

## Ⅳ 調査結果の比較考察

カガヤン州のアー、ローア両地域からそれぞれ1つの村を選定し、82年10月に実施した全戸（<sup>100%</sup> 悉皆）調査結果を2つのパートに分けて報告したが、この調査をとおして、伝統的な天水田農村に改良稲作技術がどう普及し、それが農村の社会経済にどのような効果を及ぼしているかについて幾つかの点が明らかになった。以下、2つの調査事例を素材に、改良技術の普及効果に絞って論点を整理しておきたい。

### 1. 技術普及の前提条件

A P Cによる改良稲作技術の普及を中心としたプロジェクトは、灌漑と社会開発（電化）という他の2つのプロジェクトと連繫し77年に始った。灌漑諸施設については国家灌漑局（N I A）、電化事業についてはカガヤン電化組合（C A G E L C O）がそれぞれ分担し計画が遂行された。特に、これら2つのプロジェクトは、インフラストラクチャーの基盤に直接関係することから、その条件の整備は改良技術を効果的に普及（スパーストラクチャー）するための前提となる。しかし、灌漑諸施設はその建設過程で自然災害等の影響を受け、工事の一部遅滞を余儀なくされた。他方、電化事業はほぼ予定どおり進行し、ミナガ・ノルテ村にもアンティポルダ村にも施設が敷設され通電された。村の生活も電化が進んでいるが、村民の大半は未だ電気をひくだけの生活基盤をもつには至っていない（28頁第10表および84頁第2表）。

水稲2期作に関係した改良稲作技術は、灌漑条件に強く規制される。A P Cの普及諸活動は、その点多くの場面で水利条件の制約を受けたことになる。第1図（131頁）に、この5年間にわたりL B Aで収穫された籼米の平均単当収量を4つのパイロット・ファームごと示した。イギックとラロのそれは目標水準（籼米3.5 t/ha）を達成しており、アムルンとブグイのそれは未だ到達していない。4地区をとおして“農業用水”の供給は不安定で、それが収量にそのまま反映されることになった。農家の技術水準、灌漑稲作への経験と知識の程度も、収量の変動と密接に関連しているが、灌漑面積の減少傾向に示されるように、電力ポンプの稼働能力、カガヤン河の水位変動、台風等による自然災害が、水稲2期作の基本的な制約要因として働いた。

本調査報告は、このような状況下で、A P Cによってなされた改良稲作技術の普及効果を捉えようとしたものである。多くの事例が語るように、伝統的な農村に対し本格的な近代化へのテコが入れられた場合、その初期にみられる効果は比較的大きく映りやすい。しかし、効果がどう持続し、反面どういう社会経済問題をひきおこそうとしているかについては精査

を要する点が多い。インフラストラクチャーがある程度の規模で完備され、そこに2期作技術が導入された場合と違って、ミナガ・ノルテ村もアンティボルダ村もともに効果が短期間ではにくい状況と社会的背景をもっている。ここではそうした点も配慮して、農村内部で観察された諸変化について、他の農村でもひきおこされるとみられる普遍的な側面を普及効果に絞って考察してみることにする。

## 2. 改良技術の波及過程

まず、伝統的な農村社会に改良稲作技術が導入された場合、それが農家や農村社会にどのようなインセンティブを与えながら、どう波及してゆくかについて考えてみよう。2つの調査結果から、おおよそ以下のような動きを知ることができる。

### 1) 天水田地帯は、水利条件が悪くまた技術水準も低いため、収量もずっと低位であった。

ミナガ・ノルテ村の場合、在来品種で30カパン(籾米1.5 t/ha)以下、改良品種でも40カパン(2 t/ha)前後であった。こうした地帯に、灌漑設備を中心としたインフラストラクチャーが整備され、水稲2期作の生産基盤が整い始めた。改良技術の普及に伴って、単当収量も徐々に高まる方向へ進む。ミナガ・ノルテ村のLEA農家では調査の時点で70カパン(3.5 t/ha)を越える水準に達している。また、パイロット・ファームができて間もないアンティボルダ村でも、LEAとOLEA間で籾米収量に20カパン(1 t/ha)を越える差がで始めている。

天水田地帯でも、インフラストラクチャーが整備されそこに適正な技術の普及がなされると、生産力が高まることを籾米収量の増加傾向は端的に示している。イギグ、アムルン、ラロ町にそれぞれ敷設される灌漑ポンプが完備され、カガヤン河支流のマガット河(イサベラ州)に完成したマガット・ダムの発電が本格化すれば、APCパイロット・ファームおよびCIADP地域全域に水稲2期作が普及されカガヤン河の氾濫原は穀倉地帯に変わりうる。その可能性が現実性をもちうることを調査事例は示唆している。

### 2) こうして低位停滞的であった籾米収量が上昇傾向を示すようになると、村の人口扶養力は他の多くの伝統的な村よりもかなり速いテンポで高まることになるから、村の人口は増大し始める。フィリピン全体の人口増加率は高いが(2.64%)、カガヤン州の2.03%に対してミナガ・ノルテ村のそれは2.5%と計測された。

これに対してアンティボルダ村のそれは、1.6%であった。人口増加率が低いのは、天水田農村の中でも生活条件が悪い事情を反映しているようである。

3) 人口増が、そのまま世帯数の増加を促すとは限らない。生活条件が作なわなければ人口の流出をまねくから、世帯数も転出増の傾向を示すだろう。しかし、条件が良い処は「人口扶養力が高い」、逆に転入世帯を含めて世帯数は増加する。ミナガ・ノルテ村は、77年の136戸から82年の170戸へ増加した。世帯数の伸びは1.25倍であった。アンティポルダ村では、それがこの7年間「75年から82年」に101戸から108戸へ増加した。

4) 世帯が形成され維持されるためには、少なくとも世帯を扶養する雇用機会が村内か通勤圏内に存在しなければならない。イギグ町から州庁のあるツゲガラオまで約20km(ジブニーで片道20分、2.5ペソ)あるが、非農家世帯(34戸)の就業先はイギグ町内をでるものではなかった。

ミナガ・ノルテ村の農家世帯は、77年の101戸から82年の109戸へ増加した。総世帯数が増加したため、農家率は74%から64%へ減少した。しかし、土地なし労働者が10世帯から29世帯へ増加し、総世帯に占めるその比率は7%から17%となった。土地なし労働者は近隣農家の農作業に参加しその日当で生計をたてる階層であるから、農家世帯に含めて考えてよいだろう。この階層を考慮すれば、世帯数が伸びる一方で農家率は約80%で推移したことになる。なお、土地なし労働者を含むアンティポルダ村の農家率は、88%であった。

5) 人口が増加し、農業に生活を委ねる世帯が増加すれば、耕地面積は拡大の方向へ動く。しかし、既にみたように、ミナガ・ノルテ村の耕作面積はほぼ160ha(天水田と畑)で大きくは変化しなかった。耕地に対する人口圧が、急速に高まったと判断される。

また、耕作面積の集計をとおして、ミナガ・ノルテ村の農家が天水田面積にほぼ匹敵する畑を耕作し、主にトウモロコシを栽培していることが明らかにされた。乾期(天水田の農閑期)の所得源として、さらには天水田の大きな収量変動に対する危険分散(保険)という観点から、畑作は重要な意味を持っている。アンティポルダ村は天水田だけに依存する農村であり、この調査によって2つの経営タイプの実態を知ることができた。

6) 農家世帯もしくは農業を生活の基盤とする世帯の増加にもかかわらず耕作面積が拡大されないため、耕作権の獲得競争は徐々に激化してゆく。天水田農村では、生産力が低かったため総体的に地価が安く、また均分相続制の下で農地の細分化が進んでいる。しかし、最近、生産基盤が整備され始め、生産力も高まる可能性がでてきたため、従来の単なる売買や相続にみられた農地の動きとは違う社会的競争の度合を強めようとしている。

ミナガ・ノルテ村における土地制度の変化で言及したが、L E A、O L E A 農家とも階層とその階層構成にかなり激しい動きがみられた。例えば、L E A の自作農にしても77年当時の5人から、単純増で7人になったのではない。そのまま自作農であったのは4人で、うち一人が転出した。また、代って一人が自小作から自作農となったが、何らかの理由で小作権を手放すことになったとみられる。この階層に加わった他の二人は、外部から転入してきた世帯主であった。この一例にとどまらず、階層構成員の変化には注目すべき動きが認められた(35頁第14表、36頁第5図)。

7) こうした耕作権獲得競争からはずれた世帯はどうなるのだろうか。ミナガ・ノルテ村でみたように77年当時の10戸から、82年には29戸に達した土地なし農業労働者の増大が、これをはっきりと裏づけている。耕作権(又は小作権)を獲得できない地帯は、自作農や小作農の農作業に労働者としてでむき、日当を得て生計をたてる。こうした階層は、特に灌漑条件がよく整備された水田2期作地帯に滞留しており、村によっては総人口の4割をしめる処もあると報告されている。

アンティボルダ村でも、82年現在、15世帯(総世帯数の14%)が土地なし労働者と確認された。しかし、この村の場合は子弟が村外へでたため後継ぎがなく土地なし労働者となったケースや、戸主の死去によるケースなどがあり、ミナガ・ノルテ村とは違った性格を持っている。

8) L E A 農家とO L E A 農家の収米収量の差に露的に示されるように、L E A 内に耕作権をもった農家とそうでない農家では所得格差がだんだん広がるだろう。しかし、村社会全体には急激な所得格差やそれによる摩擦を最小限にするような経済の仕組みが、慣行的に造りあげられている。

フィリピンの農村では、総投下労働時間(約100人日/ha)の6ないし8割を雇用労働に依存する。これは、例えば家族労働を中心とした日本の稲作農業のそれと大きく異なる点でもある。こうした雇用労働に依存する社会慣行がなぜ造られたかについては、幾つかの理由が考えられる。1つは、水条件さえ整えば年間をとおしていつでも作付できるという作期に規制されない自然条件、2つは個々の農家間で収量差が大きく、その危険分散上から相互扶助的作業慣行が必要であるという経済的条件、3つは伝統的な分益小作制の下では必ずしも収量増が小作農の手取り分に反映されないことによるとする社会的条件がそれである。ともかく幾つかの理由が重なって、自分の水田の例えば収穫作業に参加させる代わりに、自らもまた収穫作業に参加した農家の収穫作業に参加し、収穫シェアを現物賃金で受けとる。こうした「分益経済(Share Economy)」<sup>10)</sup>を基軸におく社会慣行が

生みだされ根づいている。

調査をとおして、比較的作期幅が狭い天水田農村でも、この慣行が生きていることを確認できた。

- 9) 先に述べたように、土地保有階層の中でもL.E.AとO.L.E.A農家では、初米の収量差がはっきりしてきた。しかし、L.E.A農家の収量増(粗収益の増)は、高い水利費(重力灌漑では初米3カパン/haであるが、ポンプ灌漑では6カパン/ha)、肥料・農薬の増投、さらには綿密な栽培技術を作なうため、コスト高となる。そのため、従来のままの収穫物分配シェアでは、雇用者側の負担が重くなる。収穫シェアの切り下げは、それを均衡させる作用を持っている。例えば、ミナガ・ノルテ村ではO.L.E.Aにおける6分の1の分配率に対し、L.E.Aで7分の1への切り下げが進んだ。また、アンティボルダ村でもこれまでの5分の1に対し6分の1への移行が図られようとしている。

収穫シェアの切り下げは、初米の収量水準、諸経費、収穫作業労働への参加人数等を反映して徐々に実行されるが、調査ではそれが定着する経緯について未だ掘り起こされていない。

- 10) 2つの調査をとおして、改良稲作技術の導入に伴う以上のような動きが確認された。前述したように、インフラストラクチャーの整備状況は未だ完全ではない。しかし、APCがイギグ町に設置した52ha、62人の耕作者、ブゲイ町の42ha、20人の耕作者が、改良技術を習熟してゆく過程は、伝統的な農村へ大きなインパクトを与えていることを教えている。

農地改革と改良稲作技術の普及は、フィリピン農村における農村開発の2大変革要因である。農地改革の実施に未だ時間を必要とするカガヤン農村の実情からみて、水利条件の整備と改良技術の普及は大きな役割を担っている。今後の動きについては、継続的な調査と観察が必要であるが、当該村の農家が一体どうAPCの諸活動をとらえているかについて、次に社会的側面から考察してみることにしよう。

### 3. 技術普及の社会効果

ミナガ・ノルテ村の調査では、家族の世帯構成、修学実情等についても詳細なデータが提示された。こうした要素が農業の生産力増大傾向と密接に関連することは疑いを入れないが、77年以降5年間という期間からみて農業技術の普及効果と結び付けて考えるには無理がある。そこで見方を変えて、APCの普及活動に対し村民の多くがどういう意識を持っているかについて質問してみた。こうした問は、聞き方によって回答も変わりうるが、おおよその

見当をつけることはできる。

まず、「APCの諸活動が各世帯もしくは村社会の改善に貢献したか」を「各世帯」について聞いた(139頁第1表)。その結果、約60%の住民が「貢献した」と答えた。97戸のうち「生産が伸びた」と答えた世帯が48で、「灌漑条件が良くなった」、「技術の導入が図られた」という回答がこれに続いた。こうした回答は、APC諸活動の効果を直接受けたLEA農家に圧倒的に多くみられた。

これに対して、「雇用機会が増えた」と答えた世帯が31戸あった。これらは、APCに直接雇用されるケースや、2期作によって収穫労働へ参加する機会が増えたケースを含む。この回答者の中には、LEA以外の世帯が多かった。前者の直接効果に対して、後者は間接効果を高く評価したとみられる。

なお、「特に、APCの諸活動が家族にとって役立ったとは思えない」と回答した世帯が全体の1/4あった。農家世帯(108戸)の中でも30戸がこうした意見を寄せた点に、APCの受益者となったLEA農家とそうでない農家とにみられる意識上の対立を感じさせる。今後、留意しなければならない問題点といえるだろう。ちなみに、全体の1/5相当が回答を保留した。

先の質問を、「村社会」について聞いた結果では、全体の半数が「村社会にも貢献したと思う」と答えた(141頁第2表)。中でも、生産の伸びと雇用機会の増加を強調する者が多数をしめた。また、「貢献したとは思えない」と回答した者が全体の1割いた。残りの4割は、直接回答することを避けた。これら2つの回答に示されるように、LEA農家に対してそれ以外の世帯では受けとり方がまちまちであった。

質問をやや具体化し、「どの点に意義があったと思うか」について質問した(142頁第3表・問2)。個々の家庭については、LEA農家以外は「雇用機会の増大」を指摘する世帯が多かった。ここでも最初の質問と同様、「生産が伸びた」とするLEA農家との間にかなりはっきりした差が認められた。この傾向は、「村社会」についても同様で、「雇用の増大と生活条件の改善、生産の伸び」を評価する世帯が全体のほぼ6割をしめた。なお、約4割が回答を保留した。

恐らく、最初の質問と混同して受けとられたとみられるが、これらの回答には卒直な見解が示されている。要するに、「水」かそうでなければ「仕事」を欲しいという村民の切実な気持ちがそれである。天水田農村の村民にとって、農業用水が確保できるか否かは死活の問題でもある。例えば、「灌漑水の導入によって初米収量はどうなったと思うか」という質問

に対し、全世帯の6割は「収量が増えたと思う」と述べた(前同第3表)。その要因として「灌漑施設が改善されたから」と回答したものが多く、これに「改良技術の導入」と「2期作」をあげる者が続いた。技術普及の問題は、灌漑の際にかくれたきらいがあるが、それだけに「灌漑稲作」への期待も大きいということだろう。

最後に、「パイロット・ファーム」の創設によって所得がどう変化したと思うかについて質問した(142頁第3表・問3)。全世帯の7割は「所得も増えたと思う」と彼らの実感を述べた。その背後には経済事情の変化もありAPC設立の効果とは断定できないが、回答者の過半は「生産の伸び、水の確保、2期作」をその主な要因としてあげた。

先に触れたように、この種の質問は問いかけ方によって回答も動きやすい。<sup>(41)</sup>しかし、全体として、APCの設立と諸活動が農村開発に強いインパクトを与えているとみてよいだろう。

他方、ブダイ町アンティボルダ村は、パイロット・ファーム設置後目が浅いため村民の反応を知るまでにはいたっていない。しかし、改良技術について興味ある回答を寄せている(123-124頁第1,2付表)。例えば、全農家世帯(80戸)のうち「改良技術を導入している」と答えた世帯は、全体の1/3にすぎなかった。彼らの多くは、「APCが貸与する耕耘機を使用して本田整地作業を行っていること」、「改良品種を植え付けていること」、「肥料を使っていること」をその理由にあげた。また、その技術をAPCを中心とした普及担当者から得たとも答えている。こうしたことから判断して、アンティボルダ村はどうか農業発展への第一歩を踏みだした状態であることが分かる。ここでもAPCのパイロット・ファームと技術指導が大きなポイントとなっている。

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4) 「分益社会」という表現をとったが、「分配社会」の方が日本との比較において適切かもしれない。ともあれ、先に触れた収穫慣行からみても、フィリピン農村は日本と異なる社会構造を持っている。

作期が季節に強くしぼられている日本では、水利に一定の秩序が形成され、これに労働力利用の割合が重なって、田植えは作業過程全体の中でも極めて重要な位置を占めてきた。田植え水を手際よく引き、労働力を確保する。古くから溜め池を築造しては田植え水や美しい水を貯水したり、他方で結(ゆい)や手間換(てまがえ)といった交換労働慣行を不可分なものとして生み出してきた。その基盤には、自然・社会環境に規制された栽培適期が厳然として存在していたとみてよい。こういう視点に立つと、日本の稲作は田植えを基盤におく「生産社会」としての特徴を備えている様子がよく分る。

しかし、フィリピンの場合はかなり違う。確かに雨期と乾期の区分があるが、気候にしばられた日本程には田植え時期の制約が厳しくない。田植え自体はやり直しのきく作業であり、田植えのよしあしよりもその後の手間のかけ方や頻繁に襲ってくる台風のダメージを考えると、作業の中心は稲米多どまりの目途が立つ収穫作業へ傾注する。収量の増減は、農家にもとより収穫労働者の実入りに直接反映される。日当つき田植え賃金と比較して、収穫作業が依然として現物賃金という全く異なる賃金体系を固守していることから、

収穫作業の特異性を知らることができる。

フィリピンの農村を見ていると、日本の田植えを中心とした「生産社会」に対し、収穫作業を核とした「分益(または分配)社会」が形作られていると考えない訳にはゆかない。「分益社会」を念頭に置くと、収穫作業やその作業に現物賃金が慣行として投づく背景も、一つひとつが結びつき社会の様子が浮き彫りにされてくる。

- 44) 英文報告に目をとむしていただければ分かるが、この調査ではかなりの部分が農家の意向調査を中心とした社会調査にむけられた。偶気だが時として寡黙な農民が、特にAPCの技術指導にどういう目をむけているかについては、社会調査の方が多くの回答を寄せてくれる。報告書には、アンティポルダ村で行った改良技術についての意見(124頁)、稲作の将来(125頁)、信用制度(126頁)、幾つかの常識的な見方に対する回答者の見解(127頁)、それに意思決定のありよう(128頁)が付表で示されている。

この調査では、社会調査について検討が必ずしも充分になされたとはいえなかった。今後の調査上の課題として残されている。



## お わ り に

これまで検討したように、APCの設立と改良技術の普及活動は当該農村の稲作農家や村の社会経済に多面的な効果を及ぼしてきた。しかし、反面、残された問題や今後に対応策を委ねた問題も多い。以下ではそうした問題の中から、重要とみられるものをあげてみよう。

1) 先に、APC創設以来5年間にLEA農家の初米収量がどのように変化したかを示した(131頁第1図)。このグラフは、まず、LEA農家においても収量の安定化が如何に難しいかを端的に例示している。例えば、イギグのパイロット・ファームを例にとると、収量達成目標の3.5 t/haをほぼ達成しているものの、81、82年の乾期作では3 t/ha(60カバン)前後にとどまった。ちなみに、マサガナ99食糧増産計画の達成目標は99カバンである。

こうした収量の不安定さは、第1に、LEA農家においても未だ十分に水が確保されないという問題に起因する。第2は、これと密接に関連するが、ミナガ・ノルテの農家が天水田兼畑作農民であるため(天水田は畑としての特性があり、もともと畑作を主とした農民であるとする見解もある)、水の管理技術を含め灌漑稲作に対する技術水準が低い。

また、灌漑面積の変化に示されるように、その面積は当初よりも減少することになった。これはポンプが順調に稼動しなかったことを主因としている。こうした事実は、パイロット・ファームが技術普及の“ショー・ウィンド”としても、未だ完成されたものではないことを教えている。イギグ・ポンプ場をはじめ灌漑設備の整備が伴わなかった点に、技術普及に先立つ大きな問題が残された。この問題に対する対策は、最優先で取り組まなければならない。

2) 灌漑問題については、農業政策上、村からみて別の意味で深刻な問題があることも指摘しておきたい。それは、70年代と80年代ではフィリピンの米の需給関係に大きな変化がおきていることに起因する。米の生産がほぼ需要量と均衡する状態に近くなり、中部ルソンや南タガログ地方の穀倉地帯の収量が安定化してきたことと関連して、「稲作」が象徴視される傾向を強めている。少なくとも末端の農村からはそう見える。米の生産が安定化するに依りて、灌漑設備を整備するテンポがスロー・ダウンしているとする見方が、特に開発が遅れた地域では強い。

こうした風潮が、灌漑設備が整備され、どうにか農村開発の足がかりをつかみ始めたカガヤン州の農民に与える影響は小さくない。大型ポンプを稼動させる電気の容量からみて、いずれ投資効果が問題にされ、稲作の生産コストが劇上にあがる可能性も高い。長く採地状態

におかれた天水田農村では、総体としての開発効果に長い年月を必要とするだろう。その場合も、まず、「米」の生産力を高めることが第1義的課題となることを視座におかなければならない。

3) 農村開発の壁となっている問題の1つに、農地制度がある。両農村にみたように、農地改革は必ずしも効果的であるようにはみえない。また、分益制が過半を占めていることから判断されるように、農民自身も自作農化にちゅうちよする性格が強い。定額小作農への移行が図られない限り、増収の効果は農民の生産意欲を高めさせる要因とならないだろう。

特に、定額割への移行を強調したいのは、灌漑設備がしかれ初米収量が増大する傾向をしめし始めると、定額小作料の査定が一層困難になるためである。ミナガ・ノルテ村では、70年代後半に定額小作料が一度査定された。しかし、天水田を前提とした定額小作料の査定額と、水利条件が整った高い生産力のそれとでは、当然、査定額が変わりうる。灌漑稲作への可能性が高まったため、農地改革をめぐって、逆に、小農が苦境に立たされることが懸念される。

4) 指摘した以上のような問題点に加えて、APCで対応可能なことに言及しておく。

費用収益分析で示されたように、ミナガ・ノルテ村ではLEA農家とOLEA農家間の収益性に明らかな差が認められるようになった。LEA農家内でも、自作農、自小作農、小作農の各階層間で大きな所得格差が生みだされようとしている。また、OLEA農家の経済事情はアンティポルダ村のそれと変わらない程度に低かった。これまで生産力が低位で停滞的であった農村には、その発展段階に応じた均衡状態が造りだされていたが、徐々に伝統的社会からの離脱が図られようとしている。その移行が急であれば、当然、プロジェクトの受益者と非受益者間に社会的摩擦を引きおこすであろう。

こうした軌<sup>おは</sup>録を避けるためには、意向調査にOLEA農家が寄せたように、受益者をパイロット・ファームだけに限定せず、灌漑面積の拡大を可能な限り早め、OLEA農家も技術普及の対象に組み込む具体策が提示されなければならない。大多数の農民は5年を経過した現在もこれまでと変わらない栽培条件下におかれている。APCの存在が大きくなり、その役割が重くなればなる程、この視点は不可欠のものとなる。

5) 具体的な技術普及の課題としては、次のような事項が考えられる。

1つは、排水施設の重要性である。灌漑が重視される反面、排水は軽視される傾向がある。

2つは、初米収量が必ずしも“水”によって保証されるとは限らない点である。施肥技術を高めるためにも、土壌条件、特に土壌診断は重要な研究対象となる。これに対する研究の

蓄積は充分といえない。

3つは、先の2と関連するが、施肥法の普及にとどまらず有機物投与についての関心を高める点である。2期作を持続させるためには、地力の研究が重要となる。

4つは、病虫害防除技術に対する関心である。現在では、2期作面積が限られていることから、主要な病虫害もステンボウラー（メイ虫）にとどまっている。しかし、年間をとおして同一品種が広域に栽培されるようになると、病虫害問題は最重要課題となる。それを見越したデータの蓄積が必要である。

最後に、農具等の改善に係るが、例えば除草剤への関心が高いにもかかわらず、農民の多くはロータリー除草機さえ所有していなかった。「土地・資本を節約し、労働集約的技術を基軸とする」技術指導の内容からすると、手除草、手持し除草機の使用経験を見落してはならないだろう。こうした段階を追った技術の普及が、長期的には極めて重要な意味をもつことになることをここでもう一度考えてみななければならない。



RESEARCH REPORT FOR TECHNICAL GUIDANCE OF THE APC PROJECT, CIADP

SOCIO-ECONOMIC IMPACT OF TECHNOLOGY  
DIFFUSION ON RICE FARMING AND TO RURAL COMMUNITY  
AT THE APC PROJECT AREA

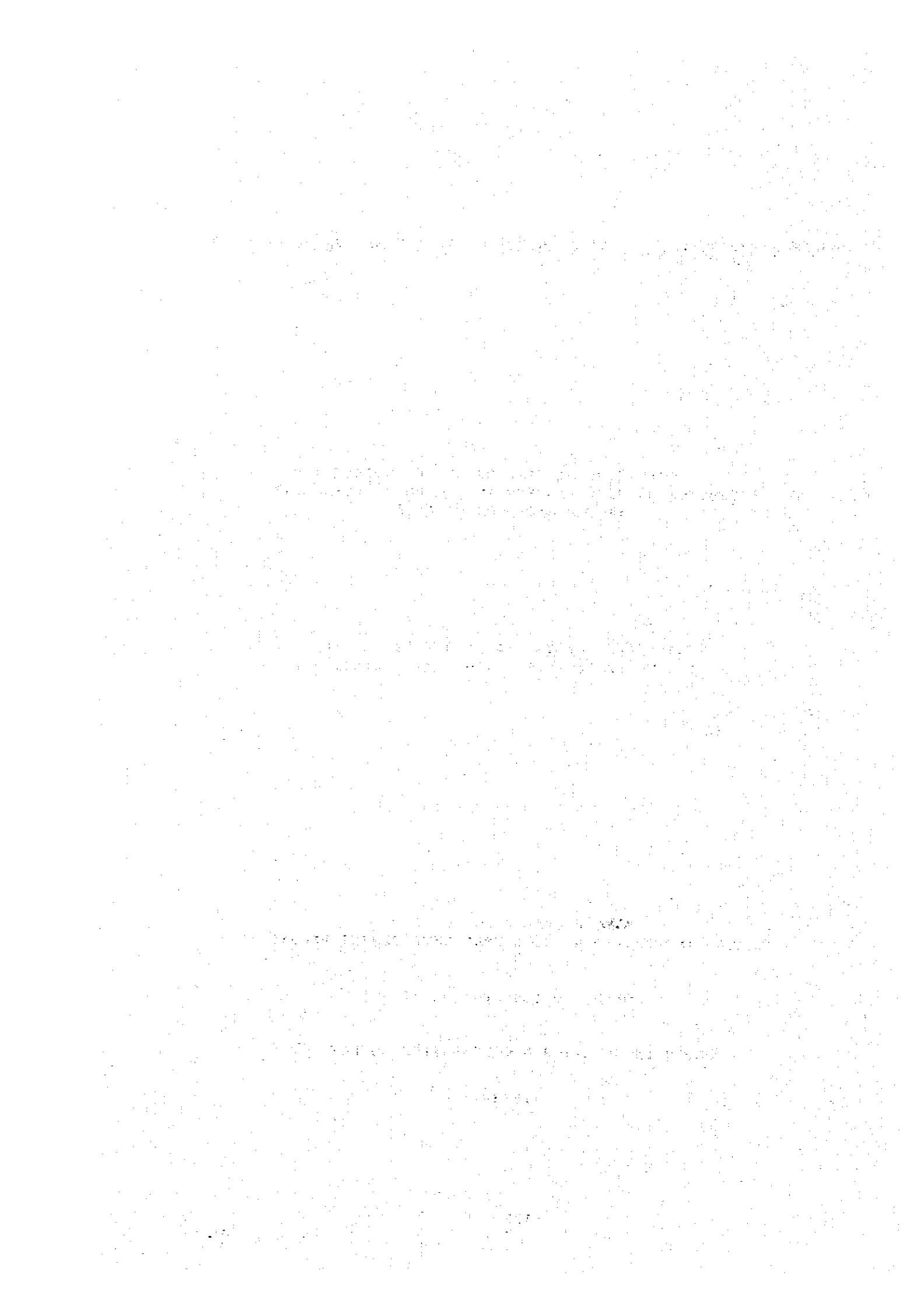
-Case Study of Two Rainfed Villages in  
the Upper/Lower Cagayan, Philippines-

AGRICULTURAL PILOT CENTER  
CAGAYAN INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT

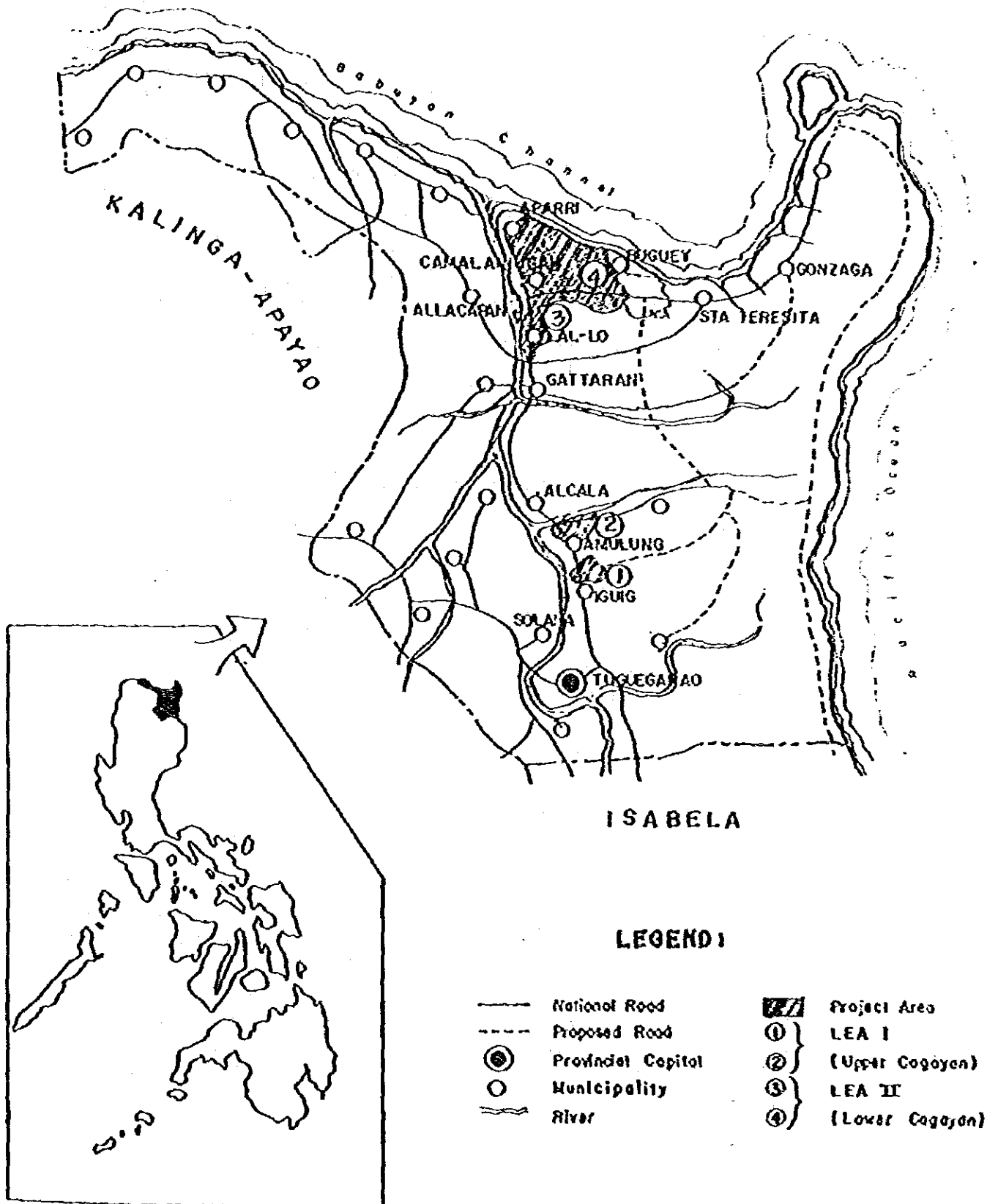
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JAPAN INTERNATIONAL COOPERATION AGENCY

-1983-



# LOCATION OF THE APC PILOT FARMS PROVINCE OF CAGAYAN



ISABELA

### LEGEND:

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>— National Road</li> <li>- - - Proposed Road</li> <li>⊙ Provincial Capital</li> <li>○ Municipality</li> <li>~ River</li> </ul> | <ul style="list-style-type: none"> <li> Project Area</li> <li>① LEA I</li> <li>② (Upper Cogoyan)</li> <li>③ LEA II</li> <li>④ (Lower Cogoyan)</li> </ul> |
|---|--|

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## FOREWORD

The Cagayan Integrated Agricultural Development Project (CIADP) was planned to uplift the socio-economic status, giving emphasis on the rural areas, and to bridge the gap between depressed and developed areas from the stand point of social justice. For this purpose, the Agricultural Pilot Center (APC) has contributed to the modernization of agriculture through the diffusion of double-cropping technology of rice and the increase of agricultural productivity corresponding to the improvement of infrastructure.

