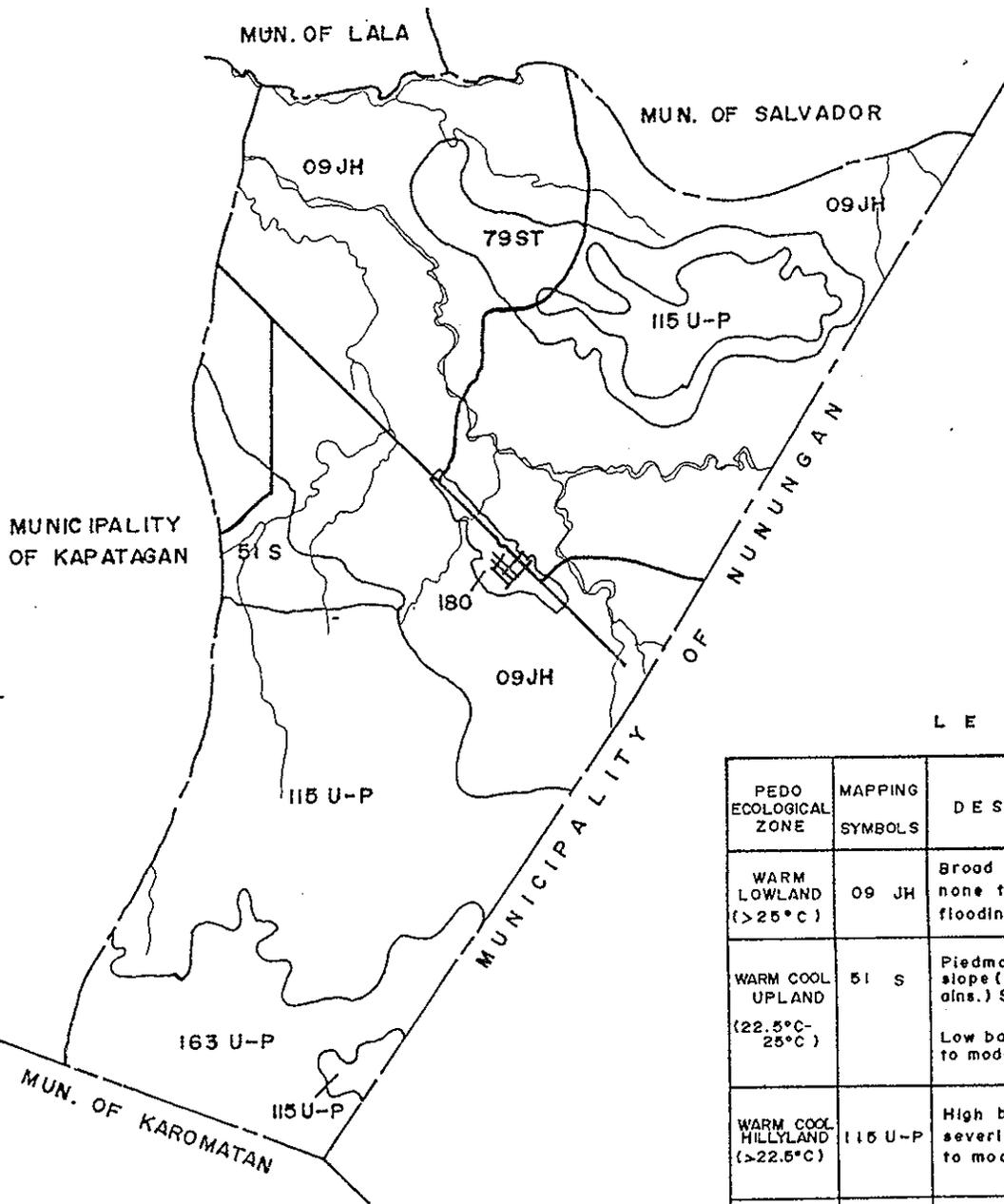
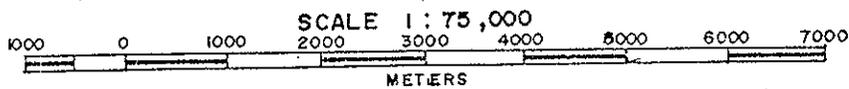


CONVENTIONAL SIGNS



123° 50' 123° 55'

