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Editor's Notes

If people would show endurance and enthusiasm for building up their communities instead of destroying the environment, there would be a chance to build a better future.

This special issue of the Silliman Journal on UPLAND DEVELOPMENT not only describes land use and forest protection in the uplands of Negros Oriental province - in central Philippines, but also investigates and discusses the environmental and socio-cultural systems of the upland project sites—the Lake Balinsasayao area (25 km. northwest of Dumaguete City) and Cangguhub, Mabinay (87 km. northwest of Dumaguete City).

Although the two upland sites differ in ecological setting and socio - cultural aspects, both have one thing in common: being recipients of a farming systems development project, introduced by Dr. Rowe V. Cadeliña, director, University Research Center (URC), Silliman University, Dumaguete City, Philippines.

URC researchers and the faculty working on special community development projects with URC representing various departments and colleges of Silliman University write comprehensive reports concerning improvement of people's living conditions (socio-economic-cultural and other aspects), community leadership and organization, farm productivity, health, education and values.

Dr. Cadeliña has authored eight articles in this issue and co-authored six others. His co-authors, all URC resarchers, are Vilina Cadeliña, Virginia Dioso, Elvisa Yrad and Rodrigo Puracan.

M. C. Cepeda, E. C. Delfin and E. I. Ligutom (co-authors, "Leadership Development: The SURADPU Experience") are faculty, department of social work, College of Arts and Sciences; N. Caluscusan and C. Y. Fontelo (co-authors, "A Survey of Sample Farmers on Marketing Practices in Lake Balinsasayao) are faculty, College of Business Administration; L. V. Lim and C. P. Fontelo (co-authors, "Nutritional Assessment Among the Negrito Families in Cangguhub and Cebuano Families Around Lake

Balinsasayao") are faculty, College of Education; F. B. Lazano, (author, "A Barangay Health Worker's Training Center Course for the Upland Development Program in Lake Balinsasayao") is faculty, College of Nursing; C. P. Cadeliña (author, "After SURADPU: Lifestyle of the Lake Balinsasayao Farmers") is faculty, department of sociology and anthropology, College of Arts and Sciences; Dr. B. C. Abregana (author, "Things of Importance: What Marginalized Farmers in Selected Sites in Negros Oriental Are Concerned About") is vice president for Academic Affairs, Silliman University; R. B. Paalan and A. M. Cadeliña (co-authors, "Soil Nutrients from Different Successful Stages in Lake Balinsasayao") are faculty, department of biology, College of Arts and Sciences.

The first article, "An Integrated and Dynamic Assessment of SURADPU Experience" (pp. 1-16) provides abstracts of all articles in this issue which are categorized in seven research areas: (1) social sub-system; (2) strategy of upland extension; (3) productivity of farms; (4) marketing; (5) health and nutrients; (6) lifestyle and values systems; and (7) biophysical sub-systems. SURADPU is an acronym for Silliman University Research Action Development Program in the Uplands.

Note: The term *Ata*, which is a local name for the Negritos (native population of Cangguhub), is either used in plural form or singular form in this issue.

J. G. Perez

CONTENTS

AN INTEGRATED AND DYNAMIC ASSESSMENT OF SURADPU EXPERIENCE: A SYSTEMATIC CONCEPTUALIZATION

Rowe V. Cadeliña

Introduction

In the middle of 1983, a one-year grant for an exploratory study in the upland areas around Lake Balinsasayao was approved by the Ford Foundation. The study, designed to assess the general living conditions of the farmers and the overall biological status of the forested highlands, was completed in the middle part of 1984. A research report was produced entitled "Comprehensive Small-Scale Upland Agroforestry: An Alternative To Shifting Cultivation In the Balinsasayao Rainforest Region, Negros Oriental, Philippines." The report came up with a proposal for a research-action program on appropriate land use and forest protection in the uplands.

Using the theoretical perspective of human ecology, a new question was raised. Under a particular sociocultural and environmental condition, how do people respond to external intervention programs designed to improve their living situation? With this question in mind, the proposal that was integrated with the research report mentioned earlier was enriched by taking into account the issue just raised. The proposal was modified by setting up an action-research project where the field action program would serve as a research laboratory. This enriched proposal eventually was approved during the middle part of 1984 with a time span of three years.

To answer our human ecology question raised earlier, the field research laboratory was designed by involving two sites characterized by different environmental and sociocultural systems. One site is Lake Balinsasayao, about 800 to 1,000 meters above sea level. It has the following coordinates 9°22′ north latitude and 123°10′ east longitude. Situated around 25 kilometers northwest of Dumaguete City, it still has around 40% of its forest cover intact and the rest are under various stages of floral succession caused by human activities. The site is occupied by lowland Cebuano farmers who migrated to the upland searching for land opportunities.

The other site is in Cangguhub, Mabinay, Negros Oriental, around 87 kilometers northwest of Dumaguete City. Situated around 200 to 300 meters above sea level, the site has the following coordinates: 9°38′ north latitude and 122°55′ east longitude. The forest is completely cleared and the area is covered with shallow-rooted grasses. The people occupying the site, unlike those found in Lake Balisasayao, are the native population. They are locally known as Ata or the Negritos.[1]

While the two sites differ ecologically and socioculturally they have one thing in common on outside intervention. In both sites, a farming systems development project was introduced.

As an action-research project, monitoring of various issue had been implemented at the start of the program, known a the Silliman University Research Action Development Prograr in the Uplands (SURADPU). After three years of operation o the program, a one-year extension was granted by the For Foundation starting in December 1987. The support for th program from the Ford Foundation ended in November 198

For the research component of the program, various min research projects have been implemented since the program star ed. A major publication of the program was accomplished whe 12 different research articles were published in a special iss

[1] The Negritos are locally known as Ata in Cangguhub, Mabin Negros Oriental. In the latter part of the paper, they will be called whenever they are mentioned.

of *Silliman Journal* (Volume 32, Numbers 1-4, 1975). These research articles include the following:

1. Exploring the Psychology of Upland Kaingineros;

2. Negrito Farm Productivity and Food Deficiency: Implications for External Intervention on Upland Agricultural Management;

3. Land Use Decision-Making in the Uplands: A Case Study of Lake Balinsasayao, Philippines;

4. Notes on Land Classification: A Case for Practicality;

5. Assessment of Nutritional Status of Residents in Lake Balinsasayao;

6. Niche Diversity and Welfare Among Lowland Migrant Swiddeners Around Lake Balinsasayao;

7. Economic Value of Lakes Balinsasayao and Danao To The Local Lake User Population;

8. Household Developmental Cycle Stage and Swidden Field Expansion: An Empirical Investigation;

9. Production Patterns, Household Developmental Cycle Stages and Participation of Household Members: The Case of the Lake Balinsasayao Lowland Migrant Upland Farmers;

10. Labor and Time Utilization Practices of Households Under Different Life Cycle Stages: Experience of the Lake Balinsasayao Lowland Migrant Upland Farmers;

11. Assessment for Development Potential in Technology (ADEPT): Research Strategy in the Uplands;

12. The Social Subsystems: A Conceptualization of the Lake Balinsasayao Upland Farmer's Experience.

Other research reports have been published in international monographs and books.

Since the two sites where our program had been implemented were viewed as field research laboratories, various mini-research projects were continuously implemented as mentioned earlier.

These mini-research projects were evaluative in nature and documentation of processes and experiences. On the whole, these served to assess the impact of the program on the two sites while at the same time, documenting the developmental processes.

Seven research areas can be identified from the mini-research projects. These are the following: (1) social subsystem; (2) strategy of upland extension; (3) productivity of farms; (4) marketing; (5) health and nutrition; (6) lifestyle and value systems; (7) the biophysical subsystems.

MINI-RESEARCH PROJECTS

This paper will attempt to conceptualize various empirical findings the mini-research projects generated. The abstraction is designed to improve our understanding of developmental processes in the uplands under varying environmental and socio-cultural conditions.

(1) Social Subsystems

The human ecosystem essentially, has two components. One is the biophysical subsystem which consists of the physical and the natural environment. The other is the social subsystem which includes the social units within a human population such as so- cial groups and the patterns of relations between members withir a social group.

The social subsystem in the uplands is threatened at presen by dissident groups who have communistic leanings. In area where forests are still available, the problem is real since natura covers (such as the forest) provide the group physical protectior The paper on "The Insurgency And Development Process In Th Uplands: An Analysis of the Lake Balinsasayao Experience" (I Cadeliña), provides information as to how the group survive in a forest area such as Lake Balinsasayao. This problem doe not exist in the other project site in Cangguhub, Mabinay.