Four (4) APC pilot farms located at the upper and lower Cagayan are intended to provide the project planners and implementors and insight of the possible developmental needs, problems and constraints in the rest of the project area. However, socio-economic condition surrounding rice farmers and/or actual situation of rural community is not yet clarified because the area has been located among the regions where development is slow. In view of the above, we conducted the whole households survey at two rainfed villages in upper/lower Cagayan where it is closely related with the APC projects.

We hope that this report will provide technical guidance in monitoring and evaluating the impact of the project in the future.

EDMUND J. SANA  
Technical Director, APC

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It is the great pleasure of the authors to state their thanks to Cagayan Integrated Agricultural Development Project (CIADP), Agricultural Pilot Center (APC) and Japan International Cooperation Agency (JICA) for their sponsorship in giving us the opportunity of conducting a village survey regarding socio-economic impacts of new rice technology on APC project area.

We would like to express our deep appreciation to Mr. Edmund J. Sana, Technical Director of APC, for his warm consideration and hospitality, and Drs. Sachihiko Tanaka and Minoru Kurihara, former and present team leaders of JICA office of APC for their cordial support and coordination.

We are also greatly indebted to Mr. Proceso Maramag, Municipal Mayor of Iguig, and Mr. Pedro Ramos, Barangay (village) Captain of Minanga Norte, for allowing us to conduct this village survey. Appreciation is also conveyed to Attorney Jorge P. Arreola, Municipal Mayor of Buguey, and Mr. Angel Cabote, Barangay Captain of Modesto Antiporda, for their kind help and useful advice to the survey. This study would not have been possible without the cooperation of the village people. The barangay council members were most helpful in our research project.

Our sincere thanks go to Mr. Vicente Galvez and his staff members, National Irrigation Administration, CIADP-Irrigation Component, for the assistance, guidance and care extended to us.

In the course of this research, Mr. Yoshinori Morooka, TARC (Tropical Agricultural Research Center, Ministry of Agriculture, Forestry & Fisheries) joined our group as a short term JICA expert. He visited APC two times, first from August to October, 1982, and second from June to September, 1982. We are grateful for his official and personal cooperation extended to this socio-economic study.

Yoshina Mizusawa  
JICA Expert  
on behalf  
Socio-Economic Survey Team

**SOCIO-ECONOMIC IMPACT OF TECHNOLOGY  
DIFFUSION ON RICE FARMING AND TO RURAL COMMUNITY  
AT THE APC PROJECT AREA**

**- Case Study of Two Rainfed Villages in  
the Upper/Lower Cagayan Philippines -**

**INTRODUCTION\***

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\* Prepared by Yoshinori Morooka (TARC) & Juan D. Lasan  
(APC)

### Outline of APC/CIADP

In Iguig, Cagayan Province, the Agricultural Pilot Center (APC) was established in 1977 as a joint undertaking of the Cagayan Integrated Agricultural Development Project (CIADP)\* and the Japan International Cooperation Agency (JICA). APC aims to increase food production through the identification of more productive rice-based cropping patterns that are acceptable to small rainfed rice farmers in the area.

The specific objective are to: 1) develop, generate and improve farm technologies through applied researches and verify the adaptability at specific location/situations; 2) to improve farm productivity through technology packaging and dissemination; 3) develop, implement and coordinate inter-agency extension work for a more effective and efficient transfer of technology to farmers; and 4) train farmers and agricultural development workers to upgrade their competence. Since the extension program aims to make farmers adopt the improved technologies developed under APC, activities include establishment of pilot farms, training programs and supportive communications. Pilot farms set up in Iguig, Alcala-Amulung, Lal-lo and Buguey, serve as Leading Extension Areas (LEA) to demonstrate improved agricultural technologies to farmers under the guidance and support of APC. A package of improved

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\*CIADP was created under PD (Presidential Decree) 1189 on August 30, 1977 to accelerate a balanced and integrated development of the province through the implementation of carefully laid off program for the simultaneous delivery of a host of agricultural infrastructure and social services. As of 1982, this is the third of the eight integrated area development projects in the Philippines.

The project serves not only to increase production of traditional crops like rice, corn and tobacco without necessarily increasing hectareage but also seeks to make full use of all land resources through the introduction of industrial and cash crops including the development of livestock, dairy and fisheries. Undermining CIADP's effort in developing the province's agricultural and natural resources, capabilities is its allied infrastructure development program jointly sponsored by the Phillipines and Japanese government.

technology is extended to the farmers within the designated LEA where conditions are similar to other CIADP areas. Any potential problem identified in LEA during the course of operation is then fed back to APC for in-depth analysis and appropriate action.

As of 1982, LEA was extended to four (4) area covering an aggregate area of about 200 hectares. The Iguig Pilot Farm (60 ha) and Alcala-Amulung Pilot Farm (75 ha) at the LEA I in the upper Cagayan started in 1978 and 1979, respectively. At the LEA II in the lower Cagayan, Lal-lo Pilot Farm (32 ha) was set up in 1980 and Buguey Pilot Farm (42 ha) was launched in November, 1981. Incidentally, it is expected that the upper Cagayan will cover a total area of approximately 3,125 ha. while that of lower Cagayan is about 10,875 ha.

#### Significance of Socio-Economic Survey

Five year have passed since the implementation of APC. During the period, extension, research and technology transfer were being conducted in pilot farms. At APC, Filipino scientists and Japanese specialists have worked together in developing appropriate farm technology under Cagayan conditions. As a result, how would the rice farmers' technology be improved? In accordance with technology diffusion by APC what impact would be attained by rural community in related villages? However, the repercussion of the project on social welfare in the areas is not yet investigated thoroughly.

Recently in the Philippines, theoretical efforts have been paralleled with empirical studies by the department of agricultural economics at the International Rice Research Institute (IRRI), resulting in major advances in the understanding of peasant economic behavior. These research works are mainly conducted at comparatively well irrigated villages while the majority of paddy field in the country still remain under rainfed condition (Table 1). Cagayan Valley is typical region where rainfed rice farming is predominant over a very

wide area. The project's impact on rural welfare through income distribution and consumption cannot be evaluated without information on production at both the household and the village society.

A major difficulty in the impact evaluation arises from the inseparability of economic functions within a peasant-household and the role of the village. To a large extent, the village community in developing countries is self-contained. Typically, production activities are based on resources within the village to satisfy the demands of the villagers; relatively few transactions are channelled through the market. Especially, a high degree of interaction still exists in the rainfed village because of tradition, kinship and need for cooperation for the sake of minimum security and survival. Intricate mutual help and patron-client relationships govern the economic activities according to specific class structure and value systems.

#### General Purpose

The main purpose of this survey is to evaluate the impact of technology diffusion on rice farming and to rural community at the APC project areas. The interview survey in light of the socio-economic aspects at the APC project areas will provide a technical guidance on how to 1) increase farm income through technology dissemination and 2) develop and coordinate inter-agency extension work for a more effective and efficient transfer of technology to farmers.

The need for such data collection is not limited to academic interests. It should be the basis for effective design for rural development programs and national development programs/ policy. For example, a program such as the development and extension of a new rice technology could be evaluated by farm production surveys to indicate how the technology will affect farm outputs, costs and returns. Research findings will serve as basic information to policy formulation and planning in revitalizing rainfed farmers in Cagayan.



Table 1. Rice Production, Area Harvested and Yield per Hectare in Cagayan Valley, Central Luzon and the Philippines, 1968 and 1978

|                                    | Cagayan Valley <sup>a)</sup> |       | Central Luzon <sup>b)</sup> |         | Philippines |         |
|------------------------------------|------------------------------|-------|-----------------------------|---------|-------------|---------|
|                                    | 1968                         | 1978  | 1968                        | 1978    | 1968        | 1978    |
| Total output (1,000 t):            |                              |       |                             |         |             |         |
| Irrigated <sup>c)</sup> (1)        | 238.4                        | 501.8 | 711.7                       | 817.4   | 2,270.5     | 3,461.4 |
| Non-irrigated <sup>d)</sup> (2)    | 242.1                        | 204.1 | 448.4                       | 228.4   | 2,290.2     | 2,606.1 |
| Total (3)                          | 480.5                        | 705.9 | 1,160.1                     | 1,045.8 | 4,560.7     | 6,067.5 |
| Area Harvested (1,000 ha):         |                              |       |                             |         |             |         |
| Irrigated (4)                      | 130.9                        | 235.5 | 360.3                       | 293.5   | 1,309.0     | 1,514.9 |
| Non-irrigated (5)                  | 165.9                        | 178.3 | 267.7                       | 120.1   | 1,994.6     | 1,993.9 |
| Total (6)                          | 296.8                        | 413.8 | 628.0                       | 413.6   | 3,303.6     | 3,508.8 |
| Yield/ha of Harvested Area (t/ha): |                              |       |                             |         |             |         |
| Irrigated (7)                      | 1.8                          | 2.1   | 2.0                         | 2.8     | 1.7         | 2.3     |
| Non-irrigated (8)                  | 1.5                          | 1.1   | 1.7                         | 1.9     | 1.1         | 1.3     |
| Total (3)/(6)                      | 1.6                          | 1.7   | 1.8                         | 2.5     | 1.4         | 1.7     |
| Rainfed area ratio (5)/(6)         | 66.0                         | 43.1  | 43.0                        | 29.0    | 60.4        | 56.8    |

a) Includes the provinces of Batanes, Cagayan, Ifugao, Isabela, Kalinga-Apayao, Nueva Vizcaya and Quirino.

b) Includes the provinces of Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac and Zambales.

c) Irrigated areas are artificially watered by irrigation pumps or by dams and canals.

d) Includes rainfed, upland and kainqin area.

Source: Philippine Council for Agriculture and Resources Research, Data Series on Rice Statistics in the Philippines, 1981.

### Procedures of Data Collection

Firstly, for the socio-economic survey of the whole household in two villages, we prepared a questionnaire composed of economic and sociological aspects. The questionnaire holds almost the same contents with the original one previously used by the Farm Services Division of APC in an evaluation survey conducted in June, 1982. For the survey, 224 sample farm households were interviewed for each project area in the upper and lower Cagayan. Attached are the contents of questionnaire for this survey.

Secondly, we selected two study villages from the upper and lower Cagayan, respectively. Reasons are described in each village.

#### 1) Minanga Norte Village

As shown in Table 2, the total area of Iguig Pilot Farm (or LEA) was about 50 ha. when we planned the impact survey. Inside LEA 76 farmers who were from different villages have cultivated rice under the supervision of APC. The Pilot Farm was mainly located at Minanga Norte and 50% of the cultivators resided within the village. In addition, all APC facilities are set up in this village. In this connection, it was expected that APC activities have directly influenced agriculture in Minanga Norte. This is one reason why we selected the village from the upper Cagayan.

Table 2. Area of Iguig and Buguey Pilot Farms by Location and Residence/Number of Cultivators, 1982

| Iguig Pilot Farm                  |                    | Buguey Pilot Farm                 |                    |
|-----------------------------------|--------------------|-----------------------------------|--------------------|
| Location (Barangay) <sup>a)</sup> | Area (ha)          | Location (Barangay) <sup>a)</sup> | Area (ha)          |
| Minanga Norte                     | 33.0               | Dalaya                            | 42.0               |
| Minanga Sur                       | 19.4               |                                   |                    |
| Total                             | 52.4               | Total                             | 42.0               |
| Residence of Cultivators          | No. of Cultivators | Residence of Cultivators          | No. of Cultivators |
| Minanga Norte                     | 38                 | Modesto                           |                    |
| Minanga Sur                       | 29                 | Antiporda                         | 13                 |
| San Esteban                       | 1                  | Fula                              | 5                  |
| San Lorenzo                       | 5                  | Dalaya                            | 2                  |
| Tuguegarao                        | 1                  |                                   |                    |
| Total                             | 76                 | Total                             | 20                 |

a) village

**CONTENTS OF QUESTIONNAIRE FOR SOCIO-ECONOMIC SURVEY  
OF HOUSEHOLD IN THE CIADP PROJECT AREA**

**SAMPLE IDENTIFICATION**

**GENERAL ASPECT**

**Family Composition**

Family member, Civil status, Sex, Age, Educational attainment and Occupation

Distance from home to farm, market and school

Transportation used

Household/home situation for daily life

Type, Construction materials, Room number, Living room furnishing, Source of potable water supply and Source of light

**ECONOMICAL ASPECT**

Details of all farmland being owned and/or farmed  
Parcel/landscape position, Tenure status, Area, Total production, Month planted and Month harvested by crops (rice, corn, mungo, peanut, tobacco and others)

Sharing system

Land use by vegetables, fruit and livestock

Area planted, Production, Total sales and Home consumption

Farm expenses by input materials

Quantity/kind, Price and Source

Irrigation fee, Interest and fees of production loan

Labor requirement for rice cultivation

Labor input by operator, family, exchange and hired labor

Farm investment

Buildings, Farm equipments and work animals

Non-farm work in the off season

**SOCIOLOGICAL ASPECT**

Credit Situation

Membership to organization

Adoption of new rice technology

Changes made in the establishment of LEA

Perspective of rice farming

Aspiration in life

Feelings of family well-being

Attitude toward respondents selected

Important factor in farming

Final decision by farm practice

Problems and solutions

Another reason is attributed to the fact that the preliminary benchmark survey was conducted by APC staff members in 1977, just five years earlier than our survey. For this whole households survey, four villages adjacent to the Iguig Pilot Farm (Minanga Norte, Sta. Rosa, San Esteban and San Lorenzo) were selected. The objectives of the study were: 1) to establish a comprehensive socio-economic profile of all households within the villages near the Pilot Farm; 2) to measure the knowledge/awareness of the LEA farmers on modern farm technologies; and 3) to gain an insight on the effect of government extension activities in the area on the farming practices of the farmers.

A part of the survey result was compiled in mimeographed form entitled Socio-Economic Profile of Households in the Iguig LEA Barangays: A Benchmark Survey, 1977. However, almost all questionnaires were destroyed by typhoon that hit Cagayan in 1980. As of now, only tabulation sheets containing some results from the original questionnaire is partly kept at APC. After checking the contents by village, we decided to use Minanga Norte data for comparing the changes in agricultural situation between 1977 and 1982.

## 2) Modesto Antiporda Village

There is no benchmark information on the socio-economic aspects in the lower Cagayan because it is not long since the establishment of this APC Pilot Farm. Therefore, two benchmark survey methods were applied to select a village for completion of the households survey. At first, a sort of road survey because socio-economic information was obtained from several sample farmers who reside along the National Road in the lower Cagayan was done. Then, an interview survey with village heads and members of the village council near the APC project area was conducted. It took around three weeks for both interview surveys to be conducted.

Based on the preliminary survey, "Modesto Antiporda" was finally selected as a sample village for the Baguey area.

A significant number of the pilot farm cultivators reside in the village (Table 2). Selection was not random, but was based on our judgement on ability and willingness to participate in the project. Use of such purposive sampling was necessary to make the whole households survey feasible.

After selection of two study villages, spot maps which shows the location of each household were drawn. Based on the maps and namelists of households head, the survey was conducted at Modesto Antiporda by the staff members of APC, from 12 to 17 of September, 1982. Successively, Minanga Norte survey was done from the end of the month. However, it took more than one month because of interruption by strong typhoon, "Weling". For both surveys, data on farm economy was set for one year from September 1981 to August 1982. Incidentally, follow-up surveys were continued whenever we needed it.

A more reliable data on agriculture was collected from the Municipal Hall and the Office of the Ministry of Agriculture, and from both offices of the National Irrigation Administration and the Ministry of Agrarian Reform.

**PART I\***

**THE UPPER CAGAYAN**

**-Minanga Norte Village-**

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\*Written by Rufito C. Pagautan, Providencia N. Feri and  
Edmund J. Sana (APC).

## I. GENERAL PROFILE OF MINANGA NORTE

### Location and Topography

Minanga Norte\* is located one kilometer north of the poblacion (town) of Iguig. It is bounded by barangays (village) San Lorenzo on the north, San Esteban in the east, Sta. Rosa, west and Minanga Sur on the south (Refer to Figure 1). It has a total land area of 152 hectares.

Water resources in Minanga Norte comes from pump wells, artesian wells, rain water, and Cagayan River. It does not have any water works system. Before the advent of the artesian and pump wells, the people were depending so much on rivers for their domestic use. For agricultural water it can be pumped from the river to irrigate ricelands. The Iguig pilot farm is an example of this.

Minanga Norte as well as its surrounding barangays are flood prone areas. They are usually flooded during heavy rains usually occurring in the months of October and November. The river swells in the upper area. Ricefields and other agricultural lands are also flooded bringing great damage to the residents in the area. This village has level lands which are suited to rice, corn and vegetable growing.

### Infrastructure Facilities

Minanga Norte has a 31 hectare irrigated area covered by the Iguig Pilot Farm. The remaining 21 ha. is a portion of Minanga Sur. The irrigation facilities make two cropping seasons possible in a year.

Prior to the establishment of the Leading Extension Area (LEA) or pilot farm, the ricefield was an ordinary rainfed area. Traditional varieties with maturity period of 5-6 months

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\*In the late 18th century, a group of Itawes people happened to settle in one of the barangays of Iguig. Then in the early part of the 19th century the place was capable of becoming a barangay. These group of people named the place "Minanga" which means "mouth of a river or creek that bisects on area from the poblacion". Since then, the area was called Minanga.

were used. Agricultural inputs like fertilizers, herbicides, and insecticides were applied rarely. The crop is usually affected by poor management practices and drought hence, a very low yield of 20 cavans per hectare.

A temporary pumping station was constructed at Minanga Sur, Iguig, Cagayan which is also the proposed site for the Iguig permanent station, and became operational in September 1978. One (1) unit of Yanmar Diesel-operated pump with a capacity of  $2.1\text{m}^3/\text{min}$  and 2 units of Kubota Diesel-operated pump with combined capacity of  $4.44\text{m}^3/\text{min}$  were installed to service the area. Total capacity for 3 pumps was  $6.54\text{ cu.m./min}$ . However, in October 1979, the temporary pumping station site was eroded by flood. It was impossible then to immediately re-install the 3 big pumps. Instead, 4 units of Klinton gasoline-operated pumps of smaller capacity were installed and became operational from January to March ( $0.9\text{m}^3/\text{min}$ ) of 1980.

To give way for the construction of the Iguig permanent pumping station, the site of another temporary pumping station was transferred to some 300 meters downstream from the eroded site. Construction of said temporary station started in April 1980. This new temporary pumping station also housed the APC pumps pulled out from the eroded pump. The station became operational in June 1980 and has remained functional up to the present. Features of pumps installed.

1. For LEA/Pilot Farm Area - 1 pump
  - 1 unit submersible pump
  - $2.0\text{m}^3/\text{min}$  capacity
2. For APC Model Infra Area - 2 pumps
  - 1 unit submersible pump
  - $1.38\text{m}^3/\text{min}$  capacity
3. 1 unit submersible pump
  - $2.3\text{m}^3/\text{min}$  capacity
  - 22 Kw motor output



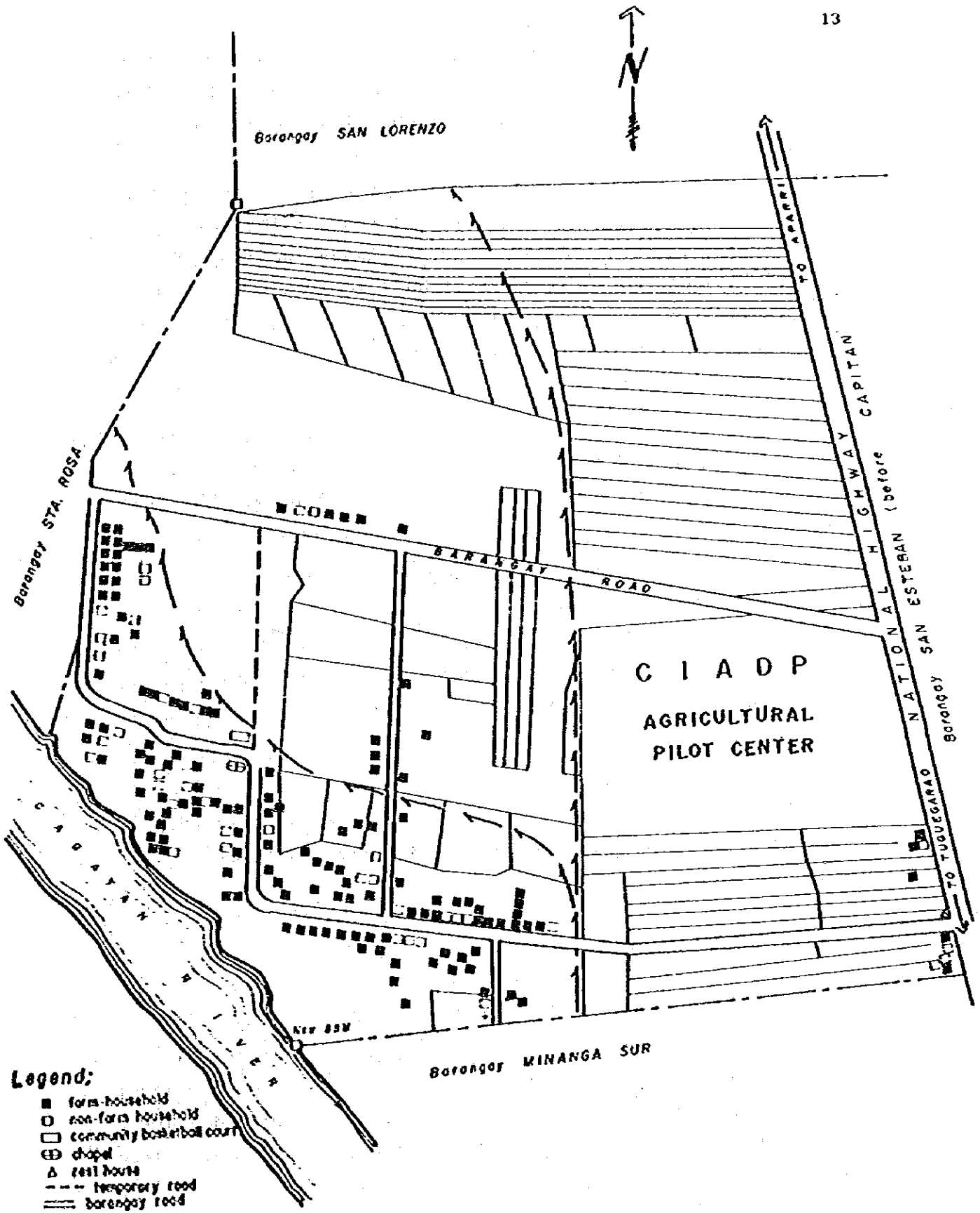


Figure 1. Spot Map of Minanga Norte, Iguig, Cagayan

The installation design enables the use of any of the 3 pumps to serve any of the 2 area stated above. From June 1980-August 1981, these pumps were run by a 35 KVA generator. From this, it is clearly seen that only one pump can be operated at a time, until the entry of the Cagayan Electric Cooperative (CAGELCO I) line to the pumping station in August 1981. To the present, the permanent pumping station is still under construction. In addition, the irrigated area in a period of five years has been decreased because of low supply of irrigation water brought about by mechanical as well as electrical breakdown.

As a result of the irrigation service given, a corresponding fee or obligation from the farmers was set up to defray operational expenses on fuel and oil only. The fee/obligation was 6 cavans per hectare per cropping season.

On the other hand, CAGELCO provides electric power to 44% of the total households since 1980. The barangay roads which were in poor condition and many times became impassable during rainy season were improved. Due to this improvement, transportation of farm produce from farm to home and home to market become more accesible.

There is no existing school building in the area. Children of school age usually enroll in Sta. Rosa Elementary School or Iguig Central School for primary and intermediate education.

## II. DEMOGRAPHIC FEATURES

### Ethnic Group and Population

Like other people in some barangays of Iguig, people in Minanga Norte, is predominantly populated by one of the major ethnic groups of the province (Table 1). The major dialect naturally spoken in Minanga Norte is Itawes as shown in Table 2.

The Ilocano and the Ibanags comprise the minority groups

Table 1. Ethnic Group

|              | Household Heads |            | Spouse     |            |
|--------------|-----------------|------------|------------|------------|
|              | No.             | %          | No.        | %          |
| Itawes       | 150             | 88         | 115        | 79         |
| Ilocano      | 10              | 6          | 13         | 9          |
| Ibanag       | 7               | 4          | 13         | 9          |
| Others       | 3               | 2          | 5          | 3          |
| <b>Total</b> | <b>170</b>      | <b>100</b> | <b>146</b> | <b>100</b> |

Table 2. Dialect Used by Households

|                      | Most Often |            | Sometime   |            |
|----------------------|------------|------------|------------|------------|
|                      | No.        | %          | No.        | %          |
| Itawes               | 165        | 97         | 4          | 3          |
| Ilocano              | 2          | 1          | 38         | 26         |
| Ibanag               | 3          | 2          | 41         | 28         |
| Others <sup>a)</sup> | -          | -          | 7          | 5          |
| n.g.                 | -          | -          | 56         | 38         |
| <b>Total</b>         | <b>170</b> | <b>100</b> | <b>146</b> | <b>100</b> |

a) Tagalog, Bisaya, Waray and Kapampangan

Table 3. Religion

|                   | No. of Household Heads |            |
|-------------------|------------------------|------------|
|                   | No.                    | %          |
| Roman Catholic    | 159                    | 93         |
| Jehovah Witnesses | 10                     | 6          |
| Iglesia ni Cristo | 1                      | 1          |
| <b>Total</b>      | <b>170</b>             | <b>100</b> |

in the area. Their dialects serve secondarily. Other settlers are the Tagalogs and the Visayans.

The families are patriarchial. The eldest married male usually heads the household. The only female household heads were widows. Coupled with this is a dominance of nuclear families consisting of 81% of the 170 households. The average number of children in each family is two to five.

Majority of the families belong to the Roman Catholic religion (Table 3). A chapel where they hold services is located in the center of the barangay. There are also a few Jehovah's Witnesses while one couple identified themselves belonging to the Iglesia ni Cristo.

There were 170 households in Minanga Norte in 1982. This is 25% higher than the number of households enumerated in 1977. Marriage of children who formed new households in the area is one of the factors that accounts for the increase. This also reflects the nuclear family system in the barangay.