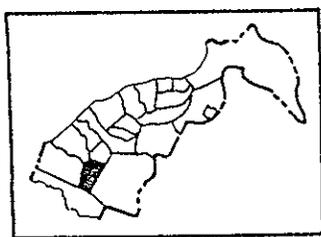
PROVINCE OF LANA O DEL NORTE MUNICIPALITY OF SAPAD LAND MANAGEMENT UNIT MAP



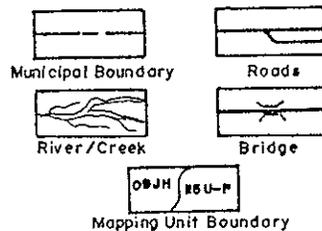
L E G E N D

| PEDO ECOLOGICAL ZONE | MAPPING SYMBOLS | DESCRIPTION | A R E A | |
|--------------------------------|-----------------|--|---------|--------|
| | | | (Ha.) | (%) |
| WARM LOWLAND (>25°C) | 09 JH | Broad alluvial plain, none to slight flooding. | 1,690 | 52.00 |
| WARM COOL UPLAND (22.5°C-25°C) | 51 S | Piedmont plains / foot-slope (Volcanic mountains.) Slightly dissected. | 114 | 3.51 |
| | | Low basaltic hills, slight to moderately dissected. | 231 | 7.11 |
| WARM COOL HILLYLAND (>22.5°C) | 115 U-P | High basaltic hills, severely dissected/rolling to moderately steep. | 843 | 25.94 |
| WARM COOL HIGHLAND (<22.5°C) | 163 U-P | Basaltic mountain severely dissected/rolling to moderately steep. | 332 | 10.21 |
| MISC. | 180 | Built-up areas / urban lands | 40 | 1.23 |
| T O T A L | | | 3,250 | 100.00 |

LOCATION MAP



CONVENTIONAL SIGNS



PROVINCE OF SULTAN KUDARAT
MUNICIPALITY OF COLUMBIO
LAND MANAGEMENT UNIT MAP

L E G E N D

| PEDO- ECOLOGICAL ZONE | MAPPING SYMBOLS | DESCRIPTION | AREA | |
|--|--------------------|--|--------|--------|
| | | | (Ha.) | (%) |
| WARM LOW LAND ($>25^{\circ}\text{C}$) | 09 JH | Broad alluvial plains, slightly flooded infilled/localized valleys, well trained. Lower piedmont plains/footslopes, (Volcanic hills) | 6,263 | 8.33 |
| | 16 H | | 152 | .20 |
| | 27 | | 374 | .50 |
| WARM COOL UPLAND ($22.5^{\circ}\text{C} - 25^{\circ}\text{C}$) | 43 | Broad alluvial valleys (100-500 m. elevation) with remnants of low hills. Infilled/ localized valleys. Lower footslopes (shale/sandstone hills or mountains) slightly dissected. Upper footslopes (volcanic hills or mountain). Upper footslopes, slightly dissected. Upper footslopes, (shale/sandstone hills or mountains) slightly dissected. Low volcanic agglomerates hills seve- rely dissected/rolling to moderately steep. | 7,423 | 9.87 |
| | 44 | | 374 | .50 |
| | 52 S | | 1,129 | 1.50 |
| | 53 | | 381 | .51 |
| | 53 S | | 748 | .99 |
| | 54 S | | 3,484 | 4.63 |
| 81 UP | 4,478 | 5.95 | | |
| WARM COOL HILLYLAND ($>22.5^{\circ}\text{C}$) | 112 ST-0 | High shale/sandstone Hilly/slight to mode- rately dissected. High volcanic agglomerate hills High volcanic agglomerate hills severely dissected/rolling to mode- rately steep. High volcanic agglomerate hills slight to moderate dissected. High meta-volcanic hills. | 409 | .54 |
| | 119 | | 23,584 | 31.37 |
| | 119 U-P | | 9,591 | 12.76 |
| | 119 ST-0 | | 1,298 | 1.73 |
| WARM COOL HIGHLAND ($<22.5^{\circ}\text{C}$) | 124 | Limestone mountain/severely dissected rolling to moderately steep. Low meta-volcanic mountains. Low meta-volcanic mountains slight to moderately dissected. Andesitic mountains/severely dissected/ rolling to moderately dissected. | 148 | .20 |
| | 153 U-P | | 134 | .18 |
| | 160 | | 3,546 | 4.72 |
| | 160 ST-0 | | 261 | .35 |
| MISC. | 164 U-P | Built-up areas/urban lands. Inland water lakes | 10,803 | 14.37 |
| | 180 | | 240 | .32 |
| | 194 | | 360 | .48 |
| T O T A L | | | 75,180 | 100.00 |