While it is true that the anti-government elements (know as the New People's Army or NPA) do not pose a threat to the loc social unit, they have challenged the local social organization in rectly and subtly; thus, weakening the efficiency of the farmers' social structure in attaining their collective and individual goals. The threat of the NPA on the social subsystem of Lake Balinsayao in contrast to that of the Ata in Cangguhub, Mabinay, Negros Oriental can be partly explained by the differences in the biophysical environment between Lake Balinsasayao and Cangguhub.

The social subsystems of the lowland migrant farmers in Lake Balinsasayao and the Ata in Cangguhub are not socially closed. They are "open systems" which allow the population to engage in any form of social and economic transaction with the outside groups. Such transaction may involve the use of the resources within the niche of the Lake Balinsasayao and the Ata farmers by outside groups. For survival purposes, the farmers have maintained mechanisms and processes through which their socioeconomic benefits are preserved.

The paper on "Inter-Group Resource Use Patterns In Two Upland Communities in Negros Oriental" (R. Cadeliña) in this volume analyzes the way the Lake Balinsasayao and the Ata farmers provide access for themselves and for other groups to resources that are available within and outside of their ecological zones. Four processes are identified to achieve accessibility of resources to users in Lake Balinsasayao and Cangguhub: (1) complementarity; (2) competition; (3) accommodation; (4) subordination.

> 'Complementarity is a social process whereby conditions, resources and opportunities of different levels are made available to individuals coming from different groups. The philosophy is that resources, goods, or technology that are not available to an individual can be made accessible to him from other groups via one's own other resources."

> "Subordination is a process by which a particular group serves the other with a lesser return. In short, there is a subordinate-superior relationship. Normally, the arrangement is voluntary since there is a pressing need for both ends to establish the relationship."

"Competition is a very subtle process of displacing one from his domain by another through the use of an irresistible medium like money. This usually happens during critical periods."

"Accommodation is a friendly attempt between groups to allow each other to have access to the resources of the respective groups. Such mutual access can take the form of exchange where resources of different nature, qualities and quantities are involved. The exchange process could take various forms like generalized sharing, balanced reciprocity and trading."

Resources in the uplands are generally scarce. Goods and opportunities are very limited that the use of these resources usually lead to inter-individual and inter-group conflict. How the social system of upland population resolves these conflicts and how it handles the problem of scarce resources are questions that are worthwhile exploring in the upland. The paper on "The Politics of Scarce Resources Among the Ata: An Experience Derived From Their Farming Systems, Development Projects" (R. Cadeliña), answers these questions. The study reveals that the Ata resolve conflict that emanates from the use of scarce resources on an individual or societal basis. When conflict involves persons who are socially or biologically related, both individuals work hard to resolve their own conflicts. When it involves unrelated individuals who belong to two different social subgroupings, the individuals concerned generally are not in a position to resolve conficl. A neutral system such as the traditional political organization, has to serve as the mediator to resolve conflict. This usually involves social punishment whoever is found to be at fault.

On the other hand, the Ata handle the problem of scarce resources through seven different measures: compensatory measures; exchange and trade; population control; generalized sharing; technological shifts and development; reduction of consumption; and mortgage of resources.

(2) *Strategy for Extension*

Given the social subsystem of the farmers in Lake Balinsasayao and Cangguhub, specific extension strategies have been implemented in the two areas. Among the lowland migrant upland farmers of Lake Balinsasayao, extensive use of the community organizing (CO) approach is employed. Among the Ata in Cangguhub, CO approach has not been employed since the Ata, unlike the Lake Balinsasayao farmers, have their own traditional sociopolitical systems. The tradition provides a sense of political organization to the Ata which we do not want to disrupt. On the other hand, since the lowland migrant upland farmers in Lake Balinsasayao do not have any traditional sociopolitical system, there is none that will organize the group into one social unit and no traditional sociopolitical system will be disrupted if CO has been introduced. Hence, CO is a strong initial activity in Lake Balinsasayao.

The paper on "Community Organizing In the Uplands: The Lake Balinsasayao Experience" (R. Cadeliña and V. Dioso), outlines the experiences and the emerging concept of CO in Lake Balinsasayao. Four phases of CO processes are identified. They are the immersion phase, social preparation phase, community organizing proper and organization of work groups. This whole effort has been challenged by the presence of the NPA in the area. The paper on "The Insurgency and Development Process In The Upland: An Analysis of the Lake Balinsasayao Experience" (R. Cadeliña) provides a case under which the efficiency of the CO structure has been weakened. Since the NPA has challenged the social subsystem of the Lake Balinsasayao farmers, the CO input in the area has been threatened. This is expected since the CO input has become an integral part of the social subsystem of Lake Balinsasayao. The paper by Cepeda, Delfin and Ligutom on "Leadership Development: The SURAD-PU Experience" in this volume finds community leadership in Lake Balinsasayao very weak. This weakness is partly attributed to the presence of the NPA in the area.

All farming systems development inputs in Lake Balinsasayao have been channelled through the CO and all labor costs in the implementation of inputs on the farm have been handled by the farmers. Since the Lake Balinsasayao farmers have succeeded in storing food, farm developpment has been observed not to compete with their daily food needs.

On the other hand, a different approach was employed for the Ata in Cangguhub. Being traditionally known as hunters and collectors, the Ata have never succeeded in storing food. Hence, getting food constitutes one of their daily activities. Any extended farm development will therefore contradict with their daily food quest. A contractual agroforestry scheme was therefore employed for the Negritos in Cangguhub. The Paper on "Contractual Agroforestry Scheme: An Experience Towards Agroforestry Development Among The Negritos of Central Negros" (R. Cadeliña), provides a detailed analysis of the approach. The issue on alternative approach is further discussed in another paper "Alternative Extension Strategies For Native Population In The Uplands: The Case of the Ata in Cangguhub, Mabinay, Negros Oriental" (R. Cadeliña). The papers claim that under the contest of the Ata, the alternative approaches are appropriate.

(3) *Productivity of farms*

It was initially assumed that if the farming systems devel opment inputs have positive impact on the farming activitie of the cooperators, the farm productivity level of the participant should increase. The increase is assumed to be the result of ef fective nutrients use by plants and controlled pest outbreaks du to the implementation of an appropriate cropping systems an improved soil management in the uplands.

Initial analysis on the effects of soil protection devices an cropping systems on crop production, however, show inconclusiv result in Lake Balinsasayao. The paper on "Production and Cro ping Styles: An Analysis of Results of Intervention On Coope ators and Demo Farms In Lake Balinsasayao" (R. Cadeliña states that "the inclusive evidence concerning the relationshi between total production and the implementation of the soil pr tection devises and the increasing variety of leguminous cro planted on the farm requires further documentation. Intuiti and common sense, however, suggest that they do, in fact, affect production. Perhaps, since the processes have effects which are long term, the gestation period is not yet long enough to have these effects manifested."

A more recent study, "Productivity Level of Test Farms Under Various Cropping Systems: The case of the Lake Balinsasayao Project" (R. Cadeliña and E. Yrad), however, shows an indication that cropping system has, in fact, affected production. Of the four test farm cases using different cropping styles, one case yields the highest level of production.

In another site in Cangguhub, the effects of rockwalling and cropping systems on the Ata farm production are more conclusive than what we found in Lake Balinsasayao. The paper on "Productivity Changes of the Ata: Effect of Agricultural Intervention on Native Tribal Population" (R. Cadeliña and R. Puracan), concludes that the Ata farms have increased their productivity level by 53% to 55% after rockwalling and appropriate cropping system were introduced. The positive change in production can be attributed to the improvement of the soil condition brought about by rockwalling. As we will see in the later part of this volume, the soil pH and the macronutrient (NPK) content level of the soil of the Ata farms increased after rockwalling was introduced.

4) *Marketing*

Even under a subsistence farming system in the uplands, the farmers still have to market a portion of their products to derive cash in order to purchase the goods the farmers cannot locally produce. The welfare that the upland farmers derived from farming can therefore be improved if they get an effective marketing system of their products. In places where the farmers have concentrated on the production of vegetables because of the favorable climatic conditions, the more the farmers have to depend largely on the market systems. Vegetables have to be converted into staple product for the daily subsistence of the farmers. To derive substantial welfare from the vegetable products, the farmers should get a good process of product conversion through the marketing system, a problem true among the Lake Balinsasayao farmers.

The paper by Caluscusan and Fontelo on "A Survey of Sample Farmers on Marketing Practices In Lake Balinsasayao" shows that there is a need among the farmers in the site to develop an efficient marketing system. Returns have been negatively affected by factors such as weather, distance, and peace and order. Distance and weather can bring damage to vegetable products during travel, bringing low prices to their products. Disruption of peace and order can force farmers to dispose of their products at a very cheap price. These problems are inherent in upland communities where forests are still found as we saw earlier. The NPAs generally have occupied these areas in Negros Oriental for consideration of physical protection.