The number of households population derived in the 1977 survey was 689. It increased to 781 in 1982. This means that there is an annual growth rate of 2.54% for a period of five years. This is relatively lower than the national rate (2.64%), but higher than the rate for Cagayan province (2.03%) from 1975-1980.

The increase was primarily the result of natural reproduction. The average number of children per family increased from 3 in 1977 to 4 in 1982. The effect of net migration has not been determined.

The distribution of population by age and sex is shown in Figure 2. Thirty-eight percent (38%) were below 15 years and 47% were below 20 years old. Assuming that 15-64 years old are the productive ages, the potential labor force in Minanga Norte is 450. The ratio of productive age group to non-productive age group is 1.36. This is considered a high rate.

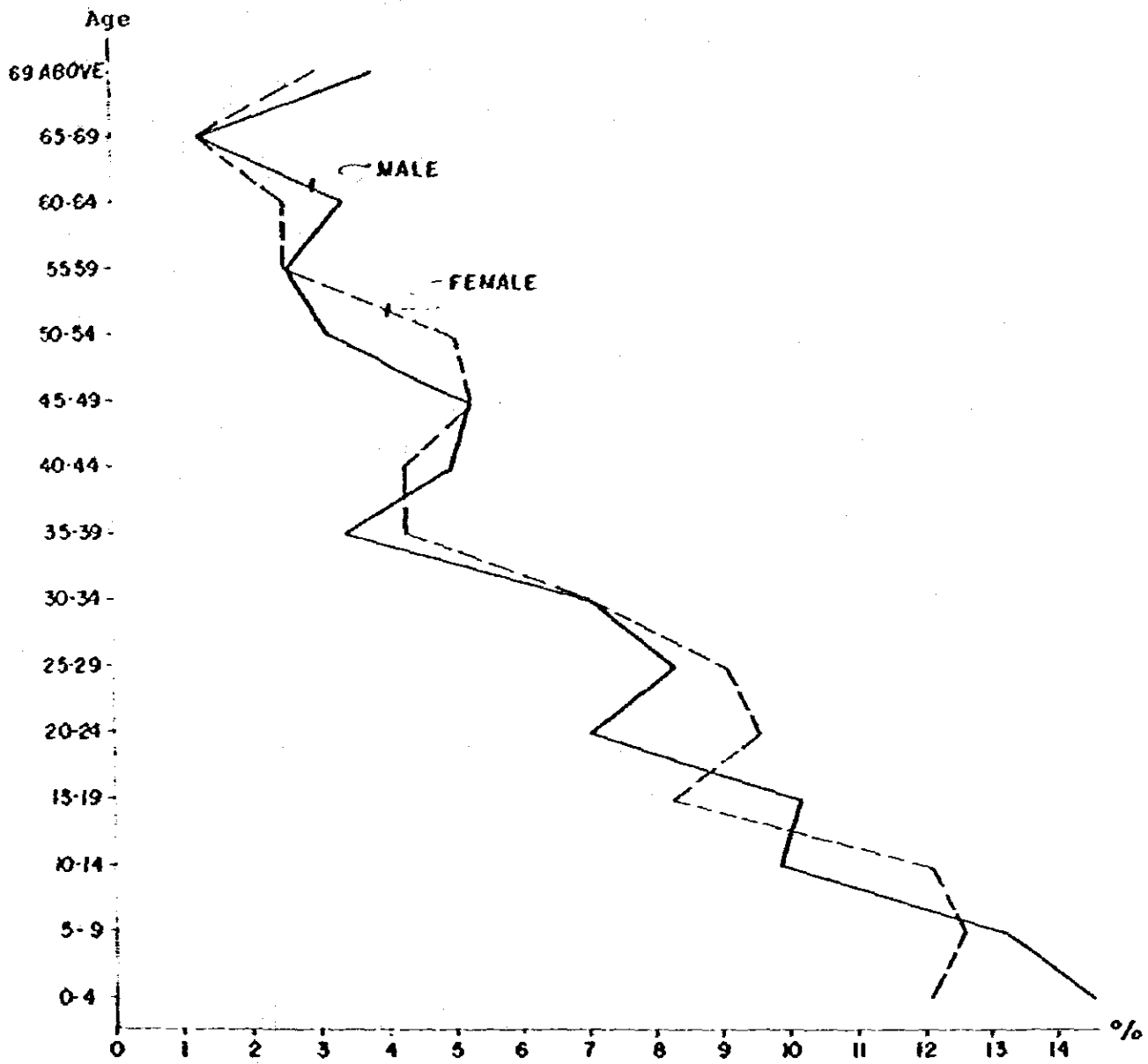


Figure 2. Age Distribution of the Population (1982) Minanga Norte, Iguig, Cagayan, Philippines.

Male  
Female

Table 4. Occupation of Household Heads, Minanga Norte, Iguig, Cagayan

| Occupation                    | !No. of HH!<br>!1977-1982! |     | Occupation                | !No. of HH!<br>!1977-1982! |    |
|-------------------------------|----------------------------|-----|---------------------------|----------------------------|----|
| <u>Farmers</u>                |                            |     | <u>Non-farmers</u>        |                            |    |
| LEA Farmers                   |                            |     | Laborer <sup>a)</sup>     | 4                          | 10 |
| Owners                        | 5                          | 7   | Fishermen                 | 2                          | 5  |
| Part-owners                   | 16                         | 23  | Carpenters                | 2                          | 5  |
| Tenants                       | 13                         | 8   | Technicians <sup>b)</sup> | 1                          | 3  |
| Lessee                        | 1                          | -   | Businessmen               | 1                          | 2  |
| OLEA Farmers                  |                            |     | Epidemic Aides            | 1                          | -  |
| Owners                        | 13                         | 11  | Housekeepers              | 1                          | 2  |
| Part-owners                   | 18                         | 22  | Weavers                   | 1                          | -  |
| Tenants                       | 33                         | 38  | Conductors                | -                          | 1  |
| Landless Agricultural Workers | 10                         | 29  | Drivers                   | -                          | 1  |
|                               |                            |     | Janitors                  | -                          | 1  |
|                               |                            |     | <u>Calesa Operator</u>    | -                          | 1  |
|                               |                            |     | Housemaid                 | -                          | 1  |
|                               |                            |     | Retired                   | 4                          | -  |
|                               |                            |     | Unemployed                | 8                          | -  |
| Sub-total                     | 111                        | 138 |                           | 25                         | 32 |

1977:

a) includes 1 construction laborer, 2 millers and 1 salesboy.

1982:

a) includes 4 gardeners, 2 construction laborers, bakery helpers, 1 hollow maker, 1 canteen helper, & emergency laborer.

b) includes 1 light machinery technician, 1 radio technician and 1 electrician.

### Occupation by Household Classification

Farming is the main occupation of the majority of household heads (Table 4). More than 80% of them are engaged in farming. Fishing, carpentry, gardening, and hired labor in farms and non-farm activities are common sidelines of these farmers. There are also a few who are employees and calesa operators. Almost all of the female spouses are housekeepers. Some of them along with their children also help in the farm for additional income.

Total farming household count is 109. These have ownership or tenancy rights to the land they till. Thirty-eight (38) farmers have lands covered by the CIADP-APC's Leading Extension Area (LEA) or pilot farm. The other farmers cultivate their land Outside the Leading Extension Area (OLEA).

In addition, there are 29 households classified as landless agricultural workers. These laborers work on the farm but don't possess right to the land. They are principally hired farm workers. More than 1/4 of them are female household heads.

The number of landless workers dramatically increased as this almost tripped since 1977. This could be the consequence of the increase in number of the new households formed by married children. Customarily, the right to cultivate a farm is not transferred to the married children until such time that the original household head is incapable of farming.

The number of non-farming households also increased by 28%. This was perhaps brought about by the increase in employment opportunities specifically for laborers at APC-CIADP. The farmers who used to cultivate areas covered by the APC complex were given employment as laborers.

### Household Sizes and Age Distribution

Household sizes in Ninanga Norte ranged 1 to 12 members in 1982 (Table 5). The higher percentage had only 4 household members which could be attributed to the nuclear nature of families.

Table 5. Household Size (1977-1982)

| Household<br>Size       | 1977              |                    |                    |                   | To-<br>tal | 1982       |            |            |            | To-<br>tal |
|-------------------------|-------------------|--------------------|--------------------|-------------------|------------|------------|------------|------------|------------|------------|
|                         | LEA <sup>a)</sup> | OLEA <sup>b)</sup> | LAWH <sup>c)</sup> | NFH <sup>d)</sup> |            | LEA        | OLEA       | LAWH       | NFH        |            |
| 1                       | -                 | -                  | -                  | 1                 | 1          | -          | -          | 2          | 2          | 4          |
| 2                       | 3                 | 2                  | 2                  | 2                 | 9          | 4          | 8          | 5          | 2          | 19         |
| 3                       | 3                 | 12                 | 3                  | 3                 | 21         | 6          | 8          | 4          | 6          | 24         |
| 4                       | 10                | 16                 | 1                  | 2                 | 29         | 10         | 19         | 6          | 7          | 42         |
| 5                       | 3                 | 12                 | 1                  | 8                 | 24         | 8          | 17         | 1          | 6          | 32         |
| 6                       | 7                 | 9                  | 1                  | 2                 | 19         | 5          | 7          | 5          | 6          | 23         |
| 7                       | 4                 | 5                  | 2                  | 6                 | 17         | 4          | 7          | 3          | 2          | 16         |
| 8                       | 4                 | 5                  | -                  | -                 | 9          | 1          | 2          | 2          | 1          | 6          |
| 9                       | -                 | 5                  | -                  | -                 | 5          | -          | 1          | -          | -          | 1          |
| 10                      | -                 | -                  | -                  | 1                 | 1          | -          | 1          | 1          | -          | 2          |
| 11                      | 1                 | -                  | -                  | -                 | 1          | -          | -          | -          | -          | -          |
| 12                      | -                 | -                  | -                  | -                 | 1          | -          | -          | -          | -          | 1          |
| <b>No. of HH</b>        | <b>35</b>         | <b>66</b>          | <b>10</b>          | <b>25</b>         | <b>136</b> | <b>38</b>  | <b>71</b>  | <b>29</b>  | <b>32</b>  | <b>170</b> |
| <b>Popu-<br/>lation</b> | <b>183</b>        | <b>388</b>         | <b>42</b>          | <b>126</b>        | <b>689</b> | <b>172</b> | <b>339</b> | <b>130</b> | <b>140</b> | <b>781</b> |
| <b>Ave.<br/>Size</b>    | <b>5</b>          | <b>5</b>           | <b>4</b>           | <b>5</b>          | <b>5</b>   | <b>5</b>   | <b>5</b>   | <b>4</b>   | <b>4</b>   | <b>5</b>   |

- a) Leading Extension Area Farmer  
b) Outside Leading Extension Area Farmer  
c) Landless Agricultural Workers' Household  
d) Non-farming Household



The average household size of 5.1 in 1977 considerably decreased to 4.6 in 1982. Except for the LEA owners and tenants, all household categories declined in size. This was most prominent among the LEA part-owners which had a highest average on 1977 (5.9 members) turned out to be the lowest in 1982 (4.3 members). The other substantial reduction in sizes were the OLEA owners and non-farming households.

As earlier observed, the decrease in the size of the households maybe due to the formation of separate households by newly married children.

The age distribution of household heads and spouses is shown in Table 6 & 7. There are no significant difference in the distribution of ages among the different household classifications. The LEA owners and their spouses have the highest mean age of 55 and 49 years, respectively, with a range of 32 to 75 years.

The non-farming households have the lowest mean ages for household heads, 40 and spouses, 35. Sixty-eight percent (68%) are from 20-44 years while only 7% are 55 years and above. This may account for the relatively fewer children of the non-farming households with a mean of only 3.

The second to the non-farming households in term of family size is the LEA owners with a mean of 4 children. The LEA tenants have the largest average family size, 6. However, it is expected that the average family size of the non-farming households will increase due to the younger ages of the heads and their spouses if no population control measure is instituted.

The difference of the mean ages of both heads and spouses of the different household classification may also explain the difference in the distribution by age of the children in Minanga Norte (Figure 3). Forty-five percent (45%) of the children of non-farming households are 10 years old and below

Table 6. Age Distribution of Household Heads, 1982

| Age Range       | LEA       |            |           | OLEA      |            |           | LAWHINFH  | Total     |            |
|-----------------|-----------|------------|-----------|-----------|------------|-----------|-----------|-----------|------------|
|                 | Owner     | Part-owner | Tenant    | Owner     | Part-owner | Tenant    |           |           |            |
| 20-24           | -         | -          | -         | -         | 1          | 1         | 1         | 4         | 7          |
| 25-29           | -         | 1          | 1         | 2         | 1          | 10        | 4         | 5         | 24         |
| 30-34           | -         | 2          | 1         | -         | 6          | 4         | 2         | 6         | 20         |
| 35-39           | 1         | 3          | -         | -         | 1          | 2         | 4         | 3         | 14         |
| 40-44           | 1         | 2          | 2         | 1         | 4          | 4         | 3         | 3         | 20         |
| 45-49           | 1         | 3          | 1         | 2         | 2          | 4         | 6         | 5         | 24         |
| 50-54           | -         | 1          | 2         | 2         | 3          | 3         | 3         | 4         | 18         |
| 55-59           | 2         | 4          | -         | 1         | -          | 3         | 1         | 1         | 12         |
| 60-64           | -         | 2          | 1         | 1         | 3          | 2         | 3         | -         | 12         |
| 65-69           | -         | 2          | -         | -         | 1          | 1         | -         | -         | 4          |
| 70-74           | 1         | 2          | -         | 1         | -          | 3         | 2         | 1         | 10         |
| 75-79           | 1         | 1          | -         | -         | -          | 1         | -         | -         | 3          |
| 80-84           | -         | -          | -         | -         | -          | -         | -         | 1         | 1          |
| 85-above        | -         | -          | -         | 1         | -          | -         | -         | -         | 1          |
| <b>Total</b>    | <b>7</b>  | <b>23</b>  | <b>8</b>  | <b>11</b> | <b>22</b>  | <b>38</b> | <b>29</b> | <b>32</b> | <b>170</b> |
| <b>Mean Age</b> | <b>55</b> | <b>52</b>  | <b>45</b> | <b>52</b> | <b>43</b>  | <b>44</b> | <b>44</b> | <b>40</b> | <b>45</b>  |

Table 7. Age Distribution of Household Spouses, 1982

| Age Range       | LEA       |            |           | OLEA      |            |           | LAWH      | INFH      | Total      |
|-----------------|-----------|------------|-----------|-----------|------------|-----------|-----------|-----------|------------|
|                 | Owner     | Part-owner | Tenant    | Owner     | Part-owner | Tenant    |           |           |            |
| 15-19           | -         | -          | -         | -         | -          | 1         | 1         | -         | 2          |
| 20-24           | -         | -          | 1         | -         | 2          | 3         | 2         | 7         | 15         |
| 25-29           | -         | 2          | -         | 2         | 3          | 10        | 5         | 3         | 25         |
| 30-34           | 1         | 3          | -         | 1         | 3          | 3         | 2         | 5         | 18         |
| 35-39           | -         | 2          | 2         | 1         | 5          | 4         | 3         | 1         | 18         |
| 40-44           | 2         | 2          | 2         | -         | 2          | 2         | 3         | 2         | 15         |
| 45-49           | -         | 2          | 1         | 1         | 3          | 4         | 2         | 3         | 16         |
| 50-54           | 2         | 2          | 1         | -         | 1          | 2         | 2         | 2         | 12         |
| 55-59           | 1         | 1          | 1         | 1         | 1          | 2         | 1         | -         | 8          |
| 60-64           | 1         | 3          | -         | 2         | 2          | 1         | -         | -         | 9          |
| 65-69           | -         | 2          | -         | -         | -          | -         | -         | 1         | 3          |
| 70-74           | -         | 1          | -         | -         | -          | 1         | -         | -         | 2          |
| 75-79           | -         | 1          | -         | -         | -          | 1         | -         | -         | 2          |
| 80-84           | -         | -          | -         | -         | -          | -         | -         | -         | -          |
| 85-above        | -         | -          | -         | 1         | -          | -         | -         | -         | 1          |
| <b>Total</b>    | <b>7</b>  | <b>21</b>  | <b>8</b>  | <b>9</b>  | <b>22</b>  | <b>34</b> | <b>21</b> | <b>24</b> | <b>146</b> |
| <b>Mean Age</b> | <b>49</b> | <b>49</b>  | <b>42</b> | <b>49</b> | <b>40</b>  | <b>38</b> | <b>36</b> | <b>35</b> | <b>41</b>  |

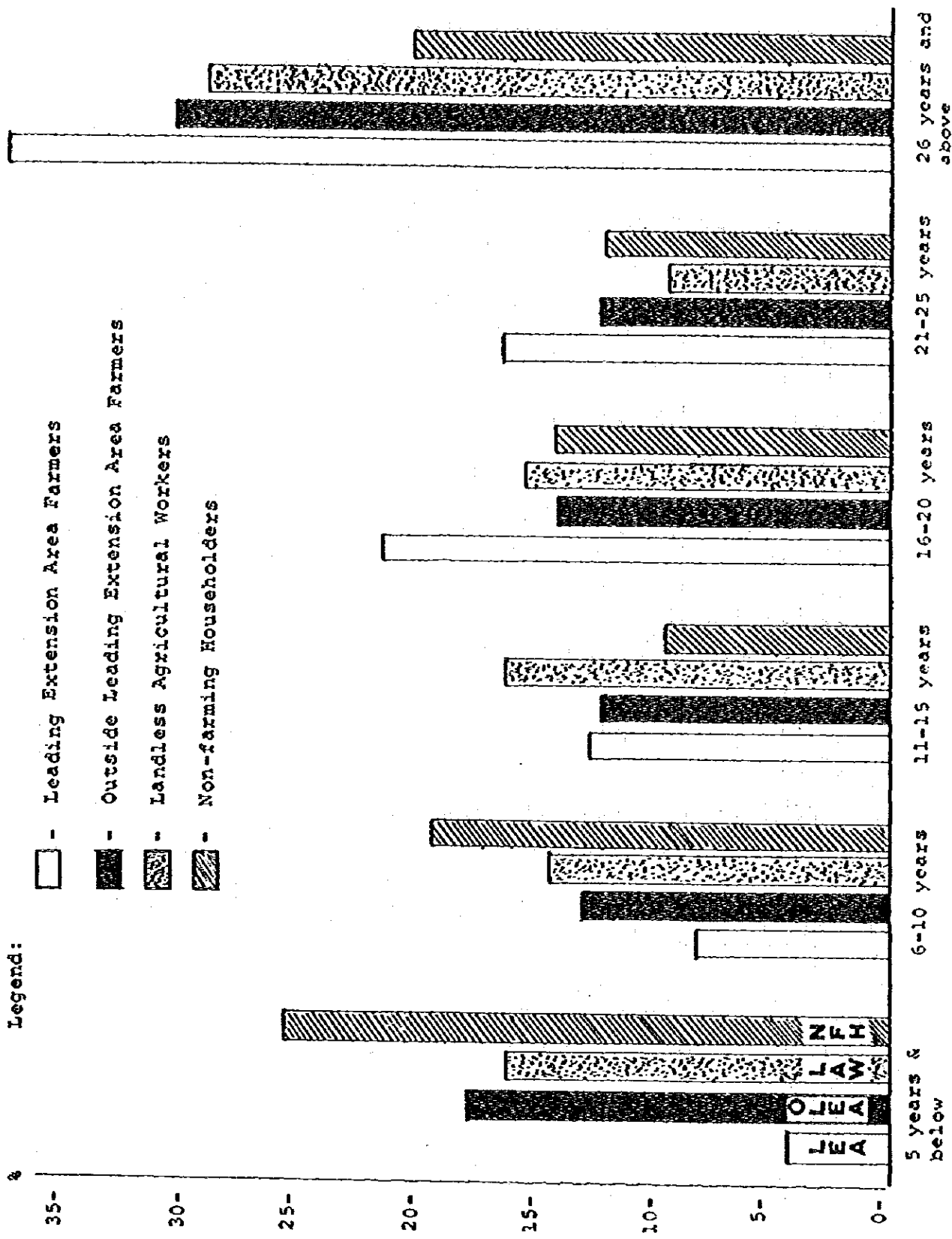


Figure 3. Age Distribution of Children, 1942

in comparison to the 31% of the children of the OLEA farmers. Landless workers also belong to this range. The LEA farmers have the lowest proportion of children in this age group with only 12%.

On the other hand, the LEA farmers have the highest portion of children who, are 20 years and above (54%). The proportion of children for OLEA farmers and landless workers are 42% and 38%, respectively.

It should be noted that the married children of the household heads, who now belong to separate households were included in this study.

The oldest couple in Minanga Norte belong to the group of the OLEA owners. The age of the head is 89 while his spouse is 90. The couple are dependent on the unmarried children for farm work.

#### Educational Attainment

Majority of the household heads and spouses have acquired an elementary education. A considerable proportion finished grades 4 and 5. The majority reached grade 6. However, after this level was attained there was an abrupt decrease of those who attended high school (Table 8 and 4).

The mean number of years of school of both male and female spouses is 5 years. One spouse from the non-farming household graduated from college. Another household head from this classification and a spouse of an OLEA tenant graduated from vocational courses.

The percentage of those who had no schooling among the household heads and spouses is only 4%. However, majority (60%) of the children reached the elementary level. Sixteen percent (16%) have reached high school while 33 (5%) attended college of which 14 (2%) have graduated. In addition, there were 5 (less than 1%) who

Table 8. Educational Attainment of Children

|                  | LEA               | OLEA              | LAWH | NPH | Total             | %     |
|------------------|-------------------|-------------------|------|-----|-------------------|-------|
| No Schooling     | 6                 | 63                | 19   | 33  | 120               | 18    |
| Elementary       | 83                | 182               | 85   | 47  | 397               | 60    |
| High School      | 46                | 42                | 7    | 11  | 106               | 16    |
| Attended College | 9                 | 5                 | -    | 5   | 19                | 2     |
| College Graduate | 9                 | 2                 | -    | 3   | 14                | 2     |
| Vocational       | -                 | 1                 | -    | 1   | 2                 | 1     |
| Two Year Courses | 2                 | 1                 | -    | -   | 3                 | 1     |
| <b>Total</b>     | 155 <sup>a)</sup> | 296 <sup>a)</sup> | 111  | 99  | 661 <sup>a)</sup> | 100.0 |

a) data on 5 LEA children and 2 OLEA children were not collected

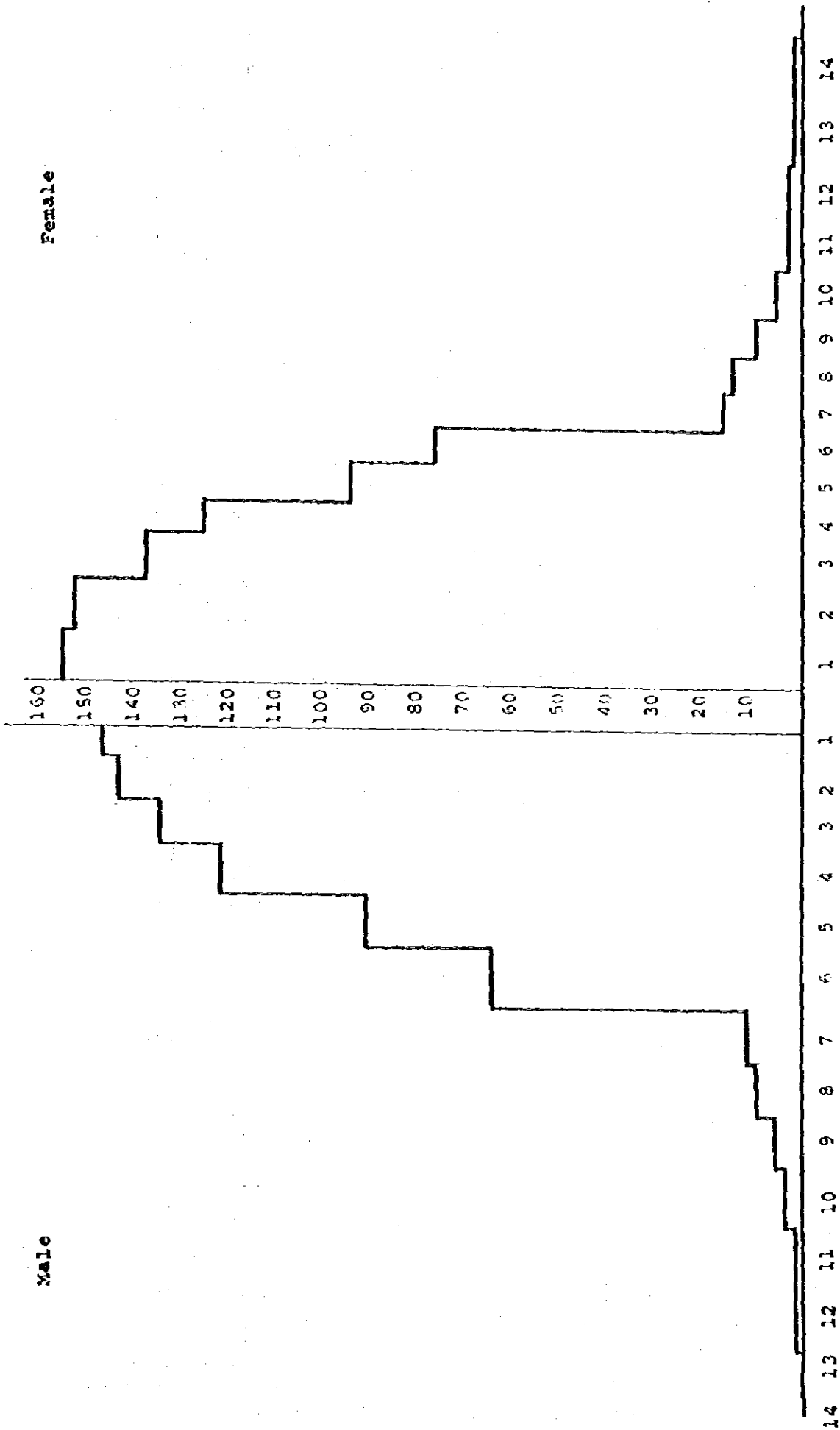


Figure 4. Cumulative Distribution of Years of Education of Household Heads and Spouses

Table 9. Housing Conditions, Minanga Norte, Iguig, Cagayan

|                         | LEA | OLEA | LAWH | NFH | Total | %  |
|-------------------------|-----|------|------|-----|-------|----|
| <b>Type:</b>            |     |      |      |     |       |    |
| Single                  | 16  | 48   | 26   | 24  | 114   | 67 |
| Double                  | 22  | 23   | 3    | 8   | 56    | 33 |
| <b>Construction:</b>    |     |      |      |     |       |    |
| Permanent               | 21  | 20   | 1    | 5   | 47    | 28 |
| Semi-permanent          | 6   | 17   | 2    | 8   | 33    | 19 |
| Temporary               | 11  | 34   | 26   | 19  | 90    | 53 |
| <b>No. of Bedrooms:</b> |     |      |      |     |       |    |
| 1                       | 11  | 32   | 18   | 13  | 74    | 44 |
| 2                       | 16  | 20   | 3    | 9   | 48    | 28 |
| 3                       | 4   | 2    | -    | -   | 6     | 4  |
| 4                       | 1   | -    | -    | -   | 1     | *  |
| Multi-purpose           | 6   | 17   | 8    | 10  | 41    | 24 |

\*less than one percent

Table 10. Housing Facilities and Source of Light, Minanga Norte, Iguig, Cagayan

|                                      | LEA | OLEA | LAWH | NFH | Total | % <sup>a)</sup> |
|--------------------------------------|-----|------|------|-----|-------|-----------------|
| <b>Toilet:</b>                       |     |      |      |     |       |                 |
| Water sealed                         | 38  | 70   | 25   | 31  | 164   | 96              |
| None or neighbors'                   | -   | -    | 2    | 1   | 3     | 2               |
| Pit type, closed sides               | -   | 1    | 2    | -   | 3     | 2               |
| <b>Cooking Facilities:</b>           |     |      |      |     |       |                 |
| Wood fueled stove                    | 38  | 67   | 27   | 31  | 163   | 6               |
| Charcoal fueled                      | -   | 4    | 2    | 1   | 7     | 4               |
| LPG fueled stove                     | -   | -    | -    | 2   | 2     | 1               |
| Kerosene fueled stove                | 1   | -    | -    | -   | 1     | 1               |
| <b>Complementary Facilities:</b>     |     |      |      |     |       |                 |
| Chicken house                        | 22  | 30   | 4    | 11  | 67    | 39              |
| Granary                              | 20  | 28   | 1    | 2   | 51    | 30              |
| Pigpen                               | 22  | 20   | 2    | 8   | 52    | 31              |
| Livestock garden                     | 31  | 56   | 6    | 24  | 117   | 69              |
| Flower garden                        | 24  | 26   | -    | 7   | 57    | 34              |
| Drying shed                          | 1   | -    | -    | 1   | 2     | 2               |
| Drying pavement                      | -   | -    | -    | 1   | 1     | 1               |
| <b>Lighting:</b>                     |     |      |      |     |       |                 |
| Electricity (CAGELCO) <sup>b)</sup>  | 28  | 29   | 3    | 15  | 75    | 44              |
| Oil/Kerosene Wick Lamp               | 11  | 42   | 25   | 17  | 95    | 56              |
| Kerosene fueled Coleman/<br>Petromax | -   | 4    | 1    | -   | 5     | 3               |

a) percentage of holders to the total households

b) Cagayan Electric Cooperative



Table 11. No. of Household Furnitures and Major Consumer Durables/Appliances

| Items  | LEA   |            |      | OLEA  |            |      | INPH | LAWH |
|--|-------|------------|------|-------|------------|------|------|------|
|  | Owner | Part-owner | Item | Owner | Part-owner | Item |      |      |
|  | (3)   | (23)       | (8)  | (11)  | (22)       | (38) | (32) | (24) |
| <b>Furnitures:</b>                                     |       |            |      |       |            |      |      |      |
| a. Wooden sala set                                     | 1     | 14         | 2    | 7     | 14         | 10   | 5    | 6    |
| b. Upholstered bed (foam/spring bed, e.i., silcon bed) | -     | 1          | -    | -     | -          | -    | 1    | -    |
| c. Other beds  | 2     | 13         | 2    | 3     | 5          | 7    | 6    | 3    |
| d. Benches/stools/chairs                               | 19    | 67         | 21   | 24    | 34         | 61   | 49   | 35   |
| e. Dining table set                                    | 5     | 16         | 2    | 5     | 8          | 18   | 20   | 7    |
| f. Clothes/Cabinet Aparador                            | 4     | 14         | 4    | 2     | 15         | 21   | 13   | 6    |
| g. China/Food Cabinet                                  | -     | 6          | -    | 1     | 1          | 2    | 2    | -    |
| h. Baul/Wooden Trunk                                   | 8     | 23         | 9    | 17    | 17         | 30   | 32   | 27   |
| i. Others a)   | -     | 1          | -    | -     | -          | 1    | 1    | 1    |
| <b>Major Consumer Durables:</b>                        |       |            |      |       |            |      |      |      |
| a. Transistor radio                                    | 5     | 16         | 3    | 3     | 9          | 13   | 14   | 11   |
| b. Radio-phono   | 1     | 7          | 3    | 2     | 2          | 4    | 4    | 4    |
| c. Casette Tape Recorder                               | -     | 1          | -    | -     | -          | 1    | 3    | -    |
| d. TV Set  | -     | -          | 1    | -     | -          | -    | 1    | 1    |
| e. Electric Fan  | -     | 3          | -    | -     | 1          | -    | 2    | 1    |
| f. Sewing Machine                                      | 1     | 3          | -    | -     | 3          | -    | 4    | 1    |
| g. Refrigerator  | -     | -          | -    | -     | -          | -    | 1    | -    |
| h. Gas/Electric Range w/ Oven                          | -     | 2          | -    | -     | -          | -    | -    | 2    |
| i. Gas Electric Stove b)                               | -     | 1          | -    | -     | -          | 1    | 3    | -    |
| j. Others  | -     | 2          | -    | -     | 1          | -    | -    | -    |

a) steel sala set

b) wall clock

attended vocational and two-year courses.

Those who had higher education notably come from households with higher income. The greater proportion of them were children of the LEA farmers.

### Housing Conditions

Table 9 describes the general living conditions of the residents in Minanga Norte. About 2/3 (67%) of the houses are of single storey type, most of which are elevated from the ground. Majority of the household classifications except the LEA farmers reside in this type of houses. A greater proportion of LEA farmers live in two-storey houses.

Temporary constructed houses consists more than half of the Minanga Norte houses. Bamboo is commonly used for both flooring and walling while cogon or similar grasses make up the roofs. Around 28% of the houses are made of permanent construction materials such as wood, plain concrete or tiles for floors, galvanized iron for roofs, lumber or lawanit and/or concrete for walls.

Most of the houses have one or two partitioned bedrooms. Some of the residences are made up of one multi-purpose room used for dining, sleeping and sala or receiving room. Almost all of the houses have a kitchen which is almost always separated from the main house.

Sixty-nine percent (69%) have livestock pens (Table 10). The other complementary facilities that some households have are chicken houses, granaries and flower gardens. Households with better living conditions are associated with those who have higher incomes.

Pieces of furnitures like chairs, stools, benches and wooden trunk or "baul" were common among all of the respondents (Table 11). However, some of these were obtained either as gifts or inheritance. Only 2 respondents were able to buy an upholstered bed.

Radio ownership among the farmer-cultivators was high. Probably because this is one of the fastest ways of securing information and also the cheapest compared to other major consumer appliances. Only 3 of the total respondents afforded to buy a TV set. Refrigerator, gas/electric range and other electrical appliances were just rare materials among the households as shown by the fact that only 1 NPH and 2 LEA part-owners were able to buy a refrigerator and a cooking range, respectively.

### III. LAND TENURE SYSTEM\*

#### Area of Arable Land by Tenure Status

According to the Barangay Index Control Map which was approved by the Ministry of Agrarian Reform in 1977, the total area of Minanga Norte was estimated at 152 hectares. Of the total land area, about 80 ha. were occupied by rainfed rice area cultivated by 122 tenants. The average area per tenant was 0.6 hectare.

The survey result conducted in the same year showed that number of tenants who resided in this village was only 65. Therefore, almost half were tenants who hold the right of cultivation inside the village but were residing outside the barangay.

In addition to the area tenanted, it was estimated that less than 20 ha. was owned by farmers. The remaining portion was utilized for village road, residence, and upland crops.

As previously mentioned in this report, number of farm households had increased from 101 in 1977 to 109 in 1982. However, because of the increase in non-farm household the rate of the farm household to the total decreased from 74% to 64%. Conversely, the

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\*Written by Yoshinori Morooka (TARC) & Nestor Bautista (APC).

number of household of landless agricultural workers increased rapidly from 10 in 1977 to 29 in 1982. The percentage of those landless households to the total has changed from 7% to 17%.

How would changes of population and household affect the land tenure system in this village?

As of October, 1982, 77 Minanga Norte farmers cultivated rice in an area of 59 hectare (Table 12). Twenty farmers also cultivated rice at 14 ha. land outside the village. All in all, 97 farmers planted rice in a 73 hectares paddy field. The rate of rainfed land was 81% inside the village while 19% for the outside portion.

In addition, 18 farmers cultivated corn at 12 ha. of their upland inside the village. However, 72 farmers have planted corn at 82 ha. of upland located outside the village. The proportion to the total area was 13% for upland inside and 87% outside the village. These data show that majority of farmers cultivate both rice and corn inside and outside their barangay. Also, it was further found out that rainfed area was concentrated within Minanga Norte while corn area surrounded the village.

Table 13 shows the number of farm household and area by tenure status. Data of 1977 indicated that 31 out of 35 LEA farmers cultivated 33 ha. rainfed while the rest planted corn in the area. Also, 48 OLEA farmers tilled 35.6 ha. of rainfed. The total rainfed area inside and outside the village was calculated at 68.8 hectare. In addition, upland area where corn was mainly cultivated was about 96 hectares. The total area was 163.4 hectares.

On the other hand, 1982 data shows that the total area was estimated at 168.7 hectares. Although population increased with the growth rate of 2.5% per year, it was recognized that the total arable land was almost the same between years. This suggests that the pressure of population to the land has been rapidly increased in Minanga Norte.

Table 12. No. of Farmers and Area of Rainfed/Upland Cultivated by LEA and OLEA Farmers Inside & Outside Minanga Norte, Iguig, Cagayan, 1982

| Items                  | Rainfed (Rice)        |             | Upland (Corn)         |             |
|------------------------|-----------------------|-------------|-----------------------|-------------|
|                        | No. of Farm Household | Area (ha)   | No. of Farm Household | Area (ha)   |
| <b>Inside Village</b>  |                       |             |                       |             |
| LEA                    | 38                    | 33.4        | 7                     | 4.6         |
| OLEA                   | 39                    | 25.2        | 11                    | 7.7         |
| Sub-total              | 77                    | 58.6        | 18                    | 12.3        |
| <b>Outside Village</b> |                       |             |                       |             |
| LEA                    | 5                     | 3.6         | 25                    | 29.5        |
| OLEA                   | 15                    | 9.9         | 47                    | 54.8        |
| Sub-total              | 20                    | 13.5        | 72                    | 84.3        |
| <b>Total</b>           | <b>97</b>             | <b>72.1</b> | <b>90</b>             | <b>96.6</b> |

Table 13. Changes of Arable Land by Tenure Status Between 1977 and 1982 in Minanga Norte, Iguig, Cagayan

|                  | 1977          |             |               |             | 1982          |             |               |             |
|------------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|
|                  | Lowland       |             | Upland        |             | Lowland       |             | Upland        |             |
|                  | No. of Farmer | Area (ha)   | No. of Farmer | Area (ha)   | No. of Farmer | Area (ha)   | No. of Farmer | Area (ha)   |
| <b>LEA</b>       |               |             |               |             |               |             |               |             |
| Owner            | 5             | 6.5         | 4             | 1.8         | 7             | 6.0         | 5             | 3.9         |
| Part-owner Share | 15            | 15.5        | 16            | 19.2        | 23            | 26.0        | 19            | 15.0        |
| tenant           | 10            | 10.7        | 12            | 14.4        | 8             | 5.4         | 7             | 5.3         |
| Lessee           | 1             | 0.5         | 1             | 1.0         | -             | -           | -             | -           |
| Sub-total        | 31            | 33.2        | 33            | 36.4        | 38            | 37.4        | 31            | 34.2        |
| <b>OLEA</b>      |               |             |               |             |               |             |               |             |
| Owner            | 9             | 6.1         | 10            | 6.4         | 7             | 4.1         | 6             | 5.3         |
| Part-owner Share | 16            | 12.2        | 17            | 18.7        | 20            | 15.4        | 20            | 24.8        |
| tenant           | 22            | 16.8        | 30            | 32.1        | 24            | 15.2        | 32            | 32.2        |
| Lessee           | 1             | 0.5         | 1             | 1.0         | -             | -           | -             | -           |
| Sub-total        | 48            | 35.6        | 58            | 58.2        | 51            | 34.7        | 58            | 62.4        |
| <b>Total</b>     | <b>79</b>     | <b>68.8</b> | <b>91</b>     | <b>94.6</b> | <b>89</b>     | <b>72.1</b> | <b>89</b>     | <b>96.6</b> |

### Land Ownership

Table 14 shows the changes of tenure/household status between 1977 and 1982. Out of 136 households, who were residing in Minanga Norte in 1977, 106 are still living in the same village in 1982. The remaining 30 households were not enumerated perhaps because they disappeared and/or moved out, because of the death of household head, retirement and other reasons. As of 1982, 64 households newly moved in and/or constructed their houses inside the village. Row and column of the table indicate the actual number of household by each status in 1977 and 1982.

Figures 5 and 6 illustrates the dramatical change of tenure status for the LEA farmers. As shown in Figure 5, the change occurred not only on the number but also on the membership of the group. In the case of LEA farmers, there were 5 owner cultivators in 1977. After five years, one of them changes his status to part-owner. In addition to the remaining 4 owner cultivators, three farmers joined the group. One was a part-owner in 1977 but transferred the right of cultivation to others. Two farmers who also purchase and/or inherited the irrigated land at the LEA moved inside the village.

In the same way, 16 part-owners resided in this village in 1977. Eleven (11) households had the same status for 5 years. The other 4 farmers transformed their status from part-owners to owner cultivator and tenants. One part-owner moved out from this village for family reasons. However, the number of the class was increased to 23 in 1982. There were owner cultivators, share tenant, lessee, immigrant and non-farm households before the survey period.

On the other hand, much attention should be focused on the changes of the number of landless agricultural workers (Figure 6). This status consists of landless workers. They have neither ownership nor tenancy rights to the land and their income is principally from their own toil. As of 1977, the number of landless workers were 10. Then one became owner cultivator and two became tenants. Also, two

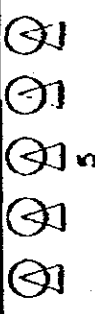
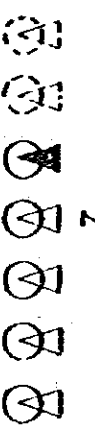

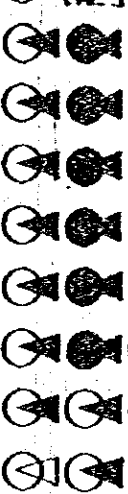
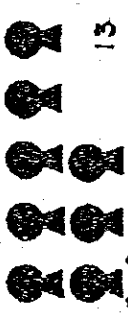
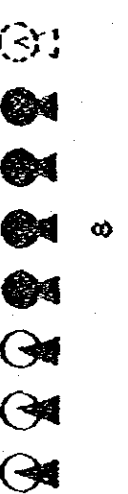


Table 14. Changes of Household Classification Between 1977 and 1982 in Minanga Norte, Iguig

| Item                    | 1982  |        |       |          |        |           |        |        |       |       | Sub-Total |
|-------------------------|-------|--------|-------|----------|--------|-----------|--------|--------|-------|-------|-----------|
|                         | LEA   | LEA    | OLEA  | Landless | Non-   | Immigrant | Sub-   | Farmer | a)    | Total |           |
|                         | Owner | Tenant | Owner | P-owner  | Tenant | Worker    | Farmer | a)     | Total |       |           |
| Owner                   | 4     | 1      | -     | -        | -      | -         | -      | -      | -     | 5     |           |
| Part-owner              | 1     | 11     | 3     | -        | -      | -         | -      | -      | 1     | 16    |           |
| Tenant                  | -     | 6      | 4     | -        | -      | 1         | 1      | 1      | 1     | 13    |           |
| Lessee                  | -     | 1      | -     | -        | -      | -         | -      | -      | -     | 1     |           |
| Owner                   | -     | -      | -     | 1        | 4      | 2         | -      | 1      | 5     | 13    |           |
| Part-owner              | -     | -      | -     | 5        | 4      | 2         | 1      | -      | 6     | 18    |           |
| Tenant                  | -     | -      | -     | 2        | 7      | 18        | -      | 2      | 4     | 33    |           |
| Lessee                  | -     | -      | -     | -        | -      | -         | -      | -      | 2     | 2     |           |
| Landless Worker         | -     | -      | -     | 1        | -      | 2         | 3      | 2      | 2     | 10    |           |
| Non-farmer              | -     | 1      | -     | -        | 3      | -         | 4      | 8      | 9     | 25    |           |
| Immigrant <sup>b)</sup> | 2     | 3      | 1     | 2        | 4      | 14        | 20     | 18     | -     | 64    |           |
| Sub-total               | 7     | 23     | 8     | 11       | 22     | 38        | 29     | 32     | 30    | 170   |           |
| Total                   |       |        |       |          |        |           |        |        |       |       | 136       |

a) Emigrant means households resided in Minanga Norte in 1979 but moved out or disappeared in 1982.

b) Immigrant means households settled in this village after 1977.

# LEA FARMERS

|              | 1977   | 1982   |
|--------------|--|--|
| Owner        |  5  |  7  |
| Part - Owner |  16 |  23 |
| Tenant       |  13 |  8  |
| Lessee       |  1  |  0  |
| <b>Total</b> | <b>35</b>  | <b>38</b>  |

Legend:

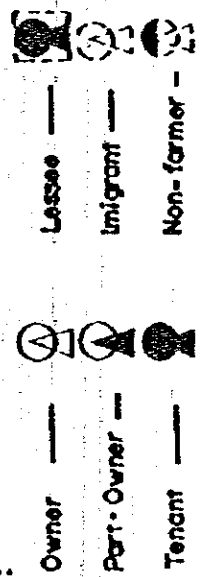
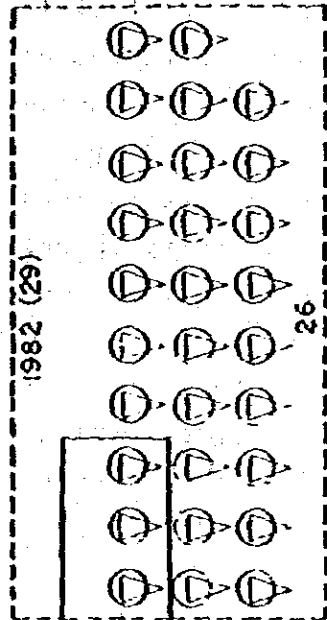
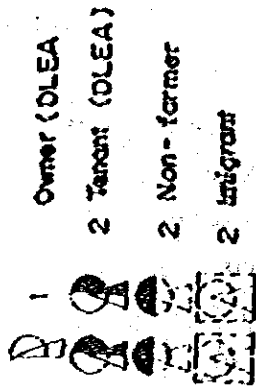


Figure 5. Changes of Household Classification of LEA Farmers from 1977 to 1982. Minanga Norte, Iguig



# LANDLESS AGRICULTURAL WORKER CHANGES OF HOUSEHOLD CLASSIFICATION



landless agricultural worker

1977 (10)

1982 (29)

26

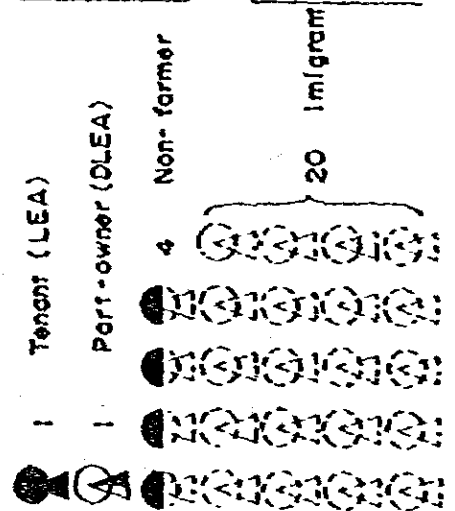


Figure 6. Changes of Household Classification of Landless Agricultural Workers, from 1977 to 1982. Minanga Norte, Iguaçu

were non-farm households and another two moved out from the village. As a result, only 3 agricultural worker household remained on the same status in 1982. However, the number of landless agricultural worker increased to 29 because LEA tenant, OLEA owner cultivators, 3 non-farm householders and 20 immigrants had joined the class during this period.

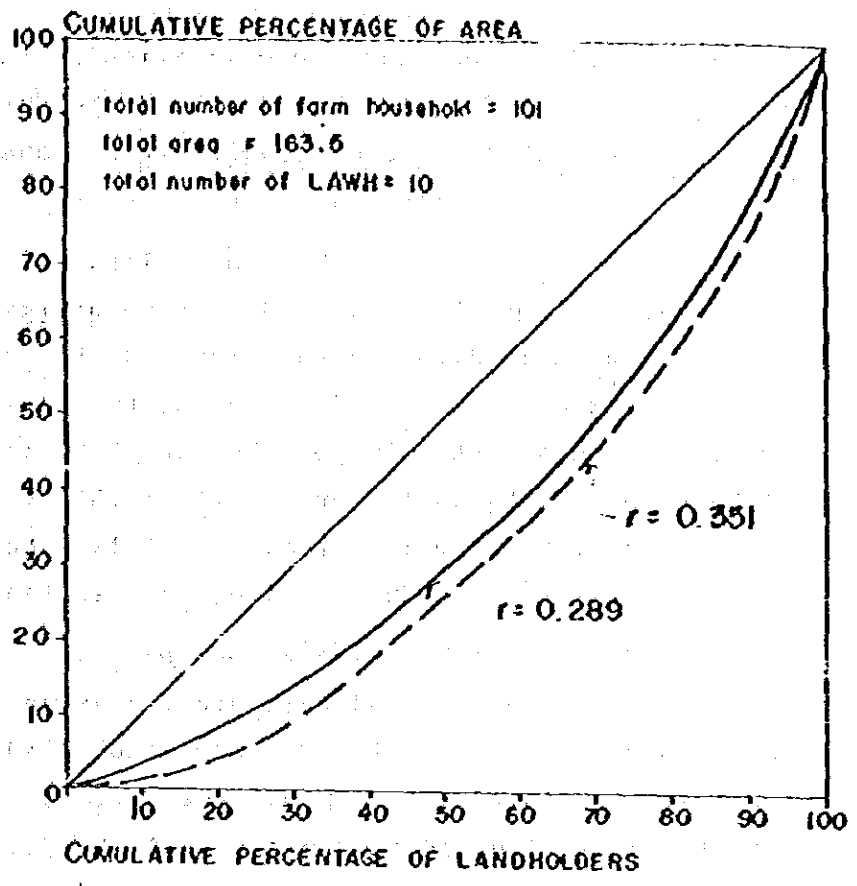
In this village, even the rice land owner cultivators are intricately located at various places in or out the village. Tenants also hold a right to cultivate plots of rice or corn lands extended over adjacent villages. The reason why right of cultivation is scattered at various places was not verified in this survey. However, this complicated situation suggests that land ownership or right of cultivation among tenants is transferable within the village. Although land productivity is still at a low level, man versus land ratio is quite high. Under this condition, farmers are obliged to compete with others for holding or obtaining a right of cultivation. In addition, inheritance custom in which all children are able to share the same right of succession provides a certain effect on the present day situation of landholding.

#### Situation of Landholding

Changes of equity with regard to the present distribution of landholdings in the village was also studied. A Lorenz curve indicates what percentage of the population hold a percentage of the land area. The diagonal line intersecting the square box represents the line of perfect equality. Similarly, the Gini ratio indicates this degree of equitable distribution in number i.e. the closer to 0, the more equitable; the nearer to 1.0 the greater the equality.

Figure 7 shows the distribution of landholdings in 1977. At that time, 163 ha. of the total arable land was cultivated by 101 Minanga Norte farmers with a Gini ratio

1977



1982

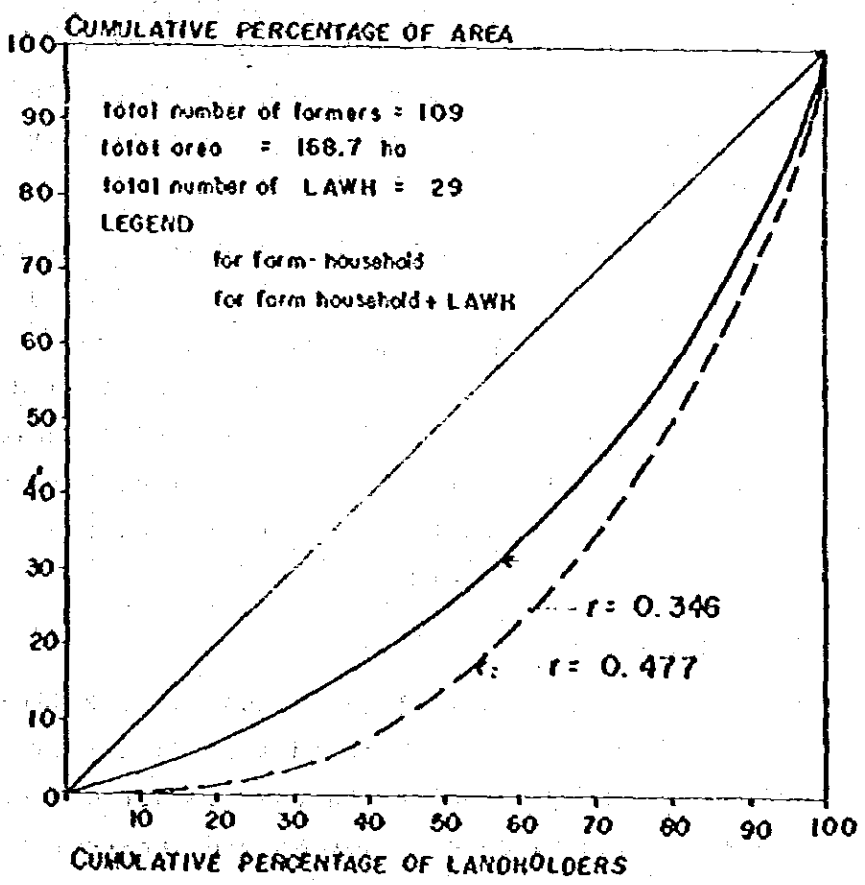


Figure 7. Area (Lowland and Upland) Cultivated by Minanga Norte Farmers, 1977 and 1982

of 0.289. However, if one extends the definition of farm work to include the 10 landless workers on land the curve produces a more inequitable ratio of 0.351. This means that 50% of all actual area was tilled by 70% cultivators.

As shown in Figure 7 the distribution of landholdings shifted to more inequitable level in 1982, the Gini ratio of 0.477 which included landless workers reveals the most inequitable distribution of landholdings among the four Lorenz curves. This means that 20% of the actual tillers of the soil have neither tenant's nor owner's rights to the land. Conversely, the top 20% of actual tillers hold tenancy or ownership titles to 50% of rice and corn land.

In 1972, the Philippine Agrarian Reform program was extended to all tenants in rice and corn growing areas. Share tenancy was officially abolished. Operation Land Transfer (OLT) was initiated to distribute Certificate of Land Transfer (CLT) to eligible rice and corn tenants. These tenants became formally amortizing owners under the program. By 1974, Operational Leasehold (LHO) started fixing leasehold status for share tenants of small landlords - OLT covered those who owned 7 hectares or more of tenanted rice and maize growing lands.

At several villages in Iguig, the land reform program has been promoted step by step. In the case of Minanga Norte, however, it seems that the program is not yet adopted because paddy and corn field is owned by small landlords who are exempted from OLT. As of 1982, CLT's were distributed to only 5 cases for 6 parcels of rice land. In addition, majority of tenants stated that they are still practicing the sharing arrangement.

#### Major Impact on Land Tenure System

For the majority of the villages in Cagayan, Barangay Committee on Land Production (BCLP) had already accomplished evaluation forms establishing the average gross production per hectare based on 3 normal crop years. In

the case of Minanga Norte, the standard leasehold rental for rainfed area was set at around 37 cavans of palay per hectare at the end of 1970.

Incidentally, the average production per ha. was 3.4 tons at Tubuan Village in Laguna in 1974 where the productivity has been rapidly increased through the "Green Revolution". Abangay Village also in Iloilo was reported at 3 tons per hectare in 1976. In addition, data from random sample from local item records of the Department of Agrarian Reform shows that the average yield of palay per hectare was roughly estimated at 1.7 tons at Rajal Sur Village in Nueva Vizcaya in 1964. If field in Minanga Norte be compared with these average yields, palay production per unit area is very much lower.

Minanga Norte is a village where the productivity was traditionally lower and irrigation facilities have been partly established since 1978 by the APC. At the same time, various activities for the dissemination of new rice technology were undertaken for Iguig farmers. As of 1982, 76 cultivators of LEA farmers from 6 different villages are cultivating rice at 52 hectares. Through the project, the average yield in this area has reached its target, 3.5 tons of palay per hectare.

How was the increasing tendency of land productivity reflected to the land tenure system in the related area?

In any case, establishment of irrigation facilities and diffusion of new rice technology among small farmers provide a fundamental knowledge and condition for increasing yield per unit area. Based on the increase in productivity, potentiality for supporting population is also strengthening gradually. However, expansion of arable land is physically limited. There is no other effective job opportunity except agriculture. As a result, competition for obtaining the right of cultivation became much more severe. Householders who

were eliminated from the competition were obliged to work at other farms as landless agricultural workers to gain a daily income. It seems that changes of land tenure system in this barangay exactly coincide with the process of development.

Irrigation facilities are not yet completely established as of now. Also, it is not good to conclude that the LEA farmers have perfectly adopted new rice technology. What have been observed in this survey are the changes on rural development that have evolved from 1977 to 1982. However, because of these unknown situations like farmer's behavior concerning land ownership might be more complicated. Kaleidoscopic changes among Minanga Norte farmers imply that they hold a great expectation on APC activities.

#### IV. OUTPUT AND INPUT RELATION

##### Yield of Palay

A preliminary benchmark survey on the socio-economic status of farmers of the Iguig Leading Extension Area was conducted in 1977 prior to the establishment of the LEA. Data show that an average of 20 cavans/ha. was attained by the farmers. This is lower compared to the national average of 35 cavans/ha. in 1975. The low yield may be attributed to the conventional farming techniques practiced by most of the farmers. The farmers planted the rice crop then visit the farm only when harvest time comes. They used the traditional varieties and no crop protection employed during the growing stages of the rice crop.

However, in 1978 when the temporary irrigation system became operational in the LEA plus the provision of technical assistance and guidance to the LEA farmers, there was a dramatic increase in the yield of palay from an average of 20 cavans/ha. to an average of 105 cavans/ha. per cropping

season. At present majority of the farmers already plant High Yielding Varieties (HYV's) used fertilizers and also adopted the recommended crop protection practices.

In 1982, the average yield of palay of the 109 farming households varies depending on size of farm and source of water, e.g. irrigated or rainfed. There was no significant difference in yield between tenure status. The average yield attained by OLEA farmers during the first cropping season under rainfed condition was 32.0 cavans/ha. while LEA farms operated under the same condition got an average of 42.0 cavans/ha. or 1.5 times higher than the OLEA (Table 15).

Under irrigated condition, the average production of LEA during the first cropping season was 80 cavans/ha. while second crop yield increased to 85 cavans/ha. The increase in production is attributed to the increase in the application of fertilizers applied by the farmers during the wet season. However, the average production of LEA farmers in 1982, when the study was conducted, is still lower compared to the average production during the previous cropping seasons. The decrease in yield is attributed to limited water supply especially during the dry season due to pump breakdown and typhoon that hit the area in October of the same year.

#### Use of Fertilizer and Chemicals

Application of fertilizers and agricultural chemicals was not the common practice of farmers in the area prior to the establishment of the pilot farm. Though majority (79%) of the 77 farmers indicated awareness of one or more of the new farming techniques in 1977, a very limited number (25 farmers) applied these in their farms. Lack of capital and water supply were mentioned as the major constraints in the adoption of the new modern technology (APC 1978).

In 1978 when the LEA became operational majority of

Table 15. Production of Palay (unhulled rice), 1982

| Area Range (ha) | LEA                  |                      |                    |                    |                 |              | OLEA                 |                      |                    |                    |                 |              |
|-----------------|----------------------|----------------------|--------------------|--------------------|-----------------|--------------|----------------------|----------------------|--------------------|--------------------|-----------------|--------------|
|                 | Irrigated (1st Crop) | Irrigated (2nd Crop) | Rainfed (1st Crop) | Rainfed (2nd Crop) | Ave. Prod'n /ha | No. of Farms | Irrigated (1st Crop) | Irrigated (2nd Crop) | Rainfed (1st Crop) | Rainfed (2nd Crop) | Ave. Prod'n /ha | No. of Farms |
| below 0.5       | 10                   | 26                   | 86                 | 4                  | 40              | 98           | 3                    | 13                   | 48                 | 21                 | 14              | 35           |
| 0.6-1.0         | 3                    | 55                   | 66                 | 1                  | 45              | 64           | 3                    | 28                   | 39                 | 21                 | 18              | 30           |
| 1.1-1.5         | -                    | -                    | -                  | 1                  | 68              | 54           | -                    | -                    | -                  | 2                  | 27              | 17           |
| 1.6-2.0         | 1                    | 107                  | 67                 | -                  | -               | -            | 1                    | 82                   | 41                 | -                  | -               | -            |
| 2.1-2.5         | -                    | -                    | -                  | -                  | -               | -            | -                    | -                    | -                  | -                  | -               | -            |
| 2.3-3.0         | -                    | -                    | -                  | -                  | -               | -            | 1                    | 90                   | 30                 | -                  | -               | -            |
| 3.1-above       | -                    | -                    | -                  | -                  | -               | -            | -                    | -                    | -                  | -                  | -               | -            |
| Total or Ave.   | 14                   | 38                   | 80                 | 6                  | 46              | 85           | 8                    | 37                   | 42                 | 44                 | 17              | 32           |

\*LEA farmers with both irrigated and rainfed farms during the first and second cropping seasons were not included in the analysis because the production from both farms cannot be determined.



the LEA adopted the modern method of farming like the used of high yielding varieties, fertilizers and chemicals. This maybe attributed to the availability of irrigation water, provision of technical assistance and guidance and the saturation of production technicians by APC in the area. But despite of all these assistance, not all farmers strictly followed the recommended technology provided by APC technicians. For example, the application of 6 bags of ammonium sulfate or 3 bags of urea during the wet season and 8 bags of ammonium sulfate or 4 bags of urea during the dry season is not strictly followed by majority of the farmers.