It has been identified by Caluscusan and Fontelo that the farmers do not get an optional price of their products since their customers are generally the middlemen. If the farmers can hit a market largely consisting of the ultimate consumers, they would be able to strike a better price for their products.

A study on "Assisted Marketing Program: An Analysis of Resource Exchange Between a Lowland Academic Community and An Upland Swiddening Population in Negros Oriental, Philippines" (R. Cadeliña), shows that the farmers get an increase in welfare by around 70% if their products were sold in an effective marketing system. Our experience with assisted marketing program for the uplands reveals that through effective information monitoring on prices and getting the right customers who are the ultimate consumers, the farmers get better profit from their products. This can be done by identifying established communities as the target customers without necessarily excluding the outsiders since they add to the total market. In our case, we utilized the academic community of Silliman as the core market of the farmers' products and the surrounding communities as additional markets.

(5) *Health and Nutrition*

The health and nutritional condition of the local population can represent one major indicator of welfare the population may derive from economic development projects. It was therefore initially assumed at the start of the program that any change in health and nutritional condition of the farming population in Lake Balinsasayao and the Ata farmers in Cangguhub during the later dates is caused by SURADPU.

The Study on "Health Condition of Upland Farmers: A Study on the Effects of the Upland Development Program In Lake Balinsasayao" (R. Cadeliña and V. Cadeliña) concludes that the present health condition of the Lake Balinsasayao population is better than five years ago. Although the episode of illness at present tends to be longer, the over-all percentage of illness incidence is lower. The study utilizes two sets of data from a synchronic 1982 study and a diachronic 12-month monthly study from March 1986 to February 1987.

In addition, the paper claims that "there is a consistent pattern revealed using the anthropometric measurements. If ever malnutrition exists, the three measurements consistently show only first degree malnutrition . . . . Nonetheless, the overall health situation is found to be a lot better than that prevailing in 1972. The establishment of SURADPU has improved the level of awareness on the part of the local mothers concerning proper nutrition, prevention of illness, sanitation and family planning."

In 1988, a synchronic study comparing the health condition of the Lake Balinsasayao farmers and the Ata farmers in Cangguhub was conducted. The study on "Morbidity Patterns of Upland Farmers: A Comparative Study Between Lake Balinsasayao and the Ata Population Groups" (R. Cadeliña and V. Cadeliña), concludes that the incidence of illness among the Ata is higher by around 53% to that of the Lake Balinsasayao farmers. This is not surprising since we find more food as revealed in other studies in Lake Balinsasayao than in Cangguhub. Food production is higher in Lake Balinsasayao than what we found among the Ata in Cangguhub.

The study by Fontelo and Lim on "Nutritional Assessment Among the Negrito Families in Cangguhub and Cebuano Families Around Lake Balinsasayao," concludes that recently, Balinsasayao farmers have better nutritional condition and have higher calories available to individual farmers compared to that in 1982. It is claimed that such increase in caloric production is caused by the projects introduced in Lake Balinsasayao.

On the other hand, the Negritos in Cangguhub have access to lower amount of calories compared to that found in Lake Balinsasayao. Such difference empirically supports our earlier claim why we tend to find higher morbidity rate in Cangguhub than that in Lake Balinsasayao.

While it is true that the farming systems development project being introduced to the Ata has improved their production as we mentioned earlier, such increase in production has not yet reached the level or surpassed that of Lake Balinsasayao. We have to remember that the ecosystem of the Ata is more degraded compared to that of the farmers in Lake Balinsasayao.

In order to improve the health condition of the upland population, health services have to be accessible to the population. However, for various reasons, health services are generally absent in the uplands. F. Lozano's paper proposes the training of a barangay health worker (BHW) among residents in the community. Lozano has outlined the manner in which the training will be undertaken in her paper on "A Barangay Health Worker's Training Course For The Upland Development Program In Lake Balinsasayao."

(6) *Lifestyle And Value Systems*

Another aspect of human life that may be affected by development project is the lifestyle of the people and their value system. Value system is directly related to the people's lifestyle. The way people live is affected by the manner they perceive things. The way they live and act are behavioral translations of the people's value systems.

Is there a change in the lifestyle of the farmers around Lake Balinsasayao after SURADPU has been introduced? C. Cadeliña answers this question in her paper on "After SURADPU: Lifestyle of the Lake Balinsasayao Farmers" by utilizing synchronic data on economic and social behavior of the members of the households of farmers from Lake Balinsasayao. Through recall, the respondents are asked to compare saving and consumption patterns, material acquisition, expenses for services, utilization and distribution of goods and services, and social and cultural involvement between the two periods — before and after SURADPU. The study reveals changes in some of these areas compared.

The changes in the lifestyle of the Lake Balinsasayao farmers are coupled with a value system that put premium on things that are higher than the basic need for food. A study by B. Abregana on "Things of Importance: What Marginalized Farmers in Selected Sites in Negros Oriental Are Concerned With," concludes that the Lake Balinsasayao farmers are concerned with issues higher than that with the Ata in Cangguhub are concerned about. The ability of the Lake Balinsasayao farmers to be more successful than the Ata in food production allows the former to think on issues that are on a higher plane than what the Ata can afford to think about. Such improved value system of the Lake Balinsasayao farmers has led to a lifestyle relatively different from what they have before the implementation of SURADPU.

(7) *Biophysical Subsystem*

Finally, one important question has to be asked: "Has the farming systems development effort improved the biophysical subsystem of the farms of the Lake Balinsasayao and the Ata farmers in Cangguhub?" Since SURADPU used the farm system of a household as the point of entry for the program, the effects of the program should be manifested by some improvements in the plant life support system from the soil.

A study by R. Pa-alan and A. Cadeliña in this volume on "Soil Nutrients From Different Successional Stages In Lake Balinsasayao," shows that the pH and the macro nutrient value of the soil under various cultivation stages with soil conservation measures introduced have an increasing value almost similar to that of the soil under primary forest. The study concludes that the farmers need not shift farm plots from one site to another if they follow the appropriate farming systems introduced by SURADPU.

In another site where soil degradation has already reached an advanced stage, a study on the "Effects of Contoured Rockwalls on Soils: The Ata Experience" (R. Cadeliña and R. Puracan), indicates a positive change on pH and macronutrient reading of soils.

EMERGING EXPERIENCE

The human ecology perspective provides an appropriate philosophy in organizing our efforts toward developing upland communities. SURADPU, as a development package for the island of Negros Oriental, allows us to see the interfacing of two subsystems in a human ecosystem. We see how the social subsystem interrelates with the biophysical subsystem and vice versa from which various socioeconomic results have been generated. Results are depicted in various areas or issues, such as productivity, marketing, health and nutrition, and the life-style and value systems. These results are found not to be isolated from each other but highly interrelated, thus, affecting each other. The data demonstrate positive changes on these results, indicating success of SURADPU in achieving its general goals. Forest protection and forest conservation as its indirect objectives appear to be realized. The remaining forest cover has stood within the reasonable limits of our expectation. In 1987, a group of physical science researchers had indicated only around 25% of the total watershed area of Lake Balinsasayao to be deforested—very much lower than what we anticipated.

The peculiar physical nature of most upland communities has provided opportunities for the NPA's existence in the areas and to challenge and threaten the viability of the social subsystem in the uplands. Such condition has negatively affected the social subsystem in the area to optimize the implementation of development efforts. Under such circumstances, SURADPU has tried to maintain neutrality with the NPA and the military. Nevertheless, such position does not improve the iffeciency of community organization.

The efficiency of a particular strategy in bringing the benefits of development to the farmers depends on the sociocultural context of the clientele population. Community Organization (CO) approach appears to be effective for farmers who do not have any traditional sociopolitical system. On the other hand, household level approach appears to be more effective among tribal population possessing traditional sociopolitical structure such as the Ata. This therefore suggests that CO should not necessarily be considered as a prerequisite for a successful development effort. As defined in this paper, CO is a deliberate effort of creating a social structure in the community through which extension services are channeled.

The nature of development program determines whether CO is necessary or not. Farming systems development which is largely implemented on a household level can be appropriately introduced without any CO processes. Other projects, however, such as cooperatives, require CO as the backbone. This suggests therefore that any development worker will have to consider whether CO is required or not; and also to consider the nature of the project and the sociocultural nature of the people involved.