Only those who availed of the Masagana 99 loan and few (financially and economically) "better off" farmers applied the correct amount of fertilizers and chemicals. Majority who used fertilizers and insecticides applied at minimal amounts or below the amount recommended by the technicians. The main reason is that, most of the farmers are subsistence farmers. They cannot afford to buy fertilizers and chemicals.

One of the scheme under the Masagana 99 program is to provide production loans to the farmers. However, most of the farmers in the area are not eligible borrowers because only those farmers with at least one (1) hectare can avail of the loan.

However, comparing LEA farmers in 1977 and OLEA now with that of LEA in 1982 when this study was conducted, there was a tremendous increase in the application of fertilizers and chemicals in the area (Table 16).

For the first and second crop, 93% of the LEA farmers applied fertilizer while 90% and 71% used insecticides for the first and second crop, respectively.

On the other hand, only 29% and 17% of the OLEA farmers applied fertilizers and insecticides in their farms. These data show that the provision of technical assistance

Table 16. Percent of Use and Costs of Fertilizers and Insecticides, 109 Palay Farms, Minanga Norte, Iguig, Cagayan, Philippines, 1982

| Crop and Item      | Percent of Farm that Used Time & Amount |              |            |            |              |             |           |              |            |            |     |    |     |     |    |    |    |
|--------------------|---|--------------|------------|------------|--------------|-------------|-----------|--------------|------------|------------|-----|----|-----|-----|----|----|----|
|                    | OLEA                                    |              | LEA        |            | OLEA         |             | LEA       |              | OLEA       |            |     |    |     |     |    |    |    |
|                    | Owner (7)                               | P-owner (23) | Tenant (8) | Owner (11) | P-owner (22) | Tenant (38) | Owner (7) | P-owner (23) | Tenant (8) | Owner (11) |     |    |     |     |    |    |    |
|                    | Amount                                  | %            | Amount     | %          | Amount       | %           | Amount    | %            | Amount     | %          |     |    |     |     |    |    |    |
|                    | /farm                                   | /Ha.         | /farm      | /Ha.       | /farm        | /Ha.        | /farm     | /Ha.         | /farm      | /Ha.       |     |    |     |     |    |    |    |
| <b>First Crop</b>  |   |              |            |            |              |             |           |              |            |            |     |    |     |     |    |    |    |
| Fertilizer         | 100                                     | 225          | 94         | 68         | 188          | 86          | 141       | 295          | 17         | 86         | 187 | 29 | 118 | 168 | 33 | 27 | 45 |
| Insecticides       | 100                                     | 41           | 68         | 88         | 16           | 45          | 86        | 57           | 119        | -          | -   | 18 | 44  | 62  | 22 | 4  | 6  |
| Total              |   | 266          | 443        | 84         | 238          | 198         | 413       | 86           | 187        | 162        | 230 | 21 | 51  |     |    |    |    |
| <b>Second Crop</b> |   |              |            |            |              |             |           |              |            |            |     |    |     |     |    |    |    |
| Fertilizer         | 100                                     | 76           | 306        | 89         | 49           | 107         | 100       | 380          | 304        | -          | -   | -  | -   | -   | -  | -  | -  |
| Insecticides       | 25                                      | 1            | 5          | 89         | 17           | 37          | 100       | 161          | 128        | -          | -   | -  | -   | -   | -  | -  | -  |
| Total              |   | 78           | 301        | 66         | 144          | 541         | 433       | -            | -          | -          | -   | -  | -   | -   | -  | -  | -  |

and guidance to farmers and other support services particularly the availability of irrigation water are important factors in the adoption of modern practices in the culture of lowland rice because of the efficiency of these recommended practices depends largely on water. This is also true with systemic or granular insecticides commonly used.

The highest average of fertilizers and chemicals applied per hectare was the LEA owners during the first crop and LEA tenant during the second crop. On the other hand, OLEA tenants reported the lowest amount spent per hectare.

#### Farm Machinery & Equipment, Transport Vehicles and Working Animals

The wooden plow, steel plow and harrow are being owned and used by LEA and OLEA farmers, Table 17. The use of these equipment are complemented by the use of working animals in the area. There are no farm machinery like tractors because of their high prices which the farmers cannot afford.

The most common transport vehicle is the cart, which is found among the majority (58%) of the farm households. This is used in transporting produce from farm to home. Sled and calesa are owned by few cultivators. Carabao, cattle and horses are used for hauling purposes. Aside from the land means of transportation, few cultivators owned banca which was used to transport farm produce specifically corn and vegetable from the other side of the river.

Only 14 of the 109 farm households owned a sprayer. Of these, 12 come from the LEA, while the other two from the OLEA. Majority of the LEA resorted to borrowing APC sprayers. This is also true with rotary weeders. APC provide custom servicing for sprayers and rotary weeders at the rate of P1.50 per day.

The number of carabaos were also determined in the survey. One hundred twenty-six (126) heads of carabao

Table 17. Number of Farm Equipment, Transport Vehicles and Working Animals from 170 Households.  
 Minanga Norte, Iguig, Cagayan, 1982

|  | LEA                |        | OLEA  |        | LAWH   | NFK    | Total  | %                                |
|--|--------------------|--------|-------|--------|--------|--------|--------|----------------------------------|
|  | Owner              | Tenant | Owner | Tenant |        |        |        |                                  |
| <b>Farm Machinery &amp; Equipment:</b> |                    |        |       |        |        |        |        |                                  |
| Wooden plow                            | 7(7) <sup>c)</sup> | 37(22) | 13(8) | 10(8)  | 23(17) | 33(27) | 3(3)   | 126(92) 84 <sup>a)</sup>         |
| Steel plow                             | 5(3)               | 7(7)   | 3(3)  | -      | 7(6)   | 10(9)  | 2(2)   | 34(30) 28 <sup>a)</sup>          |
| Harrow                                 | 6(6)               | 18(18) | 5(5)  | 6(6)   | 15(15) | 19(19) | 2(2)   | 71(71) 65 <sup>a)</sup>          |
| Weeder                                 | -                  | -      | 1(1)  | -      | 1(1)   | 2(2)   | -      | 4(4) 4 <sup>a)</sup>             |
| Sprayer                                | 2(2)               | 12(10) | -     | 1(1)   | 1(1)   | -      | -      | 16(14) 13 <sup>b)</sup>          |
| Bolo                                   | 14(7)              | 48(22) | 23(8) | 23(11) | 57(22) | 82(38) | 52(27) | 47(25) 346(160) 94 <sup>b)</sup> |
| Scythe                                 | 9(5)               | 35(20) | 20(7) | 19(9)  | 26(16) | 50(29) | 30(16) | 205(113) 66 <sup>b)</sup>        |
| Rice mill                              | -                  | -      | -     | -      | 1(1)   | -      | -      | 1(1) * <sup>b)</sup>             |
| Others (Hoe Fishnet)                   | -                  | -      | -     | 1(1)   | -      | -      | -      | 1(1) 2(2) 1 <sup>b)</sup>        |
| <b>Transport Vehicles:</b>             |                    |        |       |        |        |        |        |                                  |
| Cart                                   | 4(4)               | 17(14) | 5(5)  | 5(5)   | 12(12) | 24(23) | -      | 67(63) 58 <sup>a)</sup>          |
| Sled                                   | 3(3)               | 13(13) | 2(2)  | 1(1)   | 7(7)   | 5(5)   | 1(1)   | 32(32) 29 <sup>a)</sup>          |
| Banca                                  | 2(2)               | 5(5)   | 1(1)  | -      | 2(2)   | 2(2)   | -      | 1(1) 13(13) 12 <sup>a)</sup>     |
| Calasa                                 | 1(1)               | 2(2)   | 1(1)  | 1(1)   | 1(1)   | -      | -      | 1(1) 7(7) 4 <sup>b)</sup>        |
| Tricycle                               | -                  | -      | -     | -      | -      | -      | -      | 1(1) 1(1) * <sup>b)</sup>        |
| Motorcycle                             | -                  | 1(1)   | -     | -      | -      | -      | -      | 2(2) 3(3) 2 <sup>b)</sup>        |
| Bicycle                                | 1(1)               | 4(3)   | 1(1)  | -      | 2(2)   | 1(1)   | -      | 9(8) 5 <sup>b)</sup>             |
| <b>Working Animals:</b>                |                    |        |       |        |        |        |        |                                  |
| Caxabao                                | 8(5)               | 31(20) | 9(8)  | 12(8)  | 21(16) | 35(31) | 4(4)   | 6(4) 126(96) 88 <sup>a)</sup>    |
| Cattle                                 | 1(1)               | 3(3)   | -     | -      | -      | -      | 1(1)   | 1(1) 2(2) 2 <sup>b)</sup>        |
| Horse                                  | 7                  | 23     | 8     | 11     | 22     | 38     | 29     | 1(1) 10(9) 5 <sup>b)</sup>       |
| No. of Households                      |                    |        |       |        |        |        |        | 32 170                           |

a) percent of holders to the total farm households.  
 b) percent of holders to the total households.  
 c) number in ( ) indicates number of holders.  
 \* less than one percent.

were raised by 96 households inside the village which is equivalent to 88% of the total households. It is interesting to note that four (4) households each of the LAWH and NFH, owned a carabao. In case of LAWH, carabao plays an important role to generate additional income. According to our survey, daily wage rate for plowing and harrowing with carabao was estimated at about P25.00. Another important transport vehicles owned by 5 percent of the households is calesa. Under a traditionally rice farming community like Minanga Norte, farmers do not have enough chance to work during the off season. Therefore, calesa plays an important role to generate additional income. Calesa are used by village people to transport their farm produce from home to market and people going to the public market during market days and vice versa.

#### Forms of Labor Employment on Rice

There are three categories of labor use for rice production: these are family, operator and hired labor. Table 18 shows the total distribution for rice production. More than half of the total labor input was contributed by hired workers on both groups or 62% and 51% for LEA and OLEA, respectively. Family labor ranks second with 20% for LEA and 26% for OLEA. Exchange labor was not mentioned by any respondent. The reason could be attributed to the high population of landless agricultural workers in the area. The share of operator labor was about 18% for LEA and 23% for OLEA.

The dependency of LEA for hired labor was highest in transplanting followed by harvesting. On the contrary, OLEA is for the reverse order.

The high rate of dependency on hired labor was due to a system common in rice producing regions in the Philippines-Farmers employed by other farmers. The system was

Table 18. Composition of Operator, Family and Hired Labor Use for Rice Production per Hectare by Task in Sample households, Minanga Norte, Iguig, Cagayan Philippines, 1982, Wet Season

| Task/Labor Force                    | Labor Used for Rice Production/ha. |       |                    |       |
|-------------------------------------|------------------------------------|-------|--------------------|-------|
|                                     | LEA <sup>a)</sup>                  |       | OLEA <sup>b)</sup> |       |
|                                     | Days                               | %     | Days               | %     |
| <b>Land preparation:</b>            |                                    |       |                    |       |
| Operator                            | 8.3                                | 66.94 | 5.5                | 50.93 |
| Hired                               | 1.7                                | 13.71 | 2.1                | 19.44 |
| Family                              | 2.4                                | 19.35 | 3.2                | 29.63 |
| Total                               | 12.4                               | 100.0 | 10.8               | 100.0 |
| <b>Transplanting:</b>               |                                    |       |                    |       |
| Operator                            | 1.2                                | 4.53  | 1.8                | 17.14 |
| Hired                               | 22.6                               | 85.28 | 5.1                | 48.57 |
| Family                              | 2.7                                | 10.19 | 3.6                | 34.29 |
| Total                               | 26.5                               | 100.0 | 10.5               | 100.0 |
| <b>Weeding:</b>                     |                                    |       |                    |       |
| Operator                            | 2.0                                | 13.89 | 1.8                | 21.69 |
| Hired                               | 8.8                                | 61.11 | 4.2                | 50.60 |
| Family                              | 3.6                                | 25.00 | 2.3                | 27.71 |
| Total                               | 14.4                               | 100.0 | 8.3                | 100.0 |
| <b>Harvesting &amp; Processing:</b> |                                    |       |                    |       |
| Operator                            | 3.8                                | 9.97  | 3.2                | 11.90 |
| Hired                               | 25.2                               | 66.14 | 18.3               | 68.03 |
| Family                              | 9.1                                | 23.89 | 5.4                | 20.07 |
| Total                               | 38.1                               | 100.0 | 26.9               | 100.0 |
| <b>Others<sup>c)</sup></b>          |                                    |       |                    |       |
| Operator                            | 1.5                                | 35.71 | 1.2                | 41.38 |
| Hired                               | 1.1                                | 26.19 | 0.7                | 24.14 |
| Family                              | 1.6                                | 38.10 | 1.0                | 34.48 |
| Total                               | 4.2                                | 100.0 | 2.9                | 100.0 |
| <b>Total</b>                        |                                    |       |                    |       |
| Operator                            | 16.8                               | 17.57 | 13.5               | 22.73 |
| Hired                               | 59.4                               | 62.13 | 30.4               | 51.18 |
| Family                              | 19.4                               | 20.30 | 15.5               | 26.09 |
| Total                               | 95.6                               | 100.0 | 59.0               | 100.0 |

a) irrigated condition

b) rainfed condition

c) other (fertilizing and spraying)

developed under the output and cost-sharing tenancy (kasama) in an attempt by tenants to minimize the landlord's share (Takahashi, 1970). In that system, even if the family labor income from rice production on their farm was reduced by the amount paid to neighbors, the reduction would be more compensated for by the family's wage earned from the neighbors. This resulted in a higher level of labor income for tenants in the village as a whole.

Although under the Agrarian Reform Law, share tenancy was already abolished, in the case of Minanga Norte, majority are still practicing share tenant system since most of the landlords owned small landholdings which were not covered by Certificate of Land Transfer (CLT). Therefore, this system which may be called "Labor Exchange with wage payments" is more beneficial for share tenants than the exchange labor (bayanihan), in which labor is exchanged without payments.

In land preparation, operator and family labor played a major role for both LEA and OLEA. For OLEA, which is a rainfed area, the common practice of the farmers is to plant one crop a year. The field is left to fallow the rest of the year, that giving the operator and other members of the family more time to prepare the land before transplanting comes.

#### Labor Force and Participation

Table 19 shows the distribution of family population in relation to the available labor force among LEA, OLEA and LAWH.

The average number of family members per household was 5 of which 4 belonged to the economically-active population (10-64 years old) labor-force-potentially available. The labor force ratio is the economically

Table 19. Average Family Size, Labor Force, and Labor Participation in Sample Households, Minanga Norte, Iguig, Cagayan, Philippines, 1982

|           | Family Members          |                |                     | Labor Force | Labor Participation |
|-----------|-------------------------|----------------|---------------------|-------------|---------------------|
| Total (1) | Economically Active (2) | a) Working (3) | b) Ratio (%) (2)(1) | (3)(2)      |                     |
| LEA       | 4.6                     | 3.8            | 3.0                 | 83          | 79                  |
| OLEA      | 4.8                     | 2.7            | 2.3                 | 56          | 85                  |
| LAWH      | 4.5                     | 3.9            | 3.0                 | 86          | 77                  |
| Average   | 4.6                     | 3.5            | 2.8                 | 75          | 80                  |

a) 10-64 years old

b) working full time at rice planting and harvesting periods

(Reference Data)

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

| <u>Rice Production Activities</u> | <u>Minanga Norte Iguig, Cagayan 1982</u> |
|-----------------------------------|--|
| Seedbed preparation               | P20                                      |
| Sowing                            | 7  |
| Plowing                           | 20                                       |
| Harrowing                         | 20                                       |
| Pulling of seedlings              | 7  |
| Transplanting                     | 7  |
| Fertilizing                       | 7  |
| Spraying                          | 7  |
| Irrigating                        | -  |
| Weeding                           | 7  |
| Harvesting                        | 10                                       |



active population divided by the total number of family members which is 76% on the average.

The rate of labor participation is measured as the ratio of working population to economically-active population. The working population is family members working more or less full time during periods of peak labor requirements (rice planting and harvesting). The average labor participation rate was 80%.

As shown in Table 18, the average amount of labor used for rice production was 95.6 man-days per hectare for LEA and 59.0 man-day per hectare for OLEA. Data shows that rice cultivation at the LEA is labor intensive compared to OLEA. This is true in rainfed area in Cagayan. The traditional practice of farmers in the rainfed area is that after planting, they will visit only the farm when harvesting comes.

For LEA, harvesting required the highest number of man-days per hectare, followed by transplanting, weeding, land preparation, and others. In case of OLEA, harvesting also required the highest number of man-days followed by land preparation, planting, weeding and others. Incidentally, the average amount of labor reported by OLEA is almost similar to the result of the survey conducted by M. Valiente, Jr. *et al.*, in 1975 (Appendix 1).

#### Cost and Return Analysis in Rice Farming

The LEA cultivators had a greater advantage in terms of farm income over that of the OLEA which is still under rainfed condition. The LEA were able to till their land twice a year being benefited from the APC-CIADP. The LEA owner got the highest gross farm income of P16,600/ha/year respectively (Table 20 and 21).

Of the total variable cost, 65% was spent for fertilizers by owners, 47% by part-owners and only 24% by tenants.

Table 20. Cost and Return Analysis in Rice Production, LEA

| Items                       | ! Owner (7)       |                  | ! P-owner (22)    |                  | ! Tenant (8)      |                  |
|-----------------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|
|                             | !Total<br>! /farm | !Total<br>! /ha. | !Total<br>! /farm | !Total<br>! /ha. | !Total<br>! /farm | !Total<br>! /ha. |
| <b>Gross Return (P):</b>    |                   |                  |                   |                  |                   |                  |
| <u>Cash</u>                 |                   |                  |                   |                  |                   |                  |
| Rice sold                   | 3,813             | 4,594            | 5,400             | 4,779            | 1,146             | 1,819            |
| <u>Non-cash</u>             |                   |                  |                   |                  |                   |                  |
|                             | 9,970             | 12,012           | 9,442             | 8,356            | 6,051             | 9,605            |
| <b>Total</b>                | <b>13,783</b>     | <b>16,606</b>    | <b>14,842</b>     | <b>13,135</b>    | <b>7,197</b>      | <b>11,424</b>    |
| <u>Cost (P)</u>             |                   |                  |                   |                  |                   |                  |
| <u>Variable Cost</u>        |                   |                  |                   |                  |                   |                  |
| Seeds                       | 152               | 183              | 220               | 195              | 195               | 310              |
| Insecticides                | 61                | 73               | 93                | 82               | 75                | 119              |
| Fertilizer                  | 565               | 681              | 332               | 294              | 186               | 295              |
| Transportation              | 84                | 101              | 67                | 59               | 325               | 516              |
| <b>Sub-total</b>            | <b>862</b>        | <b>1,038</b>     | <b>712</b>        | <b>630</b>       | <b>781</b>        | <b>1,240</b>     |
| <u>Fixed Cost</u>           |                   |                  |                   |                  |                   |                  |
| Depreciation                | 130               | 157              | 256               | 227              | 77                | 122              |
| Irrigation fee              | 846               | 1,019            | 325               | 288              | 371               | 589              |
| Others                      | -                 | -                | -                 | -                | -                 | -                |
| <b>Sub-total</b>            | <b>976</b>        | <b>1,176</b>     | <b>581</b>        | <b>514</b>       | <b>448</b>        | <b>711</b>       |
| <b>User's Cost</b>          | <b>1,838</b>      | <b>2,214</b>     | <b>1,293</b>      | <b>1,144</b>     | <b>1,229</b>      | <b>1,951</b>     |
| <b>Value Added</b>          | <b>11,945</b>     | <b>14,392</b>    | <b>13,549</b>     | <b>11,990</b>    | <b>5,968</b>      | <b>9,473</b>     |
| <b>Hired Labor</b>          | <b>2,194</b>      | <b>2,643</b>     | <b>3,720</b>      | <b>3,292</b>     | <b>1,731</b>      | <b>2,748</b>     |
| <b>Land Rent</b>            | <b>-</b>          | <b>-</b>         | <b>1,430</b>      | <b>1,265</b>     | <b>1,771</b>      | <b>2,811</b>     |
| <b>Farm Income</b>          | <b>9,751</b>      | <b>11,748</b>    | <b>8,399</b>      | <b>7,433</b>     | <b>2,466</b>      | <b>3,914</b>     |
| <b>Imputed Family Labor</b> | <b>889</b>        | <b>1,071</b>     | <b>565</b>        | <b>500</b>       | <b>611</b>        | <b>970</b>       |
| <b>Return to Capital</b>    | <b>-</b>          | <b>-</b>         | <b>-</b>          | <b>-</b>         | <b>-</b>          | <b>-</b>         |
| <b>Management</b>           | <b>8,862</b>      | <b>10,677</b>    | <b>7,834</b>      | <b>6,933</b>     | <b>1,855</b>      | <b>2,944</b>     |
| <u>Share (%)</u>            |                   |                  |                   |                  |                   |                  |
| <u>Farm Income/Gross</u>    |                   |                  |                   |                  |                   |                  |
| Income                      | 71                | -                | 57                | -                | 34                | -                |
| <u>Value Added/Gross</u>    |                   |                  |                   |                  |                   |                  |
| Return                      | 87                | -                | 91                | -                | 83                | -                |
| <u>Labor Share in Value</u> |                   |                  |                   |                  |                   |                  |
| Added                       | 26                | -                | 32                | -                | 39                | -                |
| <u>Land Share in Value</u>  |                   |                  |                   |                  |                   |                  |
| Added                       | -                 | -                | 11                | -                | 30                | -                |
| <u>Residual Share in</u>    |                   |                  |                   |                  |                   |                  |
| Value Added                 | 74                | -                | 37                | -                | 31                | -                |

Table 21. Cost and Return Analysis in Rice Production, OLEA

| Items                          | Owner (11)      |                | P-owner(22)     |                | Tenant(38)      |                |
|--------------------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|
|                                | Total<br>!/farm | Total<br>!/ha. | Total<br>!/farm | Total<br>!/ha. | Total<br>!/farm | Total<br>!/ha. |
| <b>Gross Return (P):</b>       |                 |                |                 |                |                 |                |
| <u>Cash</u>                    |                 |                |                 |                |                 |                |
| Rice sold                      | -               | -              | 36              | 47             | 56              | 89             |
| <u>Non-cash</u>                | 1,577           | 2,673          | 1,531           | 1,988          | 1,459           | 2,315          |
| <b>Total</b>                   | <b>1,577</b>    | <b>2,673</b>   | <b>1,567</b>    | <b>2,035</b>   | <b>1,515</b>    | <b>2,404</b>   |
| <u>Cost (P)</u>                |                 |                |                 |                |                 |                |
| <b>Variable Cost</b>           |                 |                |                 |                |                 |                |
| Seeds                          | 48              | 91             | 84              | 109            | 73              | 116            |
| Insecticides                   | -               | -              | 48              | 62             | 4               | 6              |
| Fertilizer                     | 110             | 186            | 129             | 168            | 28              | 45             |
| Transportation                 | -               | -              | -               | -              | 9               | 14             |
| <b>Sub-total</b>               | <b>158</b>      | <b>277</b>     | <b>261</b>      | <b>339</b>     | <b>114</b>      | <b>181</b>     |
| <u>Fixed Cost</u>              |                 |                |                 |                |                 |                |
| Depreciation                   | 43              | 73             | 25              | 32             | 36              | 56             |
| Fees/repairs                   | 38              | 65             | 15              | 20             | 3               | 4              |
| Others                         | -               | -              | -               | -              | -               | -              |
| <b>Sub-total</b>               | <b>81</b>       | <b>138</b>     | <b>40</b>       | <b>52</b>      | <b>39</b>       | <b>60</b>      |
| <b>User's Cost</b>             | <b>239</b>      | <b>405</b>     | <b>301</b>      | <b>391</b>     | <b>153</b>      | <b>243</b>     |
| <b>Value Added</b>             | <b>1,338</b>    | <b>2,268</b>   | <b>1,266</b>    | <b>1,644</b>   | <b>1,362</b>    | <b>2,162</b>   |
| Hired labor                    | 302             | 512            | 324             | 421            | 402             | 638            |
| Land Rent                      | -               | -              | 321             | 417            | 389             | 617            |
| <b>Farm Income</b>             | <b>1,036</b>    | <b>1,756</b>   | <b>621</b>      | <b>806</b>     | <b>571</b>      | <b>906</b>     |
| Imputed Family Labor           | 61              | 103            | 310             | 402            | 309             | 490            |
| Return to Capital              |                 |                |                 |                |                 |                |
| Management                     | 975             | 1,653          | 311             | 404            | 262             | 416            |
| <u>Share (%)</u>               |                 |                |                 |                |                 |                |
| <b>Farm Income/Gross</b>       |                 |                |                 |                |                 |                |
| Return                         | 66              | -              | 40              | -              | 38              | -              |
| <b>Value Added/Gross</b>       |                 |                |                 |                |                 |                |
| Return                         | 85              | -              | 81              | -              | 90              | -              |
| <b>Labor Share in Value</b>    |                 |                |                 |                |                 |                |
| Added                          | 27              | -              | 50              | -              | 52              | -              |
| <b>Land Share in Value</b>     |                 |                |                 |                |                 |                |
| Added                          | -               | -              | 25              | -              | 29              | -              |
| <b>Residual Share in Value</b> |                 |                |                 |                |                 |                |
| Added                          | 73              | -              | 25              | -              | 19              | -              |

This could partly explain the higher income of owners due to the application of the fertilizers requirement through the use of high yielding varieties, which are fertilizer responsive. Insecticides were used at minimal level.

The irrigation fee/obligation should have been constant at 6 cavans/ha/cropping season or cash equivalent of P510 but due to the rotation of the service area to the different zones, the respondents who were not served with irrigation water were included in the analysis. The fee ranges from P290 to P1,020 per hectare per year.

The LEA is a labor intensive venture. Aside from the hired labor, family members contributed to the labor requirement of the farm.

The LEA owners generated the highest return to capital management of P10,700, tenants having the least return of P2,900. However, taking the share of tenants had almost the same (82% and 83%) while part-owners had the highest share. In case of OLEA the part-owners got the least return to capital management of P400/ha/year where as the tenants got the highest share of value added/gross return of 90%, part-owners having the least share of 81%.

#### Household Economy

Total household income is difficult to measure. This difficulty in measuring income is aggravated when the source is mostly by the unfixed income of a basically farming community like Minanga Norte. The employment of income earners in farming households as well as in many non-farming households is not regular. Economic activities are also intricately interwoven.

Admitting this limitation on data, rough estimate of total household income were obtained. In the survey made in 1982, the respondents were asked to give their best estimates of the total household income during the past

year. The sources of income included the following:

1. Salaries/wages for the non-farm employment of resident household members;
2. Salaries/wages for hired work of resident members in other farms;
3. Value of produce from direct farming of household separated farms;
4. Sales/receipts/managerial income of resident members from non-farm activities (e.i., sari-sari store, operation of tricycle/calesas, basket weaving, sale of home cooked food, etc);
5. Shares/rental for others' use of household owned capital assets (e.g., land rental/share, rental for equipment, etc);
6. Contributions/remittance of non-resident family members;
7. Gifts and inheritance;
8. Interest to savings/time deposits;
9. Loans obtained from credit institutions, relatives, neighbors, and others; and
10. Pensions, prizes, dividends repayment and interest of loans granted to others.

Incomes were in the form of cash and non-cash. The peso value of non-cash were taken.

The highest total household income during the past year is P32,600 while the lowest is P1,300 (Table 22). These were earned by households classified under non-farming. The household with the highest income derived from salaries. Three of them in the households: the head, the wife and the eldest child are employed while the household with the lowest income depend mainly on his children for daily subsistence. The distribution of income is typically skewed towards higher income (Figure 8). Fifty percent (50%) of the households have incomes lower than P5,750. Majority of the non-LEA

Table 22. Distribution of Total Household Income, 1982

| Income Range<br>(P) | LEA      |            |          | OLEA      |            |           | LAWH      | INFH      | Total      |
|---------------------|----------|------------|----------|-----------|------------|-----------|-----------|-----------|------------|
|                     | Owner    | Part-owner | Tenant   | Owner     | Part-owner | Tenant    |           |           |            |
| -1000               | -        | -          | -        | -         | -          | -         | -         | -         | -          |
| 1001-2000           | -        | -          | -        | -         | -          | -         | 3         | 1         | 4          |
| 2001-3000           | -        | -          | -        | -         | -          | -         | 5         | -         | 5          |
| 3001-4000           | 1        | 2          | 2        | 1         | 3          | 7         | 9         | 5         | 30         |
| 4001-5000           | 1        | 1          | -        | 2         | 2          | 11        | 6         | 4         | 27         |
| 5001-6000           | 1        | 2          | -        | 4         | 8          | 5         | 3         | 5         | 28         |
| 6001-7000           | -        | 1          | 1        | 2         | 1          | 4         | 1         | 1         | 11         |
| 7001-8000           | -        | 4          | 1        | 1         | 1          | 5         | -         | 6         | 18         |
| 8001-9000           | 1        | 2          | -        | 1         | 1          | 4         | -         | 4         | 13         |
| 9001-10000          | 1        | 1          | 1        | -         | 1          | -         | -         | 2         | 6          |
| 10001-11000         | -        | -          | 1        | -         | 1          | -         | -         | -         | 2          |
| 11001-12000         | -        | 1          | -        | -         | -          | -         | 1         | 1         | 3          |
| 12001-13000         | -        | -          | 1        | -         | 2          | -         | -         | 1         | 4          |
| 13001-14000         | -        | 1          | 1        | -         | 1          | 1         | -         | -         | 4          |
| 14001-15000         | -        | 1          | -        | -         | -          | -         | -         | -         | 1          |
| 15001-16000         | 1        | 2          | -        | -         | 1          | -         | -         | 1         | 5          |
| 16001-17000         | -        | 1          | -        | -         | -          | -         | -         | -         | 1          |
| 17001-18000         | -        | 1          | -        | -         | -          | -         | -         | -         | 1          |
| 18001-19000         | -        | 1          | -        | -         | -          | 1         | -         | -         | 2          |
| 19001-20000         | -        | -          | -        | -         | -          | -         | -         | -         | -          |
| 20001-above         | 1        | 2          | -        | -         | -          | -         | -         | 2         | 5          |
| <b>Total</b>        | <b>7</b> | <b>23</b>  | <b>8</b> | <b>11</b> | <b>22</b>  | <b>38</b> | <b>29</b> | <b>32</b> | <b>170</b> |

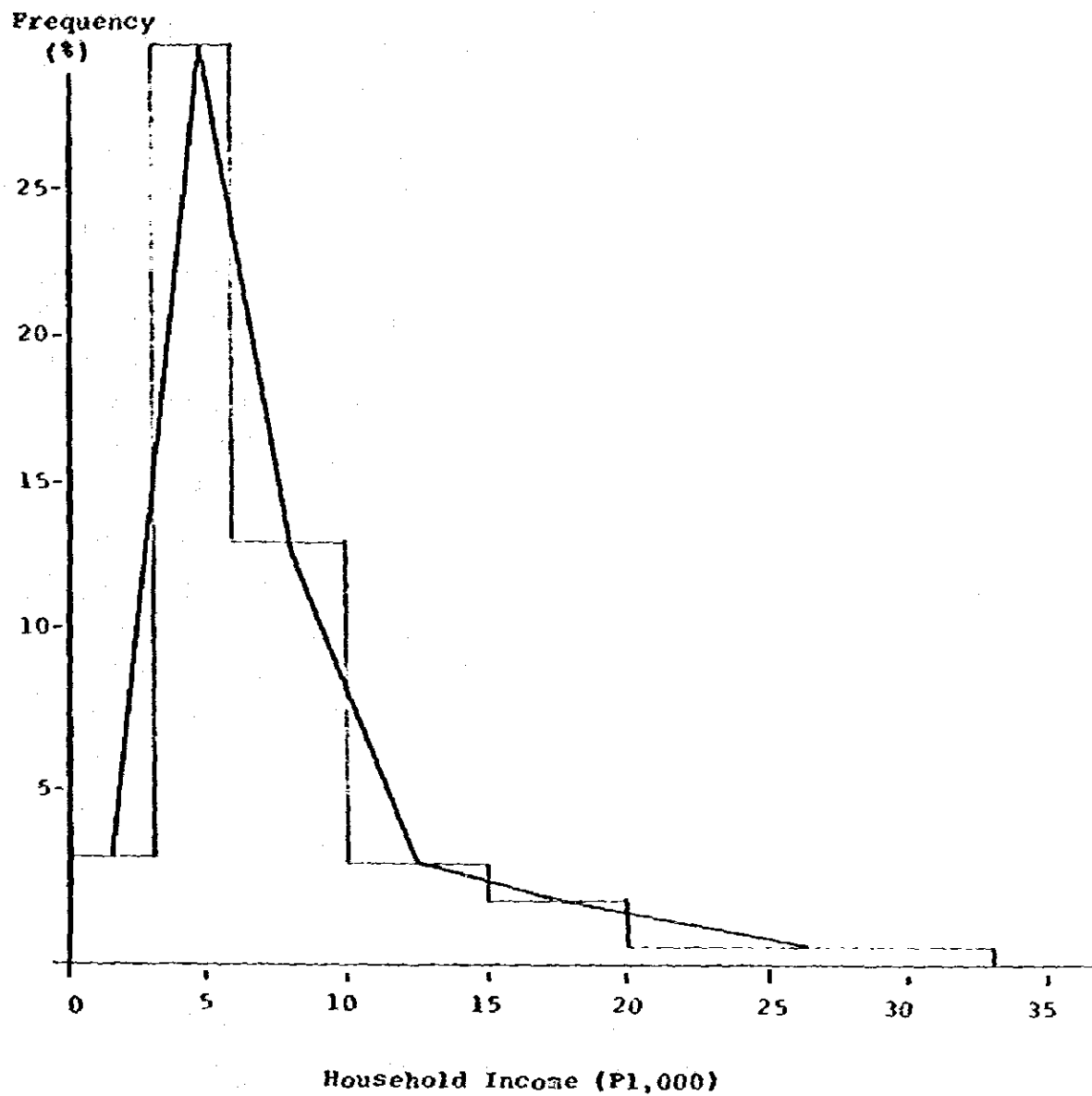


Figure 8. Income Distribution of Households in 1982

tenants and landless workers belong to this proportion. Considerable proportions of the non-LEA households, LEA owners and non-farming households have income below the median. Thirty-three percent (33%) are above the median or not more than ₱10,000 total household income. The remaining 17% have income of more than ₱10,000. Around half of the latter proportion are part-owners.

The graph compares the average income during the past year of the different households. The different households significantly differ in income although all the average per capita income in all households regardless of classification are categorized as poor as they fall below the poverty line which is ₱3,500. The cultivators in the LEA have the highest average households income with an average households income of ₱11,215 or per capita of ₱2,605. However, on a per capita basis, the non-farming household have higher incomes than the LEA tenants. The non-farming households have average household income of ₱7,950 and per capita of ₱1,800. The LEA have per capita income of ₱1,600. The landless agricultural workers have the lowest average of ₱4,400 during the past year. On a per capita basis, the figure is only ₱980.

## V. SOCIAL ATTITUDE OF VILLAGERS

### Membership to Organization

There exist a big number of organization in which residents of Minanga Norte joined. They have different natures, some organized for specific members of the household (Table 23).

There are two agricultural organizations in which the household head belongs. The first is the Samahang Nayan, which was very popular and claimed a big membership in the benchmark survey in 1977 but now has only two members from the area. The other Farmer's Irrigators Group (FIG), was formed by CIADP-APC and CIADP-IC technicians for all



Table 23. Membership to Organization

| Membership to Organization                      | Head | Spouse | Children |
|---|------|--------|----------|
| 1. <u>Samahang Nayon</u> <sup>a)</sup>          | 2    | -      | -        |
| 2. Farmers' Irrigators Group (FIG)              | 30   | -      | -        |
| 3. Rural Improvement Club                       | -    | 26     | -        |
| 4. Parent's Committee                           | -    | 2      | -        |
| 5. University on the Air                        | -    | 2      | -        |
| 6. <u>Sarikaya</u> <sup>b)</sup>                | -    | 1      | -        |
| 7. <u>Kabataang Barangay</u> <sup>c)</sup>      | -    | -      | 12       |
| 8. 4-H Club                                     | -    | -      | -        |
| 9. Parents-Teachers Association                 | -    | 2      | -        |
| 10. Anak-Bukid <sup>d)</sup>                    | -    | -      | -        |
| 11. <u>Paq-asa Youth Movement</u> <sup>e)</sup> | -    | -      | 2        |
| 12. <u>Balikatan</u> <sup>f)</sup>              | -    | 3      | -        |
| 13. Parish Council                              | -    | 4      | -        |
| 14. Catholic Womens                             | -    | 4      | -        |
| 15. <u>Barangay Tanod</u> <sup>g)</sup>         | 1    | -      | -        |

a) Farmers' Association

b) Family Planning

c) Youth Council

d) Young Farmer's Club

e) Hope Youth Movement

f) Women's League

g) Police Brigade

pilot farm cultivators. Thirty (30) LEA farmers or 79% signified their membership to the FIG while the other LEA cultivators did not because their farms were not irrigated for two consecutive cropping seasons prior to the time of study. There is also the Barangay Tanod, whose task is to maintain peace and order, but it has only one member from Minanga Norte.

More active participation is shown by the spouses. There are more organizations they joined in. The Rural Improvement Club claims the highest number of members among spouses with 26. The purpose of this is primarily for barangay improvement. Two religious organizations which have four members each are the Parish Council and the Catholic Women's League. The other organizations spouses joined in are the Parent's Committee, University on the Air, Parents-Teachers Association, and Balikatan. The reasons spouses gave for joining are to help in the barangay and for the betterment of the family through updated knowledge.

The children have their organizations, too. These are the Kabataang Barangay, Anak-Bukid and the Paq-asa Youth Movement.

The majority who did not participate in such organizations reasoned out they were not interested, have no time, or were not aware at all of such organizations. A few claim that organizations do not last long due to non-unity of members.

#### Sources of Credit

The incidence of borrowings reported was very low as only 9% of the households availed of loans (Appendix 2). The sources of credits were the Philippine National Bank, an insurance company, the municipal office, neighbors, relatives and private money lenders.

The PNB granted loans to the two LEA owners under the Masaqana 99 program for the purchase of farm inputs and to two

OLEA part-owners for additional capital in their Kilusang Kabuhayan at Kaunlaran (KKK)<sup>a)</sup> projects. The Iguig municipal office also gave out KKK loan and another under its peanut production program. Both recipients of these loans were non-farmers. Another OLEA part-owners availed of a policy loan from an insurance company.

The others borrowed money from private persons. Loans were on loose terms and easier to obtain from relatives and neighbors. These loans are usually for household consumption.

### Aspirations

Most of the goals of the respondents are family-oriented (Appendix 3). One of these aspirations is to send their children to school, which is also a means of attaining other aspirations. A Filipino professor, scholar eloquently describes the Filipino sentiments behind this aspirations.

"We are all aware that one generalization, which can be made about the Philippines without fear of successful contradiction, is the high value which Filipinos place on education, particularly higher education. The dream of every Filipino parent is to see his child obtain a college degree. It is regarded as a passport to upward social mobility - a hope for the future among the lower class. To farmers, for example, college education is their children's way out on farming, a way out of a poor and difficult life. Education is believed to be an avenue to a good job and carries prestige within itself. To the poor, higher education is their source of social equality with the price, for he who possesses a college degree is almost always never a lower class, although having a college diploma is neither sufficient nor it is a guarantee that he will make it to the upper class. To the Filipino and his family, therefore, education is an "investment" toward a better job, greater self - respect, and social esteem; and to

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a) Livelihood Movement

the parents, educated children are a continuing source<sup>a)</sup> of security for old age" (Telia, 1970).

Another family-oriented goal is to have a progressive life. This implies the respondent's discontentment over present living conditions. On the basis of income alone most of the households are living on the subsistence level. Unfortunately, they have few opportunities to improve their living conditions because they lack the means (Allo et al, 1982).

To prove this point, among the considered means of attaining aspirations, around one-half of these have nothing to do with opportunities. Hardwork, the only means considered by a majority, plus to become thrifty and active, (to eat good food), pure luck and to ask for God's help are all within the disposition of the respondent himself.

A few respondents have farm-oriented goals like increasing farm production and profits and acquiring farm lands. A small percentage of them considered modern farm technology in attaining their goals.

#### Recreation and Entertainment

There are few forms of recreation and entertainment that residents in Minanga Norte engage in as listed in Appendix 5. Except for those that involve gambling, their forms of recreation is inexpensive. This is quite natural in a rural community, which at the same time reflects the low standard of living.

The most common of these is listening to the radio, which is available in most households. The highest percentage of household heads, spouses and children, young and old, engage in this form of entertainment. Some are

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a) Librero, Florentino, et al. Rural Change in a Philippine Setting: A Study on Alternative Extension Approaches. UPLB, 1971.

also delighted in reading magazines, both in English and in vernacular, and comics which are the most popular reading materials. Aside from these, they also frequently go to movie houses especially the children, during week-ends and holidays.

Majority of the household heads drink alcohol, a vice common among rural folks. Some spouses and children drink too. A considerable percentage of household heads also gamble in cockfighting and card games.

#### Sources of Information

The radio is the most popular communication media in Minanga Norte. Listening to it (radio) is one of the most common forms of entertainment of the residents. It is one appliance most household avail of. Another reason for its popularity is its portability. One can do other things (like working) while (simultaneously) listening to the radio.

Provincial, national and international news are broadcast over the radio regularly, making it the most important source of these pieces of information (Appendix 6). Neighbors are the next major source as these pieces of information become topics for their daily conversations.

Barangay and municipal officials are also functional. They are primary sources of news within the barangay and municipality, especially during barangay meetings. Newspaper and other print media are not popular because they are seldom available and written in mediums of language not comprehended by many residents.

#### Medical Practices

In minor illness, many households resort first to self-medication (Appendix 7). They claimed that since the ailment is slight, the treatment is simple. But for safety measures, many others go to a doctor or to a nurse for proper prescription. Herbolario is also consulted as usual practice

or upon the advice of friends. Others go to a midwife who is just nearby for free medicines. People in the area, as much as possible cut down on expenses for minor illness.

However, the majority consult a doctor in severe ailments. In his absence, a nurse takes his place. When the ailment persists, they consult an herbolario. Others refer to both for complimentary treatments. In some hopeless cases, some people resort to self-medication.

## VI. CONCLUSION

1. The study was conducted in barangay Minanga Norte where the Agricultural Pilot Center is located. A total of 170 households was surveyed in 1982 which is 25% higher than the household enumerated in 1977. The 170 households have a total population of 781 while in 1977 the population were only 689. This means that there is an annual growth rate of 2.54% for a period of five years. This is relatively lower than the national rate (2.64%) but higher than the rate of Cagayan province (2.03) from 1975-1980.

2. The age distribution of household heads and spouses had no significant difference among the different household classifications. The LEA owners and spouses have the highest mean age of 55 and 49 years, respectively with a range of 32 to 78 years. The non-farming households have the lowest mean age for household heads, 40 and spouses, 35.

The mean number of years of schooling of both household heads and spouses is 5 years with only one spouse from the non-farming household graduated from college. About 4% had not gone to school at all. On the other hand, majority (60%) of the children reached the elementary level. Sixteen percent (16%) have reached high school while 33 (5%) were able to attend college of which 14 (2%) have graduated.

Two-thirds of the houses are of single storey type, most of which are elevated from the ground. Around half of the

houses are made of temporary construction materials while about 28% are made of permanent materials and the rest are the combination of both. Majority of the LEA had houses made of permanent construction materials.

A total of 79% of the LEA households own the farm or part of the farm they are cultivating, compared to only 46% in the OLEA. The rest were classified as share tenants.

3. Farming, is the main occupation of the majority of household heads. Total farming household count is 109. These have ownership or tenancy rights to the land they till. In addition, there are 29 households who are classified as landless agricultural workers. The main source of their income is derived from farming but they don't have ownership nor tenancy rights to the land. The rest are the non-farming sources. The number of landless agricultural workers in 1977 tripled in 1982. The number of non-farming households also increased by 28%. This is brought about by the increase in employment opportunities specifically for laborers at APC-CIADP. The farmers who used to cultivate areas covered by the 10 ha. APC complex were given employment as laborers. The introduction of double rice cropping in the LEA also provided labor employment for landless agricultural workers household.

4. Rice is the principal crop planted by both LEA and OLEA. The average yield/ha. at the OLEA is 32.0 cavans/ha. At the LEA, the average production varies depending on size of farm and source of water, e.g., irrigated or rainfed. Under rainfed condition the average production was 42.0 cavans/ha. which is 1.5 times higher than the OLEA. In irrigated condition, the average production during the first cropping season was 80 cavans/ha. while during the second crop it increased to 85 cavans/ha. The increase in production is attributed to high rate of application of fertilizer during the wet season. However, comparing the yield in 1982 to that of the previous cropping seasons (1978-1982), the yield is still very low. The decrease in

yield was attributed to limited water supply especially during the dry season due to pump breakdown and unfavorable weather condition.

The average gross income in rice farming by OLEA ranges from P1,990 to P2,670 per hectare/year depending on tenure status. At the LEA the average gross income is 5 to 7 times higher than OLEA. On a per farm basis LEA part-owners got the highest gross income with an average of P14,842 and the lowest was OLEA part-owners which was only P1,531.

5. There are two major agricultural organizations in which the household heads belong. The first is the Sasahang Nayon which was very popular and claimed a big membership in 1977 but now has only two members from the area. The other, Farmer's Irrigators Group (FIG), was formed by APC-CIADP and CIADP-IC technicians. Seventy-nine percent (79%) claimed their membership to the FIG.

There are more organizations the wife joined into. The Rural Improvement Club (RIC) claims the highest number of members Catholic Women's League, Parish Council, etc.

6. In terms of Social Aspect of the study, education of children and progressive life is their major aspirations in life regardless of classification. These implies the respondents' discontentment over present living conditions.

The recreation or entertainment mentioned by the majority of the household were listening to the radio, which is available in most household. Some are also, delighted in reading magazines. Drinking alcohol is also a common vice among household heads.

The most popular communication media in Minanga Norte is the radio. Barangay and municipal officials are also important sources of information in the area. Newspaper



and other print media are not popular because they are seldom available and written in mediums of language not comprehended by many residents.

Appendix 1. Average Labor Use by Operation, 443 Farms,  
Cagayan, 1975

| Operation                             | 1st Crop       |            | 2nd Crop       |            |
|---------------------------------------|----------------|------------|----------------|------------|
|                                       | Man-Days /farm | % of Total | Man-Days /farm | % of Total |
| <b>Seedbed:</b>                       |                |            |                |            |
| Plowing and harrowing                 | 3.90           | 2          | 4.11           | 3          |
| Care of seedlings                     | 5.21           | 3          | 1.74           | 1          |
| Preparation of seedlings for planting | 13.86          | 8          | 12.79          | 10         |
| <b>Main Land:</b>                     |                |            |                |            |
| Plowing                               | 16.10          | 10         | 10.10          | 8          |
| Harrowing                             | 11.13          | 7          | 8.67           | 7          |
| Clean/repair dikes                    | 4.10           | 3          | 2.48           | 2          |
| Transplanting                         | 42.29          | 26         | 24.06          | 19         |
| Fertilizing                           | 0.62           | *          | 0.67           | 1          |
| Spraying                              | 1.74           | 1          | 1.14           | 1          |
| Weeding/cultivating                   | 3.64           | 2          | 2.50           | 2          |
| Irrigating/draining                   | 0.79           | 1          | 0.53           | *          |
| Harvesting/bundling                   | 23.66          | 15         | 27.18          | 21         |
| Hauling                               | 2.55           | 2          | 2.38           | 2          |
| Piling                                | 1.46           | 1          | 1.86           | 2          |
| Threshing                             | 27.88          | 17         | 23.91          | 19         |
| Storing                               | 0.75           | *          | 0.52           | *          |
| Drying                                | 1.44           | 1          | 1.43           | 1          |
| Packaging                             | 2.44           | 1          | 1.74           | 1          |
| Delivery                              | 0.33           | *          | 0.49           | *          |
| <b>Total per farm</b>                 | <b>163.89</b>  | <b>100</b> | <b>128.30</b>  | <b>100</b> |
| <b>Total per hectare</b>              | <b>57.62</b>   |            | <b>54.97</b>   |            |

\* less than 0.5 percent

## Appendix 2. Source of Credit

| Source of Credit       | No. of Reporting |          |          |          | Total     |
|------------------------|------------------|----------|----------|----------|-----------|
|                        | LEA              | IOLEA    | LAWH     | NFH      |           |
| PNB <sup>a)</sup>      | 2                | 2        | -        | -        | 4         |
| Neighbors              | -                | 2        | 1        | -        | 3         |
| Relatives              | 1                | 2        | -        | 1        | 4         |
| Money Lenders          | -                | 1        | -        | -        | 1         |
| Iguig Municipal Office | -                | -        | -        | 2        | 2         |
| Insurance              | -                | 1        | -        | -        | 1         |
| <b>Total</b>           | <b>3</b>         | <b>8</b> | <b>1</b> | <b>3</b> | <b>15</b> |
| No. of Households      | 38               | 71       | 29       | 32       | 170       |
| % of Total             | 8                | 11       | 3        | 9        | 9         |

a) Philippine National Bank

Appendix 3. Aspirations

| Aspirations                     | LEA          |                | OLEA         |                | NEH | LAWH |               |               |    |    |    |    |    |    |    |    |
|---------------------------------|--------------|----------------|--------------|----------------|-----|------|---------------|---------------|----|----|----|----|----|----|----|----|
|                                 | Owner & INO. | P-Owner & INO. | Owner & INO. | P-Owner & INO. |     |      | Tenant & INO. | Tenant & INO. |    |    |    |    |    |    |    |    |
| <u>Farm Oriented Goals:</u>     |              |                |              |                |     |      |               |               |    |    |    |    |    |    |    |    |
| Increase production and profile | -            | 4              | 17           | 2              | 25  | -    | 1             | 9             | 2  | 5  | -  | -  | -  |    |    |    |
| Acquire farm lands              | -            | 1              | 4            | 3              | 39  | -    | 1             | 5             | 1  | 3  | 3  | 9  | 2  | 7  |    |    |
| <u>Family Oriented Goals:</u>   |              |                |              |                |     |      |               |               |    |    |    |    |    |    |    |    |
| Good health                     | 1            | 14             | 3            | 13             | 1   | 13   | 1             | 9             | 2  | 9  | 5  | 13 | 4  | 13 | 5  | 17 |
| Educated children               | 4            | 57             | 11           | 48             | 4   | 50   | 5             | 45            | 13 | 59 | 16 | 42 | 16 | 50 | 10 | 34 |
| Own house & lot                 | -            | -              | 5            | 22             | 1   | 13   | 2             | 18            | 5  | 23 | 5  | 13 | 5  | 16 | 5  | 17 |
| Sufficient food                 | -            | -              | 1            | 4              | -   | -    | -             | -             | 1  | 9  | 2  | 5  | 1  | 3  | 1  | 3  |
| Job security                    | -            | -              | -            | -              | -   | -    | -             | -             | 1  | 9  | 1  | 3  | 3  | 9  | 2  | 7  |
| Higher income                   | 1            | 14             | -            | -              | -   | -    | -             | -             | -  | -  | 2  | 5  | 3  | 9  | 1  | 3  |
| Live longer                     | 2            | 29             | 6            | 26             | 2   | 25   | 3             | 27            | 2  | 9  | 7  | 18 | 3  | 9  | 5  | 17 |
| Progressive life                | 5            | 71             | 15           | 65             | 6   | 75   | 6             | 55            | 14 | 64 | 25 | 66 | 18 | 56 | 20 | 69 |
| To have children                | -            | -              | 4            | -              | -   | -    | -             | -             | -  | -  | -  | -  | -  | -  | 1  | 3  |
| <u>Civic Oriented:</u>          |              |                |              |                |     |      |               |               |    |    |    |    |    |    |    |    |
| Help in the barangay            | -            | -              | 1            | 4              | -   | -    | -             | -             | -  | -  | -  | -  | -  | -  | -  | -  |
| No response                     | -            | -              | -            | -              | -   | -    | -             | -             | -  | -  | 1  | 3  | 2  | 6  | 1  | 3  |
| Total                           | 7            | 23             | 8            | 11             | 22  | 32   | 29            | 38            | 32 | 29 | 29 | 32 | 29 | 29 | 29 | 29 |

Appendix 4. Means of Attaining Aspirations

| Means of Attaining Aspirations | LEA   |        | OLEA  |        | NFA   |        | LAWH  |        |    |
|--------------------------------|-------|--------|-------|--------|-------|--------|-------|--------|----|
|                                | Owner | Tenant | Owner | Tenant | Owner | Tenant | Owner | Tenant |    |
|                                | %     | INO.   | %     | INO.   | %     | INO.   | %     | INO.   |    |
| Modern farm technology         | -     | 1      | 9     | -      | -     | 1      | 3     | -      | -  |
| Engage in business             | -     | 1      | 4     | 2      | 25    | 1      | 3     | 1      | 3  |
| Cooperation with others        | -     | 1      | 4     | -      | -     | 1      | 3     | 1      | 3  |
| Loans                          | 1     | 14     | -     | -      | -     | -      | -     | -      | -  |
| Hardwork                       | 6     | 86     | 21    | 91     | 7     | 88     | 7     | 64     | 20 |
| To be thrifty                  | 1     | 14     | 1     | 4      | 1     | 13     | 1     | 9      | 3  |
| To become active               | -     | -      | 1     | 4      | 1     | 13     | -     | -      | -  |
| Raise animals                  | -     | -      | 1     | 4      | -     | -      | -     | -      | -  |
| Luck                           | -     | -      | -     | -      | -     | -      | -     | 1      | 3  |
| Proper nutrition               | 2     | 29     | 3     | 13     | -     | -      | -     | -      | -  |
| Ask God's help                 | -     | -      | 3     | 13     | 1     | 13     | 2     | 18     | 1  |
| Send children to school        | -     | -      | 1     | 4      | -     | -      | -     | 1      | 3  |
| No response                    | -     | -      | -     | -      | -     | -      | -     | 1      | 3  |
| Total                          | 10    | 34     | 12    | 11     | 26    | 48     | 33    | 43     | 88 |

## Appendix 5. Recreation and Entertainment

| Recreation          | Head | Spouse | Older Children | Younger Children <sup>a)</sup> |
|---------------------|------|--------|----------------|--------------------------------|
| Drinking alcohol    | 105  | 23     | 14             | 3                              |
| Cockfighting        | 39   | -      | 5              | -                              |
| Playing card games  | 28   | 4      | 10             | 1                              |
| Listening to radio  | 111  | 107    | 75             | 44                             |
| Reading             | 51   | 56     | 60             | 31                             |
| Watching TV         | 8    | 8      | 7              | 5                              |
| Watching Movies     | 21   | 17     | 47             | 23                             |
| Others (Ball games) | 2    | 1      | 11             | 5                              |
| Playing guitar      | -    | -      | 1              | 1                              |
| Gardening           | 1    | -      | -              | -                              |

a) Data represents no. of households whose children enjoys the different forms of recreation and entertainment.

## Appendix 6. Sources of Information

| Communication                                | LEA   |            |        | OLEA  |            |        | LAWH | NFH |
|--|-------|------------|--------|-------|------------|--------|------|-----|
|  | Owner | Part-owner | Tenant | Owner | Part-owner | Tenant |      |     |
| <b>Barangay &amp; Municipal News:</b>        |       |            |        |       |            |        |      |     |
| 1. <u>Barangay &amp; Municipal Officials</u> | 6     | 20         | 7      | 7     | 17         | 20     | 14   | 27  |
| 2. Neighbors                                 | 1     | 6          | 2      | 2     | 4          | 16     | 12   | 8   |
| 3. Students                                  | -     | -          | -      | -     | -          | -      | -    | -   |
| 4. Radio                                     | -     | 1          | -      | -     | 1          | 2      | 5    | 3   |
| <b>Provincial Development News:</b>          |       |            |        |       |            |        |      |     |
| 1. <u>Barangay/ Municipal Officials</u>      | 1     | 3          | 1      | 1     | 2          | 3      | 3    | 9   |
| 2. Neighbors                                 | 1     | 2          | -      | 4     | 4          | 8      | 3    | 8   |
| 3. Students                                  | -     | -          | -      | -     | -          | -      | -    | 2   |
| 4. Radio                                     | 4     | 13         | 6      | 3     | 16         | 18     | 18   | 18  |
| 5. Newspaper/ magazines                      | -     | 2          | -      | -     | 1          | 2      | 1    | 3   |
| <b>National &amp; International News:</b>    |       |            |        |       |            |        |      |     |
| 1. <u>Barangay Officials</u>                 | -     | -          | 1      | 1     | 1          | 2      | 2    | 3   |
| 2. Neighbors                                 | 1     | 2          | -      | 2     | 4          | 7      | 1    | 6   |
| 3. Students                                  | -     | -          | -      | -     | -          | -      | -    | 1   |
| 4. Radio                                     | 4     | 16         | 7      | 3     | 16         | 17     | 17   | 21  |
| 5. Newspaper/ magazines                      | -     | 3          | 1      | -     | 1          | 2      | 1    | 7   |
| 6. TV  | -     | -          | -      | -     | 1          | -      | -    | 1   |
| <b>Popular Communication Media:</b>          |       |            |        |       |            |        |      |     |
| 1. Radio                                     | 5     | 20         | 8      | 7     | 18         | 29     | 20   | 22  |
| 2. TV  | -     | -          | -      | -     | -          | 2      | -    | 1   |
| 3. Print Media                               | 1     | 3          | -      | 1     | -          | 3      | -    | 4   |
| 4. Neighbors                                 | -     | -          | -      | 2     | 2          | 2      | 2    | 7   |
| 5. Others (people)-                          | -     | 1          | -      | -     | -          | -      | 1    | 3   |

## Appendix 7. Medical Practice

| Practices                | Minor Illness  |                |                |                |                |
|--------------------------|----------------|----------------|----------------|----------------|----------------|
|                          | 1st Preference | 2nd Preference | 3rd Preference | 4th Preference | 5th Preference |
| Doctors                  | 50             | 55             | 25             | 1              | 2              |
| Nurses                   | 9              | 27             | 32             | 12             | -              |
| Midwife                  | 18             | 12             | 7              | 2              | 1              |
| Herbolario <sup>a)</sup> | 27             | 45             | 19             | 17             | 1              |
| Self-medication          | 63             | 3              | 1              | 1              | -              |

| Practices                | Major Illness  |                |                |                |                |
|--------------------------|----------------|----------------|----------------|----------------|----------------|
|                          | 1st Preference | 2nd Preference | 3rd Preference | 4th Preference | 5th Preference |
| Doctors                  | 119            | 5              | -              | -              | -              |
| Nurses                   | 1              | 49             | 1              | 1              | -              |
| Midwife                  | 1              | 1              | 3              | -              | -              |
| Herbolario <sup>a)</sup> | -              | 23             | 40             | 1              | 1              |
| Self-medication          | 2              | -              | 2              | 9              | -              |

a) Faith Healer



**PART II\***

**THE LOWER CAGAYAN**

**-M. Antiporda Village-**

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\*Written by Yoshinori Morooka (TARC), Juan D. Lasan (APC)  
and Yoshina Mizusawa (JICA).