Development strategy has to take into account the social subsystem and the biophysical subsystem as well. Prioritizing of development activities requires careful assessment of the two interacting subsystem of the human ecosystem. For instance, soil conservation and regeneration should take precedence over cropping systems in a condition where soil degeneration has reached an advanced stage. Cropping systems development is meaningless in a highly eroded farm lands. Plant support from the soil has to be assured before new planting systems are introduced. Otherwise, soil conservation can be introduced simultaneously with cropping systems development or even later. This is possible, since in a place where topsoil is still relatively intact, plant life support system from the soil is still available. We saw this from our Lake Balinsasayao and Cangguhub experiences.

A rigid blueprint for development in the uplands is meaningless. Our experience shows that development design has to be resilient for adjustments and modifications. The human ecology perspective employed by SURADPU allows such adjustments and modifications in our priorities for services and activities.

THE INSURGENCY AND DEVELOPMENT PROCESS IN THE UPLAND: AN ANALYSIS OF THE LAKE BALINSASAYAO EXPERIENCE

Rowe V. Cadeliña

Introduction

Development programs in the uplands face a number of constraints. While the inaccessibility problem of the upland communities has contributed mainly to the physical alienation of its inhabitants from the different services provided by the private and government agencies in the upland, such problem has provided the physical protection of the insurgents in the upland areas. As a consequence, upland communities in Negros Oriental in particular and in the Philippines in general have become the territorial residence of the insurgency elements such as the New People's Army (NPA). This physical and geographical protection provided security to the NPA elements. Hence, they have mastered the terrains in the upland communities and gained "forced" support from the local population while they failed to get such kind of support from the inhabitants located in the lowland. The NPA elements, therefore, consider the upland communities as their territories.

The presence of the NPA in the upland communities has varied effects to upland development projects. To some, it has stunted the developmental processes of the projects while to others it has facilitated the achievement of certain developmental goals at one point in time or another. These conditions depend on the convenience that the NPA derived from a particular role it assumes relative to the project. Hence, at certain times, they are detrimental to upland projects; at other times they are not.

This paper is an attempt to analyze the effects of the presence of NPA in Lake Balinsasayao on the upland development project in the area. It is agreed that the NPA's role in our upland development project in Lake Balinsasayao shifts from being positive to a negative type and vice versa depending on the advantages that the NPA will get from a particular circumstance. Since the NPA operates on convenience, any circumstance that will provide a better edge to the insurgency elements will always be opted. Hence, in the long run, in spite of the positive role that the NPA will assume at certain points in time the overall effects to the development project will be negative.

THEORETICAL FRAMEWORK

The NPA and the development project have essentially similar concern for the area. Both desire a positive change in the upland area. Since the NPA survival will have to depend on the local upland population, any improvement on the living conditions of the latter will mean an easier opportunity for them to derive local support. Meanwhile, for the development project such positive change on the socioeconomic condition of the upland population will serve as an indicator of success of the development project. Under such condition, the NPA will develop a strong sense of tolerance to the presence of the development project in the area while at the same time the development project will develop further interest in supporting the upland community because of its demonstrated viability toward development. Consequently, since the development project in the upland has shown its value in the upland setting, the NPA will generate a protective role on the development project. The safety of the lives of the field personnel of the project in the upland will be assured. As this continues, the NPA may expect direct assistance from the development project over and above what it receives from the local population. This is a critical stage for the field personnel of the development project since a wrong decision can affect the relationship between the project and the NPA during the entire lifetime of the development project.

On the other hand, the development project in the upland has no reason to relate to the NPA. Since the development project is intended for the non-NPA uplanders, the field personnel has to safeguard the project resources from being directly siphoned to the non-intended beneficiaries. A strong stand on this on the part of the field personnel will nip the bud of unwarranted expectation from the side of the NPA. Generally, the NPAs do not insist for assistance from development project in the uplands if a strong disapproval is expressed by the project personnel to their first request. The first request determines the next. Disapproval to the first request generally means no more requests in the future. This arrangement will generally continue during the entire life of the project.

The failure of the upland development project to support the NPA will not necessarily lead to reprisals on the part of the latter against the former. Instead, the NPAs generally maintain their positive attitude toward the project since they realize the value of the project to the local population whom they are trying to get sympathies and to draw support from. For convenience, they have to maintain their positive role toward the development project.

However, when community organization in the upland gets stronger among the local population as a result of the development project, the NPAs generally become uneasy. As a response, they would begin to create fear among the local population to destabilize the organization since a strong community organization in the upland will create additional difficulty to the NPA in drawing local support from the upland dwellers. At this instance, the NPA will develop a negative role against the development project. The game is generally subtly played by the NPA. Through this tactic, the breaking process of the community organization starts from within hence the problem will not easily be discerned by the project personnel until the community organization will manifest an irrepairable collapse. Obviously, this will constitute a damaging blow to the project. Such negative role of the NPA will continue to work on the sub-surface against the upland development project while an apparent protection of the project field personnel is continuously demonstrated by the NPA outwardly.

This double-edged effect of the NPA on the upland development project will have numerous implications on the project. For one thing, it will create an ambivalent attitude on the part of the upland dwellers toward the project. For another thing, it will destroy the sense of community solidarity since households will tend to maintain individualized security or protection from the NPA. Since the government military force is concentrated only in the lowlands and the NPA force is in the uplands 24 hours a day, the government military force is meaningless to the security of the upland dwellers. The common crime against property in the upland, in fact, is easily curbed by the speedy trial court system of the NPA. Such system of punishing the criminal brings a strong sense of protection to the individual household in the uplands.

Development projects actually are not prevented from operat- ing in the upland by the NPA. This attitude is important to th survival of the insurgency in the area. First, a development pro ject serves as a potential unit for direct assistance to the NPA Second, a development project can serve as a model which th NPA can partly ape in other upland communities to improv their own acceptability to the local upland population. Thir the economic improvement that the development project wi bring to the upland dwellers could indirectly benefit the NP through contribution that the local upland residents will have t make in the future. Fourth, the presence of a development pr ject in the upland without harrassment from the NPA can brin message to the larger society that the NPA is in fact peac loving whose only concern is the betterment of the econom condition of the Filipinos.

However, the net effect of the NPA to the developme project in the uplands will be negative. Since the NPA will a ways create an advantageous condition for their own ant government activities, in most cases they will always unde mine the objectives of the development project. Since develo ment projects in the uplands can easily pose as counter-insu gency activities, the NPA will always make sure that this c cumstance will not happen. Various tactics can be employed the NPA to destroy the community organization from with Since the community organization serves as the framework any collective developmental efforts, the collapse of the fra work can generally bring a total breakdown of the project.

FINDINGS

Let us relate the theoretical philosophy we have just outlined to the actual experience of the Lake Balinsasayao project concerning the presence of NPA in the area.

NPA Organization Efforts

In 1985, the farmers living around the Lake Balinsasayao area were finally organized. The organization was a result of a series of seminars held for them by an interdisciplinary team from the University Research Center of Silliman University. The farmers named their organization BANAGBANAG, an acronym for *Balinsasayao Naghiusang Balangay Nga Nag-*[illegible] (which means Balinsasayao United Farming Community). The intention of the organization was to develop a collective effort toward the protection of forest and the development of farms using appropriate farming technology.

In 1986 reports were made by the farmers concerning the presence of NPA in the area. Heavily armed men traveling and visiting households were reported by the farmers. Meanwhile, the field personnel of the project never encounter them yet. It appeared that at this stage the NPA did not have any intention to associate with our field workers.

Toward the end of 1986, reports concerning meetings with the farmers and the NPA were received. Usually these meetings were called by the NPA when our field personnel left the area to make their 9-day monthly report at the University Research Center at Silliman. To the NPA, these meetings would be clandestinely made during the absence of the project field personnel in the area.

For curiosity and fear of reprisals from the NPA, the farmers attended the meeting. Reports indicated that during the initial meetings, introduction of attendants were made to familiarize each other. Slowly, later meetings started to move toward discussing issues on social problems and the need to organize one group to protect the farmers' own interest. At this stage, the farmers were already certain about the intention of the

NPA to organize the community. Since the farmers were looking for a better offer than what the development project was making, the NPA had not been able to draw a good support from the local farmers. Slowly, the attendance of the farmers whenever the NPA called a meeting, progressively declined. The farmers made good reasons. Some purposely went down to the city or the municipal public market to sell agricultural product during scheduled meetings. Others claimed that they were sick.

As a consequence, the NPA failed to organize the farmers. Nevertheless, the NPA never pushed their plans for fear of strong collective opposition from the farmers. Still the NPA maintained a social distance from the Lake Balinsasayao development project and shift their strategy from organization to non-organized individualized household approach.

At this stage the NPA did not pose as a threat to the development project. Field activities of the personnel were not disrupted and the organization of the farmers continued to function normally. That condition was misleading since the NPA had already shifted gears in their own approach in organizing, whose effects of the project were only discernable at a later period.

Meanwhile, the NPA identified households that had expressed sympathies with them. These sympathizers became the target for more intensive NPA household-to-household visitation. The sympathizers felt that their interests can be more protected by the NPA. Correspondingly, the NPA made commitments to protect the sympathizers' own interest.

But the community organizing effort of the NPA did not succeed. Although they failed to get the total community support, they succeeded to draw a compromise by getting support from a core group. This core group is a small segment of the household population in the upland community of Lake Balinsasayao. As a consequence the BANAGBANAG organization weakened since the members of the NPA core group turned out to be the major breakers of the law of the organization. For instance, one of the functions of the organization is the protection of the remaining forest from illegal cutting. The organization created a council known as the Forest Protection Council. The council divided the area into sectors and depending on the location of the farm of a council member, that person is given the responsibility to protect a particular sector.

It was learned later that most of the NPA sympathizers were the ones breaking their own organization's law against illegal cutting of trees. Assurance of protection from the NPA was allegedly made for the sympathizers who cut trees for lumber to be sold. Some reports were made concerning percentage cut that the NPA received from the proceeds of lumber the illegal loggers made. This problem was common during the summer period of 1987. The increased military operations against illegal logging have, however, reduced the incidence of illegal logging activities during the following months.

At this stage, the NPA began to be more visible to the project personnel. They broke the social distance they had established earlier between themselves and the project. A group of NPA elements began appearing to our field personnel and made attempts at inviting our field workers to join the insurgents many times. Requests for material assistance were likewise made from our project personnel. These requests were refused by the fieldworkers on the ground that only their project director can act on their request. This happened during the last part of 1986 and the early part of 1987.

As a consequence, the NPA made plans to see the writer of this paper. Finally in the middle part of 1987, the NPA and myself met in the project site. I flatly disapproved their request and suggested to the NPA representatives that the project will cease its operation if they disagree with my refusal. The NPA did not push their request and asked the project to stay since it had a good purpose for the farmers. Since then, the NPA did not make any request for assistance. However, they kept their irregular visits to our field personnel.

NPA Offered Development Program Patterned After SURADPU

Nevertheless, the NPA did not stop from their efforts toward getting the whole upland area organized to support their cause. Means of enticing the upland farmers to their side were made. The NPAs were convinced that the development project in Balinsasayao was dearly accepted by the farmers. Hence, the NPA thought that if they could offer similar project to the upland farmers they would get full sympathy or support from the local farmers.

Toward the end of 1987, reports were received again that series of seminars were made by the NPA for the upland farmers during the absence of our fieldworkers in the site. The seminars introduced a project similar in concept to our Lake Balinsasayao project. The farmers reported their surprise why a similar project being introduced by the NPA. It was very apparent that the NPA tried to get the support of the local farmers through a program which had already been highly acceptable to the local population. Unfortunately, the NPA still failed to elicit the support from most of the local farmers. The absence of logistical support in the NPA program did not allow the insurgents to provide the necessary inputs into the farms of the upland residents. The absence of this necessary ingredient in the farming systems development of the NPA turned off most of the upland farmers.

Despite all the failings of the NPA to draw the interest of the upland farmers toward their cause, they have remained to be very protective, at least outwardly, to our development project in Lake Balinsasayao. They have never manifested hostility to our field personnel. Instead, they have shown respect to our project staff. Such ambivalence on the part of the NPA is very essential to their very own survival in the area.

NPA Creating Fear Among The Upland Dwellers

The ability of the NPA to draw support from few households in the face of majority's disapproval to their presence in the area assured the insurgents with minimum resources for their own survival. By creating fear among the local population they have divided and ruled the population to their own advantage.

Fear can be sown among the local population by having the NPA's presence felt in the area. Frequent exposures of the NPA in full battle gear to the local population will of course terrorize the inhabitants. This is done through regular patrols during the day.

From January 1987 to March 1988, sightings of the NPA were monitored by our project personnel. During this period NPA sightings were practically reported every month. The field personnel noted the sudden increase in intensity of the sightings compared to the earlier periods. This period coincides with the time when the NPA elements were also intensifying their efforts to get the local farmers' support.

Usually, the NPA would stay in the project site between four days to one week and disappear. To prevent from an "over kill" of the food resources, the NPA always kept their stay in the site for a short period. While this has an economic implication, it also has a security value on their part. The element of surprise" is very essential in guerrilla activity like that of the NPA.

The waxing and waning of the NPA presence in the area intensified the feeling of fear among the local population. In fact, the sudden appearance of the NPA in the area is usually accompanied by recent mass evacuation of families from the uplands towards the coast. These situations have tremendously affected the project operation in the site. Meetings had been postponed and collective farm development had been cancelled. Since the NPA disappeared, the evacuees returned back to their farms. This condition disrupted the total program of activities in the upland areas.

The NPA did not directly disrupt the operation of the upland projects. Instead they manifested tolerance with the presence of projects in the uplands by being friendly to the fieldworkers. Such friendly relations with the fieldworkers supposedly added some sense of security to the fieldmen, but at the same time create a feeling of uneasiness on the part of the fieldworkers for fear of military reprisals. In any case, the fieldworkers are always subjected to fear. Obviously, working under this condition will not allow an optimum output of the project. With most of the clientele population terrorized, the community participation in development activities will surely go down to an insignificant level.

In this manner, the NPA indirectly destroys the project causing the clientele population to lose trust and confidence in the project. In the process, the NPA may be able to shift the loyalties of most of the local population from that of the project to that of the NPA. Such trust and loyalty may turn into a form of resource which they badly need.

It appears now that the NPAs try to achieve their goals without creating an open conflict with the existing projects in the uplands. By simply increasing their physical presence under an atmosphere of combat, fear is sown among the upland populatio including the personnel of the upland projects. Such conditio will bring internal conflict to the project bringing its own demis

DISCUSSION OF FINDINGS

The problem of the insurgency elements in the uplands is a issue that development projects in this ecozone have to grapp with realistically. While it is true that the NPA elements do n provide an open confrontation with the workers of the projec in the uplands, they have psychologically assaulted the local po ulation including the fieldworkers which affect the general we being of the upland development projects. Since the social ar bience under which the development project in Lake Balinsas yao has been adulterated by the elements of fear, the strength the community organization has been weakened. In most ca community organization serves as the mover of developme projects. In the face of weakening community organization, t life support system of development project is threatened.

Officers of the BANAGBANAG organization no longer e nestly push for the implementation of provisions that have b collectively approved. Slowly, the leaders' credibility begun to er as more rules had been purposely transgressed. For fear of NP reprisals, officers and members alike no longer implement activities that are self-initiated. The ability to self-initiate activities without the project's field personnel's direction is a quality that marks a mature community organization. The presence of NPA elements in the uplands leads to obstruction of the project.

The channel through which community organization can be nourished and strengthened is through community meeting. Community meetings allow individual members to express dissenting opinions which are essential in developing and evolving collective decision. In the absence of this process, community organization is dead. As the NPA elements create fear among the local population, the upland residents generally keep themselves away from community discussions. Such attitude is caused by fears: (1). the local population group may be mistaken by the military as a unit organizing to support the NPA; and (2) the local population group may be mistaken by the NPA as a unit organizing to support the military.

In either cases, the local population has to face the risks and hazards of armed attacks from either side. As a consequence, community organization becomes inactive and the social momentum is lost. Social momentum is essential in keeping the community organization going. Once this is blocked, community organization stops moving.

As an alternative, the local population may attend community meeting only when such activity is called and organized by the fieldworkers of the project. Such alternative, however, is unhealthy toward the development of a strong community organization. Since it has to be kept as a permanent component of community development, community leaders and members should run community meetings by themselves. This is part of the training which the local leaders and members have to internalize while the project is still operating. The idea is that the leaders and the members will have to learn the processes of running a meeting so that when the project terminates, they can sustain the community organization. Community meetings are processes through which community organization depends upon. Community organization draws its life from community meetings. It serves as the community forum through which community issues are discussed in a democratic manner. In the process, sources of community conflict are dissolved while potential for community cooperation is strengthened. Community cooperation serves as the backbone for community development. With the NPA's presence in the upland, this necessary element of community development is never given a chance to grow. This is not surprising since the NPA's survival in the upland will be higher if the community is either loosely organized or not organized at all. Under this circumstance, the NPA will not necessarily have to face a solid front of unwilling supporters. The more socially fragmented the upland communities are, the more likely the NPA can draw minimum and fragmented support.