## I. PROFILE OF THE BARANGAY M. ANTIPORDA

### Setting

"Uray danum nga inumen ket saan nga umanay (Even drinking water is not yet sufficient)". This Ilokano passage implies that the village is located at a typical rainfed area in the lower Cagayan. Throughout the season, earthenware water tanks of various shapes are set up at the same portion under the eaves of each nipa house for stocking valuable rainfall.

In the late eighteen century, a few groups settlers from Ilocos Sur and Pangasinan provinces settled in this mountainous place facing the Babuyan Channel in the north, and inhabited the parcel of land with red color soil called "laterite". Judging from the topography of the Municipality of Buguey and location of the central town (poblacion), it seemed that the early settlers first worked the arable land at the coastal area and moved gradually to the mountainous area. This maybe the reason why the town has been characterized for its fishing and agriculture industries since its reclamation.

The LEA (Leading Extension Area) with 41 hectares, was set-up at Dalaya village which is one of 30 villages in the municipality. In this area, three other villages; Modesto Antiporda, Fula and Quinawegan are adjacent to the pilot farm. Both M. Antiporda and Fula are separated from other two villages by the unpayed National Road which connects the National Highway (Road 5) to the provincial capital, Tuguegarao, and the northeast rural area of Cagayan Valley. In addition, every two villages are divided by a road and drainage canal. The road was constructed through mutual-help work (bayanihan) of the village people, and the canal was established recently

by the National Irrigation Administration (NIA) to improve the swampy land condition.

According to the record of the NIA, M. Antiporda covers approximately 200 ha. of the total area. However, only limited rainfed rice field is seen along the National Road because majority of the area is located between the hills covered with various tropical trees. At a glance, it looks like there are no arable land and residential area inside the village.

As shown in the spot map, the village consists of six hamlets (sitios) and the road traverses the central part of the village from north to south (Figure 1). Almost half of the land area is idle and without any vegetation because big amount of mountain soil was excavated and moved to other places for constructing several drainage canals under the NIA project. The rest of the land is used for rainfed rice farming. Data on the area planted and production of palay (unhulled rice) is not available. At the beginning of the 1970's, the provincial leasehold rental in this area was formally fixed at 25 cavans (sacks) or 1.25 tons per hectare by the Ministry of Agrarian Reform. This indicates that land productivity is considerably low as that of other non-irrigated areas in Cagayan Valley.

#### Population and Household Situation

The human population in M. Antiporda and its distribution by age and sex appear in Figure 2. Total population in 1982 consisted of 636 with almost equal distribution of male and female. The age distribution is a typical pyramid form reflecting the high rate of population growth.

According to the population census data, the population in 1975 was 571. During the past seven years, the annual population growth rate reached 1.6 percent. The rate of

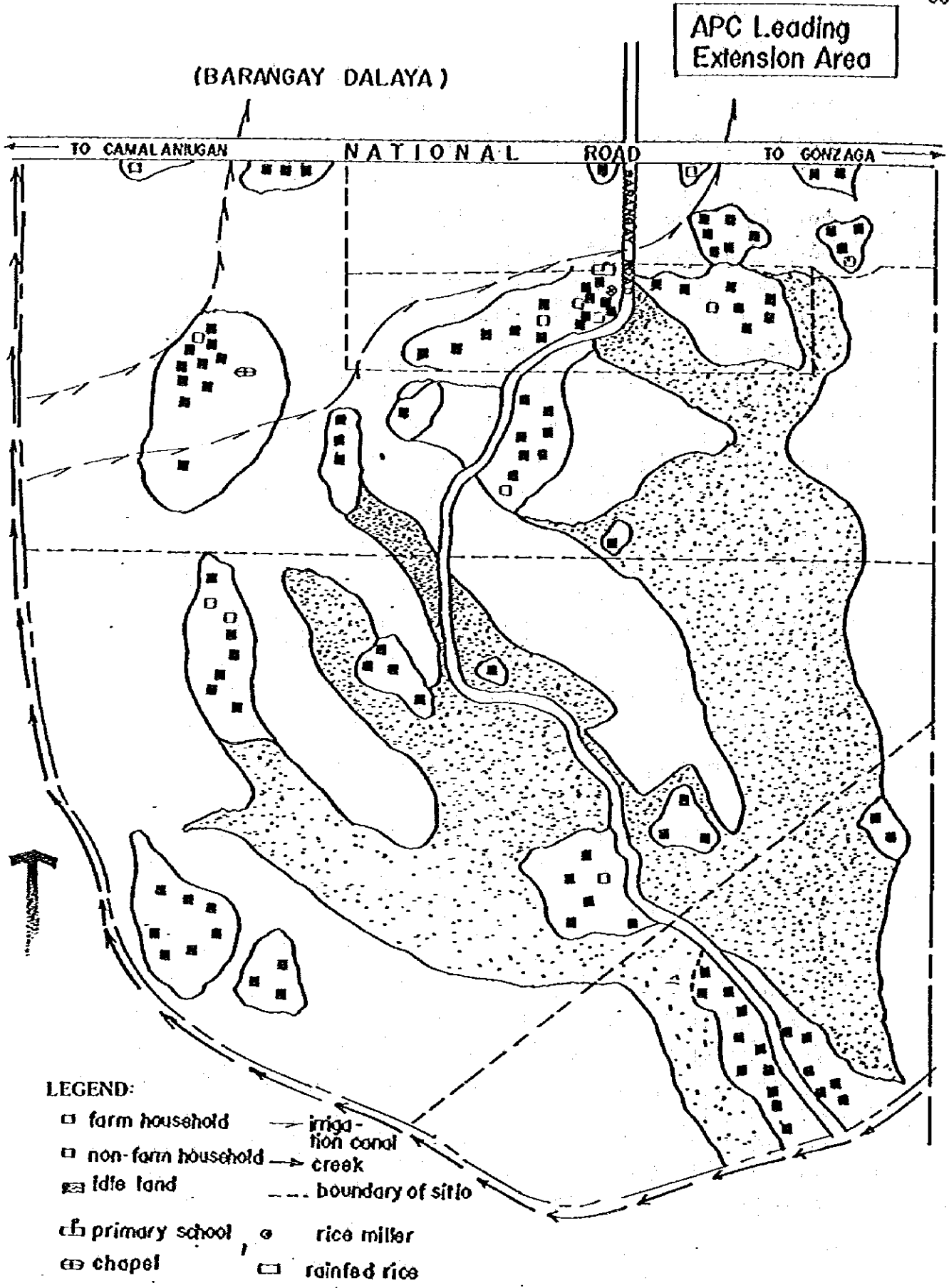


Figure 1. Spot Map of Hodesto Antiporda, Buguey, Cagayan  
-222-

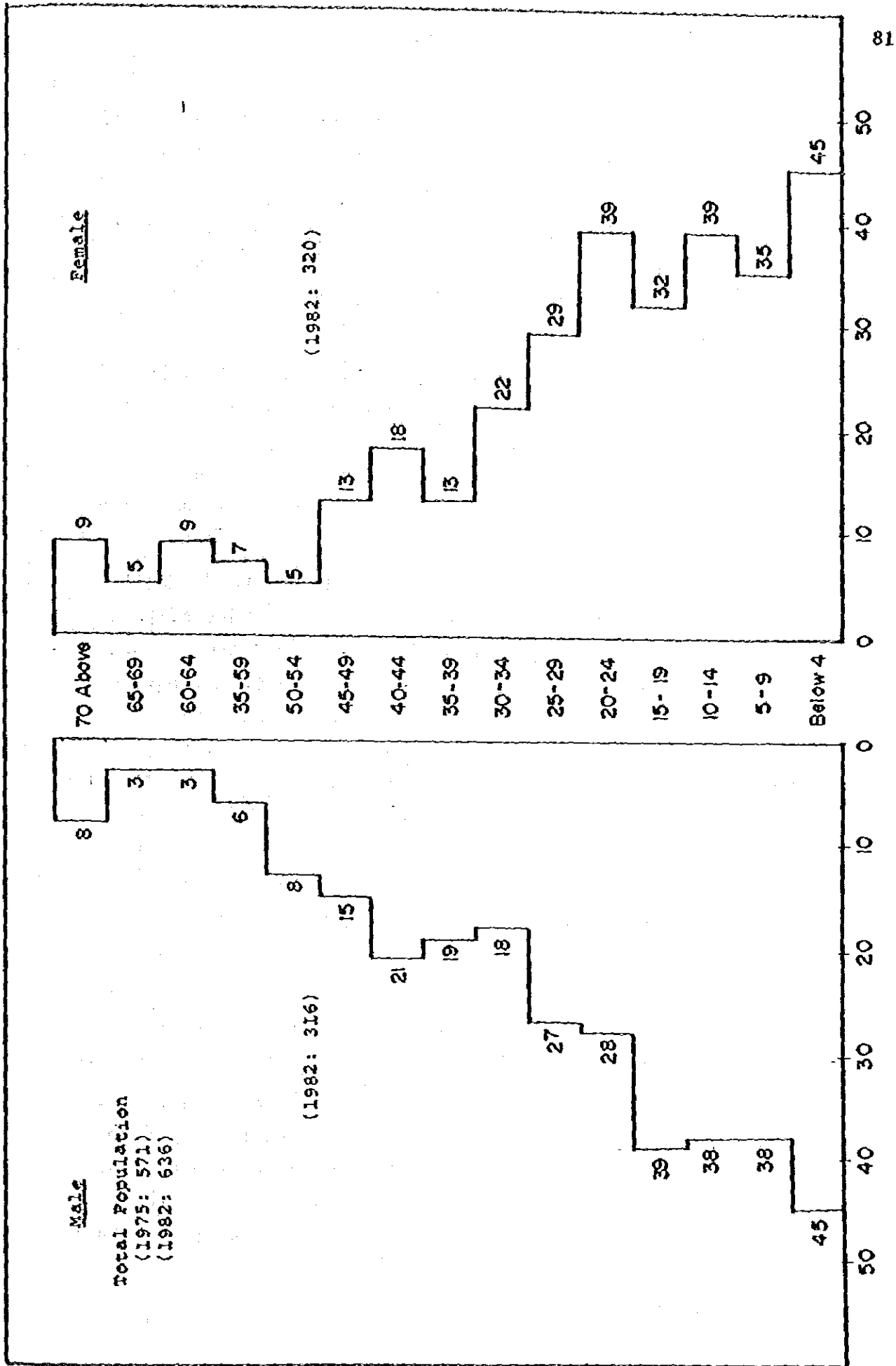


Figure 2. Age Distribution of the Population (1982), Modesto Antiguada, Suguey, Cagayan, Philippines

population growth by birth rate and net migration into the village was moderate compared to other villages in the country.

In case of M. Antiporda, the ratio of productive age group (15-65 years old) as a source of labor to non-productive age group (below 14 to 70 above) was estimated at 0.71 in 1982.

There is a total of 108 households in this village when our survey was conducted (Table 1). And the total numbers of farm households is 80. Out of the total, 13 farm-householders cultivate their land inside the LEA. The rest (67) are engaged in farming outside the APC project area (OLEA).

In addition to the farm-householders, there are 15 rural workers who are landless because they have neither ownership nor tenancy rights to the land and their income is principally from their own toil. Because they have no clear-cut rights over the land under Agrarian Reform, landless workers constitute an amorphous and shifting group in peasant society. It seems that they have been indirectly but strongly affected by the diffusion of improved rice technology of the APC project. Considering their economic situation, landless households are included into this analysis together with the farm-household group.

Moreover, the remaining 13 households are classified as purely non-farm households in this village. Non-farm householders are working as carpenters, logging workers, jeepney drivers and laborers at the NIA Camalaniugan Office.

Their living condition is summarized in Table 2. Type of houses indicates that 65% of farm householders reside in one-storey houses and the rest live in two-storey houses. 51% of the total houses were constructed with temporary materials such as bamboo, nipa and cogon (a kind of eulalia)

Table 1. Occupations of 108 Householders,  
M. Antiporda, Buguey, Philippines, 1982

| OCCUPATION       | NO. OF<br>HOUSEHOLDERS | OCCUPATION                 | NO. OF<br>HOUSEHOLDERS |
|------------------|------------------------|----------------------------|------------------------|
| <u>Farmers:</u>  |                        | <u>Non-Farmers:</u>        |                        |
| LEA Farmers      | 13                     | NIA laborers <sup>b)</sup> | 3                      |
| Part-owners      | 9 <sup>a)</sup>        | Carpenters                 | 2                      |
| Tenants          | 4                      | Logging workers            | 2                      |
| OLEA Farmers     | 67                     | Jeep driver                | 1                      |
| Owners           | 20                     | Housekeeper                | 1                      |
| Part-owners      | 12                     | Retired                    | 2                      |
| Tenants          | 35                     | Others <sup>c)</sup>       | 2                      |
| Landless Workers | 15                     |                            |                        |
| Sub-total        | 95                     | Sub-total                  | 13                     |

a) Includes two part-owners who do not yet produce rice at the pilot farm.

b) Carpenter, Bulldozer operator and laborer, respectively.

c) Small landowners who are not working at their field for family reasons.

Table 2. House Conditions and Sources of Potable Water and Light, M. Antiporda, Buguey, Cagayan, Philippines, 1982

|                               | LEA<br>FARMERS | OLEA<br>FARMERS | LANDLESS<br>WORKERS | TOTAL | (%) <sup>a)</sup> |
|-------------------------------|----------------|-----------------|---------------------|-------|-------------------|
| <b>Type</b>                   |                |                 |                     |       |                   |
| Single                        | 7              | 42              | 13                  | 62    | 65                |
| Double                        | 6              | 25              | 2                   | 33    | 35                |
| <b>Construction</b>           |                |                 |                     |       |                   |
| Temporary                     | 7              | 33              | 8                   | 48    | 51                |
| Permanent                     | 2              | 18              | 2                   | 22    | 23                |
| Semi-permanent                | 4              | 16              | 5                   | 25    | 26                |
| <b>Room No.</b>               |                |                 |                     |       |                   |
| Separate                      | 5              | 32              | 1                   | 38    | 40                |
| Multi-purpose                 | 7              | 30              | 13                  | 50    | 53                |
| Others                        | 1              | 5               | 1                   | 7     | 7                 |
| <b>Living Room Furnishing</b> |                |                 |                     |       |                   |
| Wooden chair/table            | 6              | 36              | 6                   | 48    | 51                |
| Benches/table                 | 12             | 43              | 10                  | 65    | 68                |
| Bamboo chairs                 | 1              | 11              | 2                   | 14    | 15                |
| Others                        | 2              | 1               | 3                   | 6     | 6                 |
| <b>Source of Water Supply</b> |                |                 |                     |       |                   |
| Open well                     | 7              | 62              | 11                  | 80    | 84                |
| Artesian well                 | 2              | 1               | 1                   | 4     | 4                 |
| Pump well                     | 3              | 2               | -                   | 5     | 5                 |
| Deep well                     | 1              | 3               | 2                   | 6     | 6                 |
| Others                        | -              | 1               | 1                   | 2     | 2                 |
| <b>Source of Light</b>        |                |                 |                     |       |                   |
| CAGELCO <sup>b)</sup>         | 1              | -               | -                   | 1     | 1                 |
| Kerosene lamp                 | 12             | 66              | 15                  | 93    | 98                |
| Others                        | -              | 1               | -                   | 1     | 1                 |
| No. of Households             | 13             | 67              | 15                  | 95    | -                 |

a) Percentage of holders to the total households

b) Cagayan Electric Cooperative



while 23% are semi-permanent constructed with wood and galvanized iron sheet together with nipa. 26% were built with other materials. In most houses, a room is used for various purposes while the rests have separate living rooms.

Drinking water was mainly supplied from wells dug near lowland. Under the project of the Cagayan Electric Cooperative (CAGELCO), electric facilities were completely constructed along the National Highway a few years ago. However, only one non-farm family uses electric power. Others are still using kerosene lamps during night time.

Table 3 and 4 show the educational background of farm householders. Two-thirds (66%) of the total householders are elementary graduates while 11% are in the "no-schooling" category. There are 4 dialects in Cagayan, namely: Ilocano, Itawes, Ibanag and Gaddang. Village people at M. Antiporda usually use only the Ilocano dialect. A few villagers are able to speak English and/or Tagalog.

#### Land Holding

Table 5 shows the total area cultivated by M. Antiporda's farmers in 1982. As similar with Minanga Norte, the rice land is intricately separated at various places inside or outside the village. Tenants also hold a right of cultivation at several areas extended over adjacent villages. The reason why land or right of cultivation is scattered at various places may have been attributed to inheritance custom or transferable condition of land ownership.

Around 178 ha. of lowland area are used for rice production. Only two OLEA farmers planted corn on a 0.5 ha. of upland. This is one of the different points compared with Minanga Norte farmers who have cultivated rice and corn at the same portion of land. In addition, the average area per farm household in M. Antiporda is 2.2 ha. while that of Minanga Norte is 1.5 ha. However, it is noted that there

Table 3. Educational Attainment of Farm-householder  
by Tenure Status

| ITEMS             | LEA FARMERS |          | OLEA FARMERS |           |           |
|-------------------|-------------|----------|--------------|-----------|-----------|
|                   | P-owner     | Tenant   | Owner        | P-owner   | Tenant    |
| No Schooling      | 1           | -        | 5            | 1         | 2         |
| Elementary School | 3           | 4        | 11           | 7         | 28        |
| High School       | 3           | -        | 4            | 4         | 4         |
| College           | -           | -        | -            | -         | 1         |
| n.a.              | 2           | -        | -            | -         | -         |
| <b>Total</b>      | <b>9</b>    | <b>4</b> | <b>20</b>    | <b>12</b> | <b>35</b> |

n.a. No answer

Table 4. Average Size of Farm-household by Tenure Status

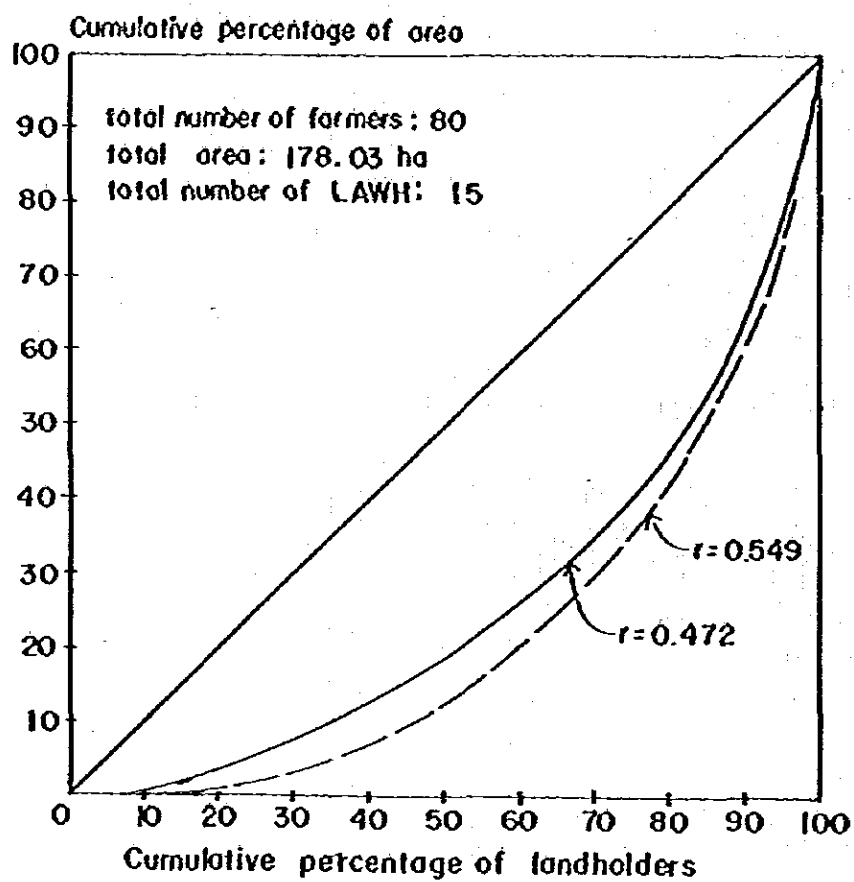
| NO. OF MEMBERS | LEA FARMERS |          | OLEA FARMERS |           |           |
|----------------|-------------|----------|--------------|-----------|-----------|
|                | P-owner     | Tenant   | Owner        | P-owner   | Tenant    |
| 1              | -           | -        | -            | -         | -         |
| 2              | -           | -        | 2            | -         | 1         |
| 3              | -           | 2        | 3            | -         | 4         |
| 4              | 2           | 2        | 3            | 1         | 10        |
| 5              | 2           | -        | 2            | 2         | 4         |
| 6              | 1           | -        | 2            | 2         | 2         |
| 7              | -           | -        | 4            | 2         | 3         |
| 8              | 2           | -        | 2            | 2         | 6         |
| 9              | 1           | -        | 2            | -         | 4         |
| 10             | -           | -        | -            | -         | -         |
| 11             | -           | -        | -            | 1         | -         |
| 12             | -           | -        | -            | 1         | 1         |
| 13             | -           | -        | -            | 1         | -         |
| 14             | -           | -        | -            | -         | -         |
| 15             | -           | -        | -            | -         | -         |
| 16             | -           | -        | -            | -         | -         |
| 17             | 1           | -        | -            | -         | -         |
| 18             | -           | -        | -            | -         | -         |
| <b>Total</b>   | <b>9</b>    | <b>4</b> | <b>20</b>    | <b>12</b> | <b>35</b> |

Table 5. Area of Arable Land Cultivated by M. Antiporda's Farmers at Buguey in 1982.

| ITEM      | LOWLAND (Rice) |              | Upland (Corn) |
|-----------|----------------|--------------|---------------|
|           | Irrigated Area | Rainfed Area |               |
| LEA (13)  | 18.2           | 35.2         | -             |
| OLEA (67) | -              | 124.1        | 0.5           |
| Sub-total | 18.2           | 159.3        | 0.5           |
| Total     |                | 177.5        |               |

Table 6. Distribution of Land, M. Antiporda, Buguey

| Farm Size (ha) | LEA FARMERS |        | OLEA FARMERS |         | To-Total % |       |     |
|----------------|-------------|--------|--------------|---------|------------|-------|-----|
|                | P-owner     | Tenant | Owner        | P-owner | Tenant     | Total | %   |
| 0.1-1.0        | -           | 1      | 13           | 1       | 16         | 31    | 38  |
| 1.01-2.0       | 3           | -      | 3            | 5       | 10         | 21    | 26  |
| 2.01-3.0       | 2           | -      | 3            | 2       | 6          | 13    | 16  |
| 3.01-4.0       | 1           | 1      | 1            | 1       | 2          | 6     | 8   |
| 4.01-5.0       | 1           | 1      | -            | 2       | 1          | 6     | 8   |
| 5.01-above     | 2           | 1      | -            | 2       | 1          | 6     | 8   |
| Total          | 9           | 4      | 20           | 12      | 35         | 80    | 100 |



#### LEGEND

- for farm household
- - - - - for farm household + LAWH

Figure 3. Area (Irrigated, Rainfed and Upland) Cultivated by Modesto Antiporda Farmers, 1982

are several farmers who own or till comparatively larger areas. Table 6 indicates the distribution of rice land by tenure status. About 60% of farm householders cultivate rice at less than 2.0 ha. of land.

Figure 3 shows the actual situation of equity with regards to the present distribution of land holding in the village. The Gini ratio was estimated at 0.47. Also, the ratio includes 15 households of landless workers which suggests that the equity was more expanded to 0.55. According to the Gini ratio, 50% of the total area is cultivated by 80 or 85% of farmers while the other half is tilled by less than 20%.

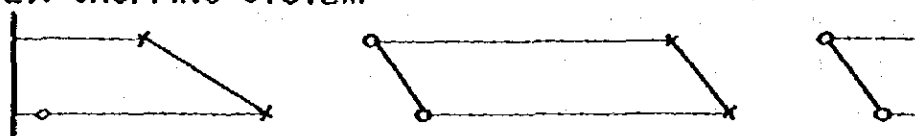
At several villages in Buguey, the land reform program has been promoted step by step. In the case of M. Antiporda, however, it seems that the program is not yet practical because paddy field is owned by small landlords who are exempt from the OLT. Therefore, there is no amortizing owners inside the village. Majority of tenants stated that their sharing arrangement with landlords is either 30:70 or 25:75. Differences in sharing arrangement depends on the agreement between the landlords and tenants. Landlord's share is high when they provide fertilizer, chemicals and/or carabao (water buffalo) for their tenants. In spite of the land reform program, some tenants still confuse the difference between share tenant and leaseholder.

## II. PRODUCTION AND FARMING TECHNOLOGY

### Change of Rice Cropping Pattern

Seasonal sequences in rice farming operation commonly practiced in Buguey area are illustrated in Figure 4. The basic environmental condition governing the seasonal pattern of rice production is predominated by the monsoon, which brings heavy precipitation from May through November. Prior to the introduction of new technology, the farmers used traditional practice and grew rice varieties that

LEA CROPPING SYSTEM



NON-LEA CROPPING SYSTEM

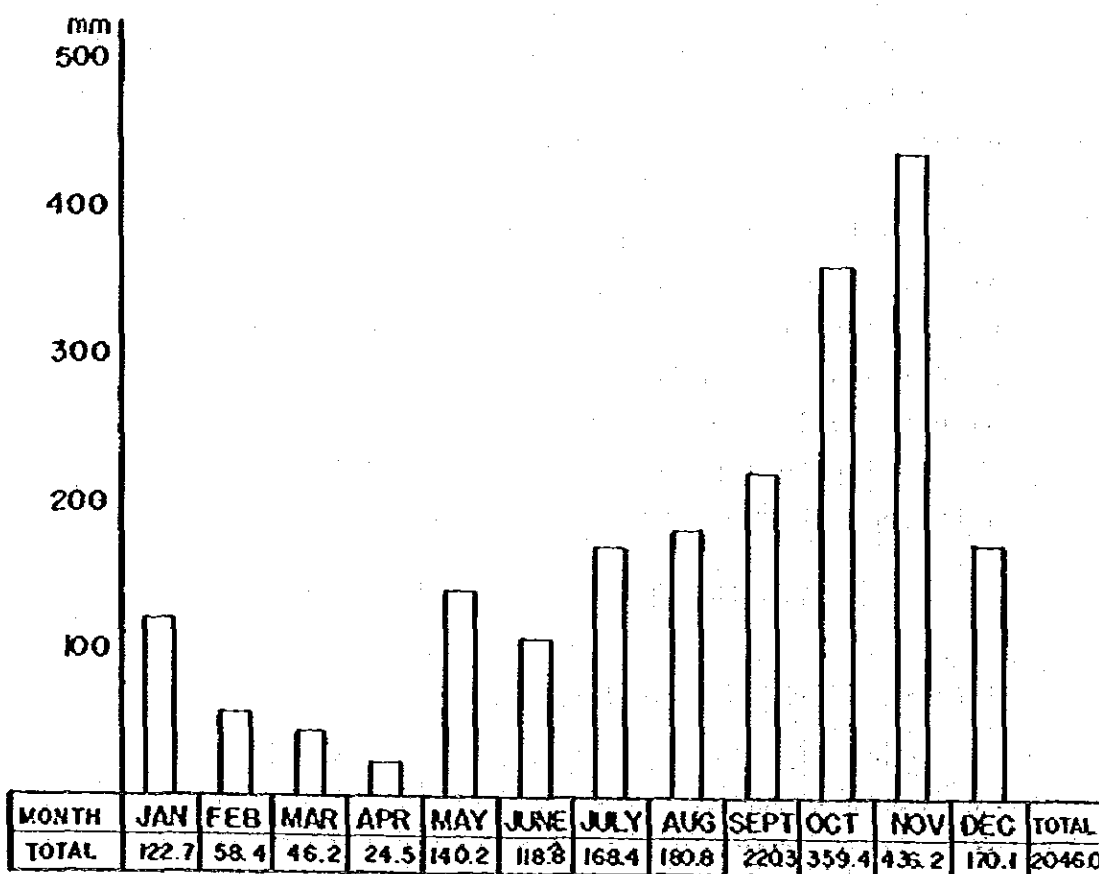
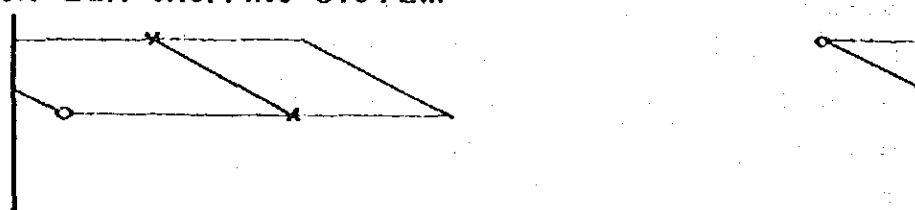


Figure 4. Seasonal Sequence of Rice Farming Operation in Buguey and Average Monthly Total Rainfall in Aparri for 13 years (1970-1982)

took 5 or 6 months to mature. The field was plowed from November to December when the rainfall is sufficient for land preparation. Seeds were sown at the same duration and seedlings were transplanted after harrowing with the use of a carabao. Harvesting is done from February to April. Majority of farmers usually keep their land fallow for around six months until the following years crop.

Recently, the pattern of rice production in this area has undergone drastic changes since the irrigation system was extended by the Irrigation Component (CIADP-IC) and the modern rice varieties were introduced through the establishment of the APC pilot farm. Irrigation enabled a rice crop in the dry season. Double cropping will be facilitated by two main factors such as the development of irrigation system and the introduction of modern technology since 1981.

The LEA farmers are able to plow their field in May or June. In July, they utilize the transplanting method for the IR variety and apply pre-emergence herbicide as soon as the field is wet. Fertilizer and insecticides are applied. The crop is ready for harvest in September. The field is immediately plowed after harvesting the first crop. Some farmers sow their seed at 20 to 25 days before harvest and then transplant a second crop. The second crop is harvested in the early part of the coming year.