The NPA capitalized on their physical presence and movements within the upland zone of Lake Balinsasayao. By projecting the image of ready combatants truly willing to kill private residents known for their strong positive military support, they have succeeded in controlling the Lake Balinsasayao area. The farmers have never launched either clandestine or open attacks against the NPA. The fieldworkers have to maintain a strong stand on neutrality in return for NPA's tolerance and respect of the farmer's presence in the area. The area is considered a territory of the NPA, hence, the fieldworkers of the projects are outsiders. In fact, the farmers have to maintain a sense of gratefulness to the NPA in allowing them to make a living in an area considered to be an NPA territory.

The NPAs could throw the development project out of their own territory in Lake Balinsasayao but they did not opt for this. Instead, they have kept a seeming supportive attitude to the project for possibly a number of reasons:

(1) by tolerating the project in the area, the NPAs have succeeded in projecting a positive image for themselves for the outside society as peace loving and generally concern for the development of the upland poor;

(2) the project can serve as model for upland development which the NPAs themselves may implement under their own aegis and administration; and

(3) whatever improvements the upland farmers will get from the project, part of it may flow toward the NPAs' benefits— thus, improving their survival in the area.

But to prevent the community from developing into a strong self-fulfilling community, the NPA kept the project from optimally delivering its benefits to the farmers. By simply creating fear on everybody in the community, developmental processes were shortchanged causing farmers confusion and inaction in the face of threatening risks.

On the whole, the NPAs have demonstrated ambivalent attitude toward the development project in Lake Balinsasayao. For convenience, such attitude is essential for their own survival. The mixture of positive and negative support allowed the NPA to calibrate the effects of the development project to their own advantage. The net result is the inability of the project to deliver the full developmental process and output to the upland farmers.

SUMMARY

The BANAGBANAG experience with the NPA elements in the Lake Balinsasayao area may be considered unique. However, in the absence of similar study in other parts of the Philippines, we cannot make a definitive statement on this. Nevertheless, specific observations may have to be highlighted at this point:

(1) by providing certain amount of tolerance, the NPA had succeeded in allowing the development project in Lake Balinsasayao to exist under a controlled condition;

(2) under this controlled condition, the NPA had regulated the impact of the project on the local farmers below the optimal level to protect the interests of the NPA for survival;

(3) the NPA had a mixed attitude toward the project in Lake Balinsasayao (somewhat in favor and somewhat against);

(4) the NPA had maintained this stand on the project without necessarily having an open confrontation and conflict with the project. Through the use of fear, the NPA had suceeded in

keeping the farmers' involvement in the development proces limited;

(5) the NPA had capitalized on the use of increased physica presence with full combat gear to sow fear among the local pop ulation;

(6) by using fear the NPA had succeeded in dividing th local upland population according to their loyalties to the NPA i order to rule the area;

(7) since the NPAs only needed minimum support from th local population in order to survive, they purposely main tained a philosophy of localizing support only from the symp thizers without harassing those not sympathetic to their cause;

(8) through this approach, a certain degree of peace and or der had been kept by the NPA in the area;

(9) in this manner, the effects of the NPA on the proje would be working from within; (Community organization h been weakened and the whole process of community developme would suffer from the problem of community inaction and u derprduction).

(10) the net result of the project on the local farmers wou be underdevelopment; (This condition was purposely kept by t NPA since it would provide them utmost control on the local far ers. The NPA elements were acting on the basis of convenien for their own survival.)

(11) any development project in the uplands which wo strongly depend on community organization would have a ve slim chance of success in the upland areas where NPA eleme could be found.

It is therefore recommended that under this circumstan a development project has to be designed in such a way that can operate without community organization support. Cropp systems development can be one.

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INTER-GROUP RESOURCE USE PATTERNS IN TWO UPLAND COMMUNITIES IN NEGROS ORIENTAL

Rowe V. Cadeliña

Introduction

One of the inherent processes of populating the upland areas in the Philippines today is the continuing upward migration of lowlanders looking for farmland. Considering the limited capability of the highlanders to absorb additional people due to its marginal topographic and land characteristics, the process can easily bring economic tragedy to all people who attempt to make a living in this zone.

On the basis of the type of highland settlers in the 1920s, two types of communities can in turn be recognized in the Negros Oriental highlands. One such community is largely of the Malayan type. This comprised the lowland Christians who by necessity were forced to leave the crowded lowlands in search for land to cultivate. In the 1920s, they composed the pioneer population in these highland communities.

Some of these migrants, however, have small parcels of land in the plains which are too small for their families. Nonetheless, these lots were planted to permanent crops like coconut and bananas so they did not need constant cultivation by the owner. This gave them the time to migrate without necessarily neglecting their lowland farms.

The other type of communities comprises those whose (past and present) members are indigenous native upland populations like the Bukidnons or the Negritos. They are forced to stay in their present upland communities since they have no more forest land to retreat at the time when they were crowded out by the migrating lowland population.

In these highland communities, small clusters of Negrito villages exist virtually in the midst of a large number of lowlanc migrant Cebuano farmers.

This study investigates the patterns of resource use proc-ecess among social aggregates in two upland communities o Negros Oriental. It will explore the usual practices and behavio by which ethnic groups allocate to, and between themselves th resources available in these areas. In the process, implication toward upland development will be delineated.

The community typified by the upland migrants is repre-sented by the farm villages around the Lake Balinsasayao are The place is around 20-25 kilometers northwest of Dumague City whose center has the following coordinates: 123°10' ea longitude and 9°21' north longitude. It has an elevation betwee 600 to 1,500 meters above sea level. At present, only around 20 to 30% of its forest cover can be considered as primary fore and the rest, secondary.

The other highland community type is represented by t indigenous native Negrito population found in Barangay Can-guhub, Mabinay, Negros Oriental. This is around 70 kilomete north of Dumaguete City. Its center has the following coor nates: 122°70' east longitude and 9°39' north latitude. It is a proximately 300 to 500 meters above sea level. Unlike the La Balinsasayao area, Cangguhub has virtually no forest cover. T primary forests were cut down long time ago and they are n replaced with shrubby vegetation that can be cleared by t use of garden trowel.

Ethnic Groups In Two Communities

The Lake Balinsasayao and Cangguhub areas differ in composition of population groups that inhabit and utilize resources in the localities.

The Lake Balinsasayao Area

Occupants of the Lake Balinsasayao area are of Malayan type of population who were migrants from the lowland communities. They occupied the site as early as the 1920s. Oral reports by the oldest occupants indicated no other ethnic groups (like Bukidnon or Negrito) found in this site during the initial influx of the lowland migrants to the area.

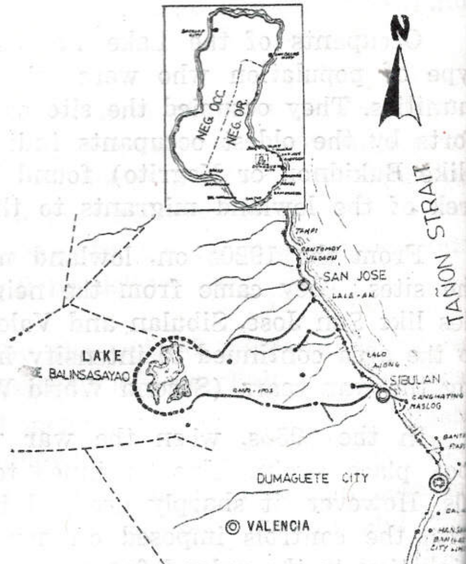
From the 1920s on, lowland migrants continued to occupy the sites. They came from the neighboring lowland municipalities like San Jose, Sibulan and Valencia (see Map 1). Movement to the area continued to intensify in the 1930s but declined during the war years (Second World War), for obvious reasons.

In the 1950s, when the war was over, migration upsurge took place again. This continued to rise in the 60s and in the 70s. However, it sharply declined in the 1980s (see Figure 1). With the controls imposed on new clearings in the highlands, migration to the upland for permanent settlement has stabilized. No upsurge of migrants had been noted since most of the upland areas ideal for cultivation had already been taken. In 1987, an increase in forest clearings was noted but these forest clearing activities were caused by absentee occupants who seek opportunities for land expansion only.

Thus, for distinction, the Lake Balinsasayao occupants can now be aptly called upland dwellers. They constitute one social aggregate controlling and utilizing the upland resources of Lake Balinsasayao.

Lake Balinsasayao, however, is not a closed community. The lowland dwellers freely move between their lowland habitat to the upland zone to utilize some of the agricultural products in the uplands. The lowland dwellers then constitute another social aggregate in the uplands.

They cannot be distinguished as ethnic groups, but rather as two distinct social aggrupations inhabiting two different spatial locations and utilizing the same resources in the upland. Hence, the distinction of upland and lowland dwellers is practical in the Lake Balinsasayao condition.



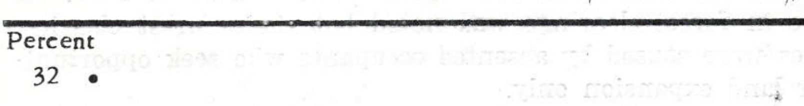


Figure 1

Trend of In-Migration Flow To Lake Balinsasayao Area

The Cangguhub Area

Unlike the Lake Balinsasayao area, Cangguhub provides a social setting where two distinct ethnic groups occupy the same community. These are the Negritos and the Cebuanos.

The Negritos are the earliest occupants of the area, whose traditional technology included hunting, collecting and fishing. They are known to be one of the aborigines of the country who first occupied the lowland portions of most parts of the country during the early times. When Negros Island was first reached by the Spaniards, the short dark skinned and kinky haired people were found living close to the mouths of the rivers along the coast. The Negritos of Cangguhub descended from this group who tried to maintain their foraging technology whenever opportunities allowed them to do so.

The Negritos in Cangguhub are the last stock of the first occupants of Negros Oriental. They have occupied an area which hopefully should have been controlled by them if they did not gradually lose their ethnic identity caused by intermarriage and cultural assimilation with another ethnic group, the Cebuanos.

The Cebuanos descended from the Malayan stock inhabiting the coastal towns of Negros Oriental and the southwestern coastal towns of the island of Cebu. The present group came to Cangguhub as settlers who had been displaced from their own localities by the extreme demographic pressure on land resources. As they move closer to the Negrito communities, they continue to maintain their technical skills in farming and lifestyle.

Physically, the two groups can easily be distinguished in the community. Culturally, there are tremendous overlaps of their cultural items and traits caused by intensive cultural borrowing.

Social Relations and Economic Transactions

Ethnicity has been largely defined on the basis of language and sociocultural differences. Over the years, as a result of genetic crossings through intermarriage and cultural borrowing, these criteria for ethnic group differentiation have proven themselves to be already irrelevant. Individuals who used to be differentiated as among from a distinct group now speak the languag and follow the lifestyle of another. In short, these groups n longer distinguish themselves as peculiar social units in thei own communities. They represent a continuum of social unit who share the same traits and characteristics.

Similar phenomenon seems to prevail between individual coming from the same ethnic groups but occupying different ec zones. Under this condition, the individuals coming from thes ecozones may differ in some few specific technologies but shar common sociocultural practices.

Hence, they form social aggregates or groups. As soci aggregates or groups, they do not exist in a social vacuum. The represent a continuous social unit undergoing various soci processes.

These processes take various forms: complementarity; co petition; accommodation and subordination. The concern of ea of these processes is to provide, under a protractive basis, t chances of each group to service.

Complementarity

When two or more groups are in contact, chances are th they may possess different technical skills and differentiat access to resources. Each group desires for a maximum option the use of resources and enjoyment as well as other opportu ties available. This can be achieved in a number of ways. O common social process taking place among the uplanders and t lowlanders in the Lake Balinsasayao area and the Negritos a the Cebuanos in Cangguhub is through complementarity.

Complementarity is a social process whereby conditions, sources and opportunities of different levels are made availa to individuals coming from different groups. The philosophy that resources, goods or technology that are not available to individual can be made accessible to him from other groups via one's own resources. This is possible since individuals may have different demands for resources that are in the hands of different social units.

One such demand for example is a *banca* (canoe) dug-out from logs usually provided by uplanders to the lowlanders. The Lake Balinsasayao farmers have the technology in making dug-out *banca* and they have access to a preferred tree species.

On the other hand, cash is a very scarce resource in the upland. While it is true that cash can be obtained from sale of their own farm products, this type of conversion is not always looked upon with favor. They need to have a constant supply of very essential staple food for their household. In the complementarity procedure, such contractor tries to get a better deal in terms of benefit returns. *Banca* construction skill is quite rare. Hence, the return from this job is generally higher than that of the sale of farm products. Given the option for obtaining cash, the former is preferred. The lowlanders who have the cash and the need for the banca would generally ask the uplanders to make it for them for various reasons. While it is true that the lowlanders may be able to construct their banca in the forest by themselves, a number of constraints would favor hiring as the more advantageous:

First, the lowlanders will spend more man-hour efforts in travelling from their residence to the site of construction. In the final analysis, the banca may cost higher.

Second, they are exposing themselves to more forest risks and hazards in an unfamiliar forest environment.

Third, they may run the risk of being exposed to the legal authorities since the lowlanders are intruding into a forest zone which the uplanders have the control.

On the other hand, among the Negritos and the Cebuanos, complementarity largely happens within the realm of farm management. In Cangguhub, the Negritos and the Cebuanos occupy the same land terrain. It is rolling characterized by small valleys with good soils and rolling hillsides largely covered with limestone rocks. In the catchment or valley areas, soils are excellent which can be plowed. On the rolling hillsides, plowing is an impossible medium for cultivation. Hence, human labor is imperative.

Under this context, complementarity has been pursued b the Negritos and the Cebuanos. The Cebuanos have an edge ove the Negritos in that the former have succeeded in keeping thei own draft animal. The Negritos until now do not own any wor animals. As a consequence, the Cebuanos have their work ani mals in addition to human labor which is not true among the Ne gritos.

The Negritos claim that farms prepared by plowing alway produce better than those prepared by human labor alone. Henc they always prefer to have their fields in catchment or valley plowed. The Cebuanos provide plowing services for some Negri to plots in exchange for Negrito labor in cultivating their hillsid farms which are hard to plow.

Since the Cebuanos have plots that cannot be plowed, the ask the Negritos to do the cultivation of these particular plot In time of farm preparation, the Cebuano household labor supp is usually insufficient, hence the need for the Negritos' help.

The complementing process in the provision of goods an services has a number of adaptive functions to the transacti social aggregates. The process allows the Balinsasayao uplande to obtain cash without selling their subsistence crops. On t other hand, the lowlanders get the goods they need at a low actual price with no risks.

For the Negritos, the system allows them to produce high yield by tapping the Cebuanos' plowing services. On the oth hand, the Cebuanos noted that cultivating their farms that cann be plowed becomes less difficult with the Negritos labor. T benefits received are equal. At the same time, the sociocultu and ecological fitness of both population groups improve.

Subordination

Subordination is a process by which a particular group serves the other with a lesser return. In short, there is a subordinate-superior relationship. Normally, the arrangement is voluntary since there is a pressing need for both ends to establish the relationship.

Under this setup, two types of resources are involved. One is the resource base of the potential subordinate (labor) and the other is that emanating from the potential superior (job opportunity). This is usually represented by single men and women working as household help.

During the months of food scarcity (usually taking place during summer or from February to May), upland households generally try to improve its food supply level by sending away working age individuals to work in the lowlands. The latter contribute to the household coffers regularly, through remittances.

The uplanders from the Lake Balinsasayao area seasonally send young girls in the labor force to the lowland, like in the coastal municipalities of Sibulan and San Jose, to serve as household help of the lowlanders. The lowlanders generally determine the monthly rate of the workers depending on their capability.

Similar process is happening among the Negritos. However, this is only true among the working age females. The females have developed an aggressive attitude toward working outside their communities as household help for the Cebuanos. The males generally work for wage labor in the farms of their neighboring Cebuano households only. This practice generally intensifies during the months of food scarcity.

The lowlanders and the Cebuanos in these two communities provide free board and lodging for the workers. During the harvest time, the workers go back to the upland communities and assist in the harvesting of their respective household's farm.

Since these people have already established their link with the Cebuanos and the lowlanders, looking for possible employers during the next cycle of famine is not much of a problem. Hence, this process becomes a cycle. This arrangement however, is now producing some problems for the employer as we will see later in this paper.

The system has a significant impact when it comes to ad justment. Through the process of subordination, the uplanders and the Negritos are able to reduce the demographic pressure o their respective household's food supply temporarily. During lea months, they obtain additional income to supplement the limite food resources in the households. However, since the deman for this job opportunity is greater on the side of the potenti subordinates, they do not have any say on the wage rate whic is controlled by the potential superior. In its totality, the arrange ment seems to bring more benefits to the superior rather tha to the subordinates.

However, the practice of working for a limited time durin the famine months and going back home during harvests ha created much difficulty to the employer in terms of continuo service from the household help. This, in fact, has now reduc the opportunities of the uplanders and the Negritos in obtaini the jobs during summer since the employers have already learn their lessons during the previous years.