Irrigation water, high yielding varieties, and modern farming techniques represent various aspects of yield-increasing technology in terms of crop yield per hectare and the expansion of effective crop area by means of double-cropping. In case of M. Antiporda, however, the effects are not yet direct because it has been a year since the APC project started. Moreover, there is a locational handicap because the pilot farm is established at adjacent but different village.

### Yield of Palay

From 80 householders, the interviewers asked the area harvested and the yield of palay during the last cropping season. However, we have to recognize the fact that there is a big difference between the LEA farmer's response to interviewers and the pilot farm record which is kept by the APC staff members (Table 7). This bias would be due to several reasons: 1) farmers had already forgotten the total yield of palay because most of them harvested the last crop more than 6 months ago; 2) both farmers and interviewers confused the gross yield with the net yield which was calculated by subtracting harvester's share paid out at the field in kind from the gross yield; and 3) it was also not easy for each farmer to memorize the total yield because their paddy field was scattered inside or outside the village, and the harvesting time was staggered according to water and land conditions.

The APC data will provide the exact result, but farmers' answers may also imply more complex and/or significant meanings. As mentioned earlier, actual situation on land holdings and the right of cultivation among tenants are complicated in villages where the man-land ratio is constantly high but the land productivity is low and risky. Under these situation, land itself or the right of cultivation is easy to transfer mainly because of family circumstances. Several farmers stated that they had tried to transfer their land to other farmers as a sort of mortgage for a given time.

Because of some constraints in our survey, we cannot clearly state the reason underlying their answer. In the case of the LEA farmers, the average yield of palay by farmers was estimated at 51 cavans or 2.6 tons per hectare, while that of the APC data showed 64 cavans or 3.2 tons per hectare. Also the average yield of palay which was produced outside the LEA farm by the same farmers indicated only 35 cavans or 1.8 tons per hectare. Though the



Table 7. Area Harvested and Production of Palay  
(Unhulled Rice) by LEA Farmer

| Farm Household<br>No.             | LEA            |                              |              |                | OLEA           |                |
|-----------------------------------|----------------|------------------------------|--------------|----------------|----------------|----------------|
|                                   | Farmer's Reply |                              | APC Data     |                | Farmer's Reply |                |
|                                   | Area<br>(ha)   | Yield<br>(cav) <sup>a)</sup> | Area<br>(ha) | Yield<br>(cav) | Area<br>(ha)   | Yield<br>(cav) |
| <b>Part-owner</b>                 |                |                              |              |                |                |                |
| 1                                 | 4.2            | 251                          | 5.9          | 278            | -              | -              |
| 2                                 | 1.4            | 58                           | 3.6          | 179            | 1.6            | 48             |
| 3                                 | 5.2            | 256                          | 5.3          | 506            | 4.2            | 103            |
| 8                                 | 0.9            | 98                           | 1.4          | 75             | 0.5            | 33             |
| 27                                | 1.0            | 57                           | 0.3          | 18             | -              | -              |
| 22 <sup>b)</sup>                  | 2.0            | -                            | -            | -              | 1.0            | -              |
| b)                                |                |                              |              |                |                |                |
| 43                                | 1.5            | -                            | -            | -              | -              | -              |
| 45 <sup>b)</sup>                  | 0.8            | -                            | -            | -              | 6.2            | 245            |
| 50 <sup>b)</sup>                  | 0.2            | -                            | -            | -              | 3.4            | 140            |
| <b>Tenant</b>                     |                |                              |              |                |                |                |
| 6                                 | 0.5            | 22                           | 0.5          | 25             | 3.5            | 100            |
| 7                                 | 1.0            | 75                           | 1.1          | 58             | -              | -              |
| 9                                 | 5.0            | 200                          | 0.9          | 73             | -              | -              |
| 35                                | 3.5            | 142                          | 0.9          | 58             | 5.0            | 160            |
| <b>Total</b>                      | <b>22.7</b>    | <b>1,159</b>                 | <b>19.9</b>  | <b>1,270</b>   | <b>24.4</b>    | <b>829</b>     |
| <b>Average Yield<br/>(cav/ha)</b> |                | <b>51</b>                    |              | <b>64</b>      |                | <b>34</b>      |

a) one cavan equals 50kg of palay

b) newly opened

data obtained is unreliable because of several reasons, it can be emphasized that the land productivity of the LEA farm is definitely higher than that of the OLEA farm where water is not yet sufficient.

Table 8 indicates the average yield of palay per hectare distributed with wide range. 58 persons or about 70% produced less than 60 cavans or 3 tons of palay per hectare. However, 26 farmers said their yield was less than 30 cavans or 1.5 tons per hectare. The actual average yield is between 25 and 45 cavans or 1.2 and 2.3 tons per hectare.

Table 8. Distribution of Average Yield Per Hectare, Modesto Antiporda, Buguey, Cagayan

| Yield              | LEA FARMERS |          | OLEA FARMERS |           | Total     | %         |
|--------------------|-------------|----------|--------------|-----------|-----------|-----------|
|                    | P-owner     | Tenant   | Owner        | P-owner   |           |           |
| -30 <sup>a)</sup>  | 2           | -        | 4            | 6         | 11        | 23        |
| 31-60              | 4           | 4        | 12           | 4         | 18        | 42        |
| 61-90              | -           | -        | 3            | 2         | 2         | 7         |
| 91                 | 1           | -        | -            | -         | -         | 1         |
| n.a. <sup>b)</sup> | 2           | -        | 1            | -         | 4         | 7         |
| <b>Total</b>       | <b>9</b>    | <b>4</b> | <b>20</b>    | <b>12</b> | <b>35</b> | <b>80</b> |

a) cavan (50kg) of palay

b) not yet harvest

#### Cash Input

All farm householders were interviewed in order to know the application level of fertilizers and chemicals. However, in the case of the OLEA farmers, no one has applied any kind of fertilizer in their farm except two farmers who used only a small amount of Urea. On the other hand, the LEA farmers replied that they used several sacks of Urea (46-0-0) or Complete (14-14-14) under the

guidance of APC farm technicians. In general, farm practices like fertilizer application and insect control were seldom carried out after transplanting and harvesting in rainfed areas. It seems that farmers in this village are also not accustomed to farm practice of fertilizer application.

Figure 5 indicates three yield response functions to nitrogen (a.i., active ingredient) which were derived from sample surveys in Luzon. These are:

- 1)  $Y = 2100 + 18N - 0.09N^2$
- 2)  $Y = 1400 + 15N - 0.11N^2$  and
- 3)  $Y = 3442 + 30N - 0.16N^2$

Where Y denotes yields of rough rice in kilograms per hectare and N is nitrogen in kilogram per hectare.

The first equation is based on Atkinson and Kunkel's (1974) data from a sub-sample of 320 farms from the annual nationwide farm survey conducted by the Bureau of Agricultural Economics in the first semester of 1969-70. The second equation was adjusted to the coefficients of equation 1) to derive response function for rainfed condition by Barker. Two equations reflect best judgment regarding the difference of fertilizer response to modern rice varieties for irrigated and rainfed conditions at farm level. Third equation is based on experimental data at the Maligaya Rice Research and Training Center, Central Luzon from 1968-75.

Yields of palay recorded by the OLEA farmers are dotted on a vertical line of the figure because they did not apply nitrogen during the last cropping season. The yields per hectare vary from 0.3 tons to 4.5 tons. Compared with the value of intercept of Maligaya experimental response function, several OLEA farmers produced large amount of palay without fertilizer. They are farmers who are owners or tenants of rice land at relatively well irrigated area but not in the pilot farm.

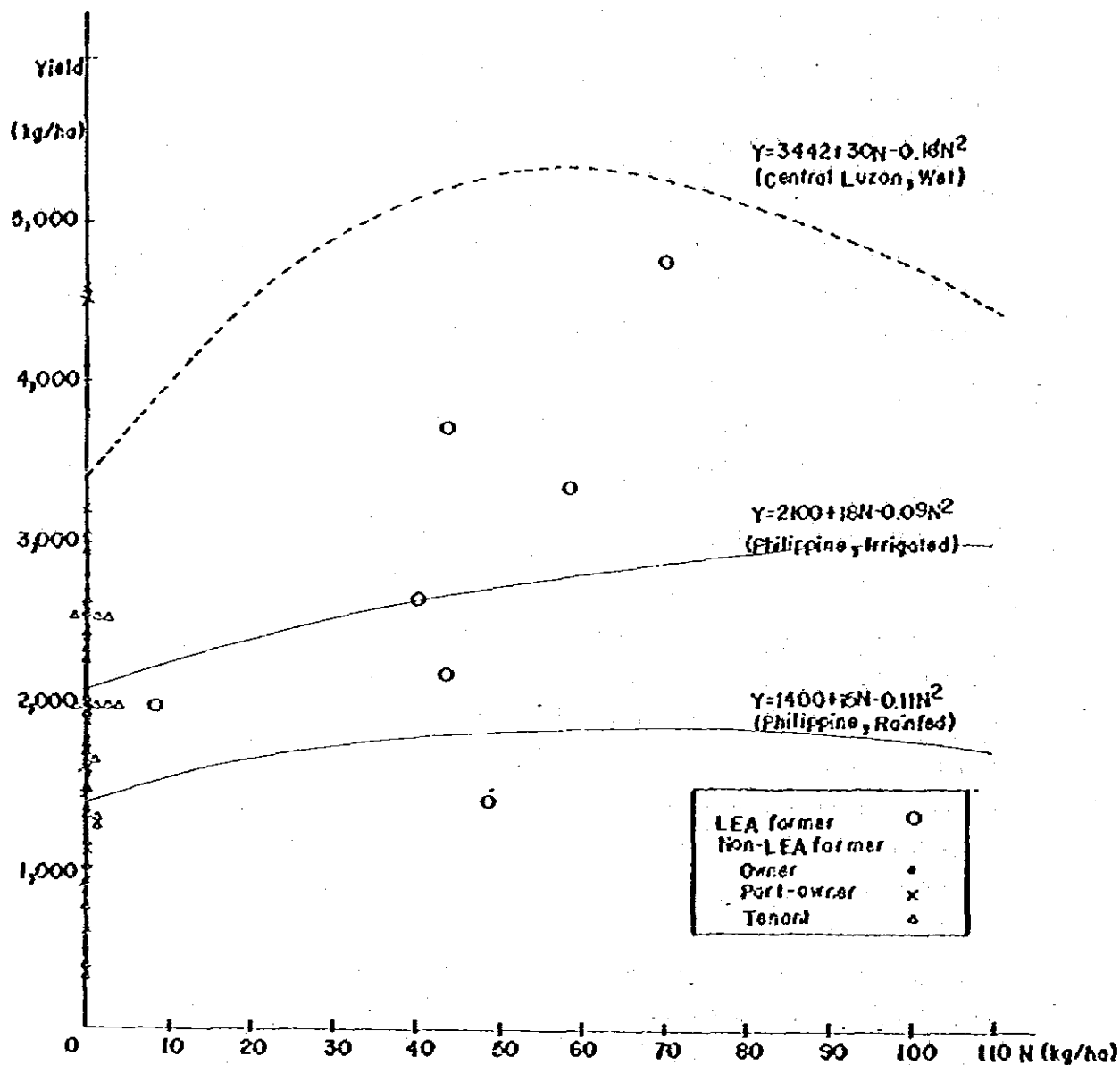


Figure 5. Yield Response to Nitrogen of Rice Varieties, Modesto Antiporda, Buquey, Cagayan

Based on the following response functions: (Philippine, Irrigated and Rainfed) by David, C. C. and R. Barker, and (Central Luzon, Irrigated) by Barker. IRRI. Economic Consequences of the New Rice Technology. 1978

Yields of the LEA farmers are dispersed between the rainfed and the experimental response functions. Though their techniques on fertilizer application was not always stable, some farmers could obtain good harvests through the use of nitrogen from 40 to 70 kilograms per hectare.

Chemicals are also not popular among farmers. Only 8 farmers own sprayers in this village.

#### Farm Equipments

Table 9 shows numbers of farm machinery and equipments, and working animals which are owned by 80 farm householders and 15 landless workers. Through this survey, we noticed distinct features surrounding village agriculture as discussed below.

Firstly, 62 heads of carabao are raised by 65 percent of the total householders inside this village. Why do farmers keep so many carabaos?

Needless to say, one reason is for its power use. Traditionally, rainfed farmers are forced to carry out their farming activities under the unstable weather condition. For example, they are used to start land preparation as soon as rain water is sufficiently stocked at their paddy fields. For such occasion, they are always faced with critical problems caused by the competition on labor use. As a result, at least one carabao per household is indispensable for managing land preparation by their own labor.

On the other hand, under the traditional rice cropping pattern, village people do not have enough chance to work during the off season. In some cases, carabao plays an important role in generating an additional income from land preparation at the irrigated area outside their village. According to our survey, daily wage rate for plowing and harrowing practices with carabao was

Table 9. Number of Farm Machinery and Equipment and Working Animals from 95 Households, Modesto Antiporda, Buguey, 1982

|                                      | LEA<br>Farmers | OLEA<br>Farmers | Landless<br>Agricultural<br>Workers | Total            | %  |
|--------------------------------------|----------------|-----------------|-------------------------------------|------------------|----|
| <b>Farm Machinery and Equipments</b> |                |                 |                                     |                  |    |
| Tractor                              | 2              | 2               | -                                   | 4                | 4  |
| Plow                                 | 17             | 65              | 2                                   | 84               | 88 |
| Harrow                               | 15             | 53              | 2                                   | 70               | 74 |
| Carts (Sled)                         | 18             | 28              | 2                                   | 40               | 42 |
| Weeder                               | -              | -               | -                                   | -                | -  |
| Sprayer                              | 2              | 5               | 1                                   | 8                | 8  |
| Bolo                                 | 24             | 117             | 14                                  | 155              | -  |
| Sacks of palay                       | 840            | 2,683           | 115                                 | 3,638            | -  |
| <b>Working Animals</b>               |                |                 |                                     |                  |    |
| Carabao                              | 14             | 45              | 3                                   | 62               | 65 |
| Cattle                               | -              | -               | -                                   | -                | -  |
| Horse                                | -              | -               | -                                   | -                | -  |
| No. of Households                    | 13             | 67              | 15                                  | 95 <sup>b)</sup> | -  |

a) Percentage of holders to the total farm households

b) The rest (13) households is non-farm households

estimated at P26.00. This rate indicates the highest value among other farm practices.

In addition, there are many instances wherein carabao is rented under tenure system with share arrangement. In this case, carabao holds an important character as a home asset. Carabao is also convenient as a carrier for villagers because this village is located at hilly place.

Secondly, farm machinery was not commonly used among farmers. Both LEA and OLEA farmers own 2 hand-tractors each. These farmers have owned or tenanted more than 8 ha. of irrigated rice land. For example, one LEA farmer bought a hand-tractor at P27,700 in 1976 because he tried to moderate labor intensity for land preparation. Since his farm is equipped with the hand-tractors, labor for land preparation is very much reduced compared with the time spent in the use of carabao. However, hand-tractor is still used in combination with carabao, the machine is frequently used in the initial plowing, and the carabao in the final harrowing. Many farmers seem to consider the carabao superior to a hand-tractor for the final harrowing or land leveling. In fact, depth of soil for final harrowing was not uniform between plots because of natural condition without any improvements.

Thirdly, nobody used rotary weeders in this village. They said that village farmers seldom controlled weeds for a long time. In the well irrigated regions, there is a labor arrangement among farmers. This refers to the arrangement in which free labor for weeding practices is combined with the right to join harvesting and threshing, and to get harvester's share. The labor arrangement is popularly called "gama" in Laguna province, "sagod" in the Visayas and "aguiaqui" in Bicol region. However, there is no such labor arrangement in this village. Traditionally, weeding practice was not important in the rainfed village. A few LEA farmers answered that they apply herbicides.

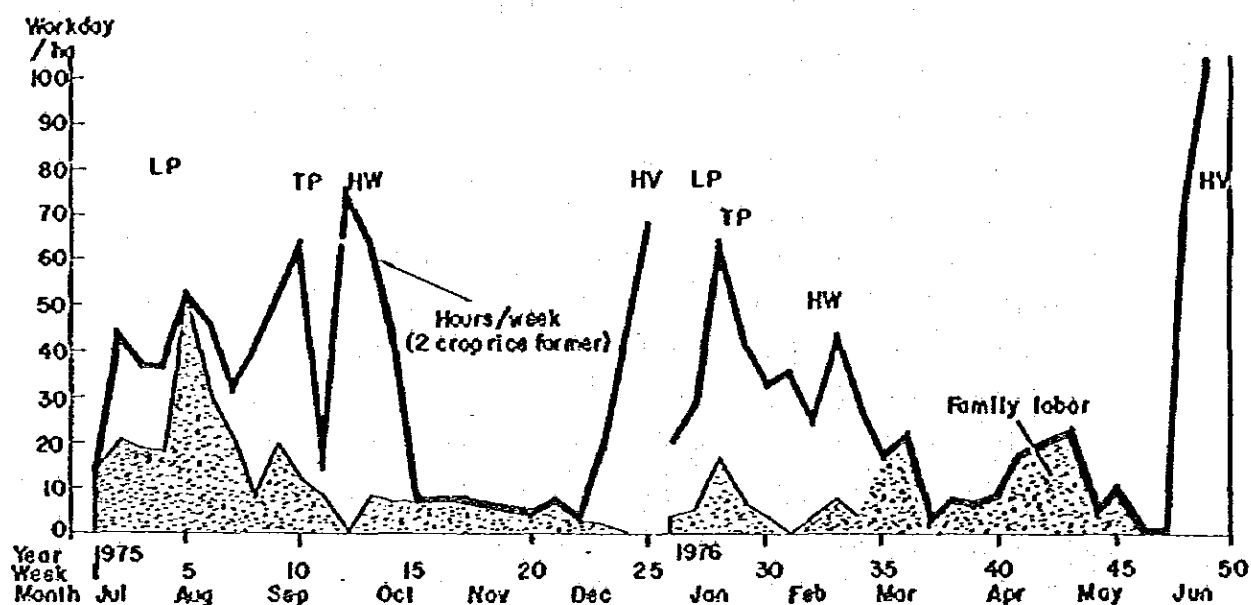


Figure 6. Weekly Labor Input per Hectare on a two-crop Rice Farm, Laguna Province (1975-76)  
 LP is land preparation, TP is transplanting,  
 HW is hand weeding, and HV is harvesting.

Morooka, Y., R. W. Herdt, and L. D. Hawes. 1979. An Analysis of the Labor-Intensive Continuous Rice Production System at IRRI. IRRI Research Paper Series No. 29. International Rice Research Institute.



To calculate an average annual cost of farm machinery, equipments and animals at the village level, 8 OLEA farmers were selected. They are exactly alike in terms of yields, area harvested and numbers of equipments. Table 10 indicates the annual costs on the average. The total depreciation cost was estimated at P272,00.

On the other hand, two representative farmers were chosen among the LEA farmers. Farm A is a tenant who cultivated two crops in a year at one hectare of rice land inside the LEA pilot farm. Farmer B is a part-owner. He owns 0.4 hectare at the pilot farm and is tenant for 3.8 ha. outside the LEA farm. These values suggest that farmers in this village are cultivating under capital saving technology.

### III. LABOR UTILIZATION AND "SHARE" ECONOMY

#### Labor Use by Farm Practice

In general, rice farming is highly labor-intensive during planting and harvesting. Land preparation and weeding are also labor intensive but do not have the time limits of planting and harvesting. The labor peaks associated with transplanting and harvesting characterize much of the rural labor use in monsoonal Asia.

Figure 6 shows the weekly labor use by a two-crop rice farmer during 1975-76 in Laguna province, Philippines. The farmer's record was selected from among those of 26 farmers in an IRRI Agricultural Economics Department study. This farmer's land and labor productivities were highest and most stable among the 26 farmers. He produced 3.7 tons per hectare during the wet season and 4 tons per hectare during the dry season. The total labor input was 729 hours or 91 days per hectare during the wet season, and 80 days per hectare during the dry season. Figure 6 also shows the fluctuations in farm labor input. Hand weeding during the wet season gave

Table 10. Annual Cost (P) of Farm Equipment and Animal  
(Depreciation Rate/Year: 10%), OLEA Sample  
Farmers

| ITEM                       | Unit | Purchase Price | Total | Depreciation |
|----------------------------|------|----------------|-------|--------------|
| <u>OLEA Sample Farmers</u> |      |                |       |              |
| <u>Equipments</u>          |      |                |       |              |
| Plow                       | 1    | 135            | 135   | 13           |
| Harrow                     | 1    | 120            | 120   | 12           |
| Cart/sled                  | 1    | 30             | 30    | 3            |
| Bolo                       | 2    | 50             | 100   | 10           |
| Sacks                      | 20   | 3              | 6     | 6            |
| <u>Animal</u>              |      |                |       |              |
| Carabao                    | 1    | 2,275          | 2,275 | 228          |
| Total                      |      |                |       | 272          |
| <u>LEA Farmer A</u>        |      |                |       |              |
| <u>Equipments</u>          |      |                |       |              |
| Plow                       | 1    | 150            | 150   | 15           |
| Harrow                     | 1    | 130            | 130   | 13           |
| Cart/sled                  | 1    | 50             | 50    | 5            |
| Bolo                       | 2    | 60             | 120   | 12           |
| Sacks                      | 60   | 3              | 180   | 18           |
| <u>Animal</u>              |      |                |       |              |
| Carabao                    | 1    | 2,200          | 2,200 | 220          |
| Total                      |      |                |       | 283          |
| <u>LEA Farmer B</u>        |      |                |       |              |
| <u>Equipments</u>          |      |                |       |              |
| Plow                       | 2    | 100            | 200   | 20           |
| Harrow                     | 2    | 85             | 170   | 17           |
| Cart/sled                  | 1    | 60             | 60    | 6            |
| Bolo                       | 2    | 45             | 90    | 9            |
| Sacks                      | 100  | 3              | 300   | 30           |
| <u>Animal</u>              |      |                |       |              |
| Carabao                    | 1    | 3,000          | 3,000 | 300          |
| Total                      |      |                |       | 382          |

a sharp peak because weed control was done by 2 to 6 workers under the "gama" labor arrangement.

Rice farm labor is primarily supplied by the cultivator, his family, and hired labor from the village. Transplanting and harvesting are traditionally done by hired labor and labor for crop care is usually provided by the farm operator. In the case of the Laguna farmer, family workers provided 36% of the total labor input during the wet season and 33% of the total labor input during the dry season.

Compared with labor input data at the well irrigated area in other regions, how did rainfed farmers share tasks for rice farming? It is difficult to determine the exact labor input for each practice because the time used changes depending on the knowledge and judgment of the enumerator and the memory of farmers. Labor input data, however are fundamental information for evaluating the economy and feasibility of a new rice technology.

After checking each questionnaire in detail, 3 sets of labor input data were obtained. On the whole, rice farmers and their family do most of the work during land and seedbed preparation. Usually, the rice farmer also takes care of fertilizing, spraying, and water control. However, transplanting and harvesting, which takes up to two-thirds of the total hours of farm work are mostly left to hired labor. These patterns are distinguishable: 1) the household head leads most of the farm work (Case 1); 2) the family members play main role for the farm work in place of their head (Case 2); and 3) both exchange and hired labors share the work (Case 3).

Table 11 shows these data of labor input at M. Antiporda. These data were obtained from 15 farm householders whom the labor input items by practice were completely filled up by enumerators. Five sample farmers were selected for each set for the 3 sets.

Table 11. Three Sets of Labor Input Data (Man-days/ha) of Rice Farmers at M. Antiporda, Buguey, Cagayan, 1982

| Rice Production Activities | CASE 1      |               |              | CASE 2       |               |              | CASE 3       |               |                 | Ave-Total, case |              |             |
|----------------------------|-------------|---------------|--------------|--------------|---------------|--------------|--------------|---------------|-----------------|-----------------|--------------|-------------|
|                            | Opera-: tor | Family: Labor | Hired: Labor | Total: Labor | Family: Labor | Hired: Labor | Total: Labor | Family: Labor | Exchange: Labor |                 | Hired: Labor |             |
| Seed-bed preparation       | 3           | -             | 2            | 5            | 4             | -            | 4            | 1             | 3               | -               | 4            | 4.7         |
| Plowing                    | 3           | -             | 6            | 9            | 2             | 6            | 8            | -             | 5               | -               | 5            | 7.3         |
| Harrowing                  | 6           | -             | 1            | 7            | 2             | 3            | 5            | -             | 6               | -               | 6            | 6.0         |
| Cleaning Dikes             | 3           | -             | 2            | 5            | 1             | 1            | 2            | -             | 2               | -               | 2            | 3.0         |
| Irrigating                 | 1           | -             | -            | 1            | -             | -            | -            | -             | -               | -               | -            | 0.3         |
| Transplanting              | 1           | -             | 26           | 27           | 1             | 22           | 23           | -             | 3               | 22              | 25           | 25.0        |
| Weeding                    | 2           | -             | -            | 2            | 2             | -            | 2            | -             | 2               | -               | 2            | 2.0         |
| Spraying                   | 1           | -             | -            | 1            | 1             | -            | 1            | 1             | -               | -               | 1            | 1.0         |
| Fertilizing                | 1           | -             | -            | 1            | 1             | -            | -1           | 1             | -               | -               | 1            | 1.0         |
| Harvesting                 | -           | 2             | 20           | 22           | 1             | 22           | 23           | 3             | -               | 24              | 27           | 23.0        |
| Others                     | 2           | -             | -            | 2            | 2             | -            | 2            | 2             | -               | -               | 2            | 2.0         |
| <b>Total</b>               | <b>23</b>   | <b>2</b>      | <b>57</b>    | <b>82</b>    | <b>17</b>     | <b>54</b>    | <b>71</b>    | <b>8</b>      | <b>21</b>       | <b>46</b>       | <b>75</b>    | <b>75.3</b> |
| <b>%</b>                   | <b>28</b>   | <b>.2</b>     | <b>70</b>    | <b>100</b>   | <b>24</b>     | <b>76</b>    | <b>100</b>   | <b>11</b>     | <b>28</b>       | <b>61</b>       | <b>100</b>   |             |

On the hectare basis, the highest labor input was 82 man-days for Case 1, while the lowest input was 71 man-days for Case 2. The ratio of operator and family members to the total labor input was 30% for Case 1. Compared to the other two cases, ratio of operator and family members to the total was higher because farmers of Case 1 performed land preparation and seedbed making by themselves. On the contrary, Case 3 depended 89% of the total labor input on hired and exchange/contract labors. Also, the ratio of dependence to hired labor was 76% for Case 2. More than two-thirds of the total labor input was contributed by hired labors. Incidentally, the total labor input was estimated at 75 man-days per hectare on the average basis.

If compared with the other village located at the well irrigated area in Laguna, the total labor input difference is about 30 man-days per hectare. (Figure 7). M. Antiporda farmers spent much time for land preparation and transplanting, while those of Tubuan used more labor input for weeding and harvesting.

Figure 8 shows how the total labor inputs for rice production were divided into those of family, exchange, and hired labors. In the distribution of labor input by tasks, transplanting happened to record the largest share of the total labor input, followed by harvesting. These values indicate an opposite tendency compared with those of irrigated area in other regions that dependence on hired labor was highest for harvesting and followed by planting. Anyway, these two major tasks took about 65% of the total labor input in the case of M. Antiporda.

#### Share Arrangement and Job Opportunity

As shown in the labor input data, the high rate of dependence on hired labor was due to a system or custom common in rice-producing region in the Philippines. Farmers employ each other in their farm operation. In this system,

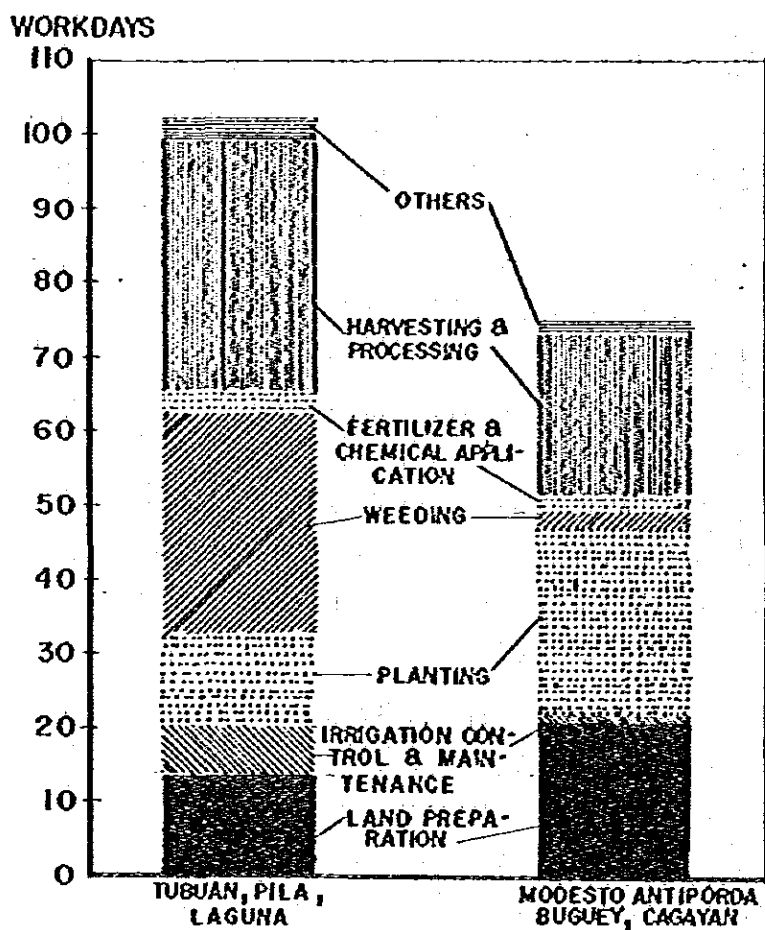


Figure 7. Average Labor Inputs for Rice Production per hectare (Man-Days) in Modesto Antiporda, Buguey, Cagayan, (1982) and Tubuan, Pila, Laguna, (1974).