Competition

Competition is a social process which eventually brings co plete exclusion of the unsuccessful competitor from the scene. a perfectly competitive system, this may happen. Otherwise, may only involve the restructuring of resource control so th a new population group may control one resource category wh another on the other category. In the real social world, consta process of reshuffling social roles takes place due to social co petition. Others are replaced while new forms of arrangem may emerge.

In the Lake Balinsasayao and the Cangguhub areas, com tition seems to be taking place in the control of the land. W it is true that both areas are considered to be forest reserves, a good number of people are trying their luck to own the ri to a piece of land in these areas.

mally, the mortgaged amount will be counted as part of the pay ment for the land. This arrangement usually happens when th land owner is expecting a big expense in the future. For instanc marriage of a son may lead to this arrangement. However, th owner expects that after marriage the son may be able to rais the money and can take back the land at a designated period.

The other is a mortgage system with a clause for an abs lute sale. Under this system, the mortgagor promises to pay th mortgagee back the amount on a designated period and in cas the owner fails to pay on schedule, the property is automatical considered as sold. This happens during extreme cases when t owner is badly in need of cash. For instance, a Negrito farm was forced to go into this arrangement when his son was accus of murder and he needed the money to hire a lawyer.

The competition for land ownership is basically taking pla under certain circumstances when the land owner is under e treme financial difficulty. Fitness here is basically gauged the ability of a person to produce the desired amount of mon at the right time. There is no coercion involved between the in rested person and the potential land vendor. The victor has o to wait patiently until the right time comes. In fact, the pers who has the money during this particular crisis will have the chances to get the land at a price and arrangement m favorable to him.

Since there is an apparent degree of mutual respect betw the uplanders and the lowlanders on the first hand, and betw the Negritos and the Cebuanos on the other, recent incidents orchestrated coercion on the part of the land speculators to fo the farmers to sell their property, rarely happen.

During the early times, the Cebuanos used to threaten Negritos to force the latter to sell their land to the former. present, with all the land already occupied, the Negritos can longer be threatened. They now seek legal protection from constituted authorities. Hence, competition has to be carried a most socially acceptable manner.

Accommodation

Accommodation is a friendly attempt between groups to allow each other to have access to the resources of the respective groups. Such mutual access can take the form of exchange where resources of different nature, qualities and quantities are involved. The exchange process could take various forms like generalized sharing, balanced reprocity and trading.

Accommodation tends to intensify between groups whose relationship is further reinforced by other forms of social ties such as friendship, affinity through ceremonies and other legitimizing processes. These links allow the free flow of information and goods across various social units.

Generalized Sharing: This is a form of exchange where reciprocation is not expected theoretically. It is largely a gesture of friendship between individuals coming from the same or different groups. Such form of sharing may involve portable goods or real property.

Among the lowlanders and the uplanders of Lake Balinsagan, sharing of land rights is a common practice between close friends or relatives. A lowlander who wants to utilize a temporary clearing in the upland is allowed by his friends to do so on the uplander's farm without any obligation to the latter. The arrangement is that the borrower uses it for a short time only after which it goes back to the owner. Otherwise, if it involves a longer period of time, a fixed sharing arrangement of products is followed.

Between the Cebuanos and the Negritos in the Cangguhub area, generalized sharing usually involves farm produce like corn or root crops. While this arrangement does not involve a return theoretically, there is actually an implicit moral obligation on the part of the recipient to extend similar gesture to his donor when the right time comes. The return does not have to come instantly, and does not have to be of the same kind and quantity.

However, each party tries to give an amount that will please th other so that a see-saw effect of the giving and taking will tak place alternatively, making the whole system a continuing proces

Such process of accommodation allows both population group to handle seasonal problems of food scarcity especially when th households involved come from two different domestic develo mental cycle stages. In the context of adjustments, househol with unfavorable demographic pressure on food supply may b assisted through generalized sharing by households with othe wise favorable food supply.

Balanced Reciprocity: It is an explicitly agreed form of a rangement where certain goods change hands from the "have to the "have-nots." Goods are rated according to quantity a quality. Reciprocation does not necessarily happen immediate In most cases, the reciprocation is delayed, in which case pena is imposed for the delay.

For instance, between the uplanders and the lowlanders the Lake Balinsasayao area, cash may be needed very badly by t uplander. A lowlander may provide cash advance to the form before the harvesting time on condition that the amount will paid with certain quantity of agricultural product. Normally, t computation for determining the repayments takes into accou the interest and risks of delay.

For instance, between the uplanders and the lowlanders the Lake Balinsasayao area, cash may be needed very badly the uplander. A lowlander may provide cash advance to the f mer before the harvesting time on condition that the amou will be paid with certain quantity of agriçultural product. N mally, the computation for determining the repayments ta into account the interest and risks of delay.

Among the Negritos and the Cebuanos in Cangguhub a goods in kind are generally involved. This usually happens du the months of food scarcity. Generally, the Cebuanos have al an edge over the Negritos in the availability of food resou during the months of scarcity. Hence, the Negritos gene depend on the former during lean months for their food supply. However, the Negritos usually pay the price. The Cebuanos may advance agricultural products like corn to the Negritos during off-harvest period, while the latter pays the former during the harvest time. Normally, the lending period lasts utmost three months. Three months after, a payment has to be made. Normally the repayment doubles the amount of what was borrowed during the lean months period.

The idea of balanced reciprocity is quite complex. It takes into account a number of factors when reciprocation is made. The length of time the goods will have to be reciprocated and the risks involved in possible failure of reciprocation are considered in fixing the amount to be paid in a balanced reciprocation. Hence, balanced reciprocity does not necessarily mean equal amount of goods or cash changing hands between transacting parties. It signifies balancing the risks and the opportunity costs between two different goods transferring hands during two different temporal points. Thus, balanced reciprocity does not necessarily signify quantitative equality of goods. It includes intrinsic cost not necessarily associated with the goods involved as with the transaction *per se*.

Trading: Trading represents a process where resources assumed to have equal value change hands, legitimized by the use of medium, usually money. Since different social aggregates may control different kinds of goods or products, these groups theoretically exchange goods through a series of conversion of goods in kind into cash and perhaps finally into other goods in kind. For instance, a Negrito brings a chicken for sale to a trading center in order to buy salt. He negotiates a sale, with a Cebuano. Once the deal is closed, the Negrito gets his cash and then uses it to purchase salt right at the same trading center.

This process of inter-ethnic accommodation, is characterized by the attempts of both contracting parties to derive profit from the goods involved. Sahlins (1965) has classicaly called this as "negative reciprocity." Negative reciprocity, however, is an extreme form of trading which is generally characterized by deceit and cleverness to outsmart each other. Despite such negative socia characteristic of trading, the element of social accommodation i still maintained.

Summary and Implications for Development

It is very apparent that the resource use patterns betwee social aggregates in the two upland communities of Negros Orien tal suggest certain degree of interdependence between groups i order to survive. While it is true that there are incidences c social and economic imbalances between transacting individual these imbalances have to take place due to the nature of the tran saction. For instance, in a balanced reciprocity, the recipient wi have to pay the cost of delayed payment and the risks for possib failure of payment.

There is only one process that appears to put the inferi cultural group at a distinct disadvantage. It is in the process c competition where the uplander or the Negritos are unwitting displaced from their land by the Cebuanos. This process of di placement, however, is no longer employed through the act c coercion or threat by the Cebuano lowlanders. The inferior ca condition of the Negrito and other uplanders compared to t Cebuano lowlanders is a subtle way by which land ownership w soon be shifted to the latter. It is a sad thing since land is the on source of living for these Negritos and other uplanders.

Development programs, therefore, in the upland should ta this particular process (like competition) seriously in order protect the interest of the people we wish to help in the uplan While land is the basic resource for the upland dweller's develo ment, it is precisely this resource vied for by a competing eth group. Since threat and coercion can no longer be used at p sent, the Cebuanos are taking undue advantage of the extre economic difficulty of the Negritos and other uplanders to has the misplacement process.

Upland development programs should take serious measu of protecting upland clientele from this difficulty. Modest lo program for handling such emergency needs should be provid

Legal prohibition from disposing land rights is not enough since people can easily get around this when an emergency need for cash is pressing. Hence, such legal restrictions should be provided with a realistic program of assistonce. The base for upland development is land. Upland development process, therefore, becomes meaningless when the potential clientele is gradually losing this resource through unfair competition.

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THE POLITICS OF SCARCE RESOURCES AMONG THE ATA AN EXPERIENCE DERIVED FROM THEIR FARMING SYSTEMS DEVELOPMENT PROJECT

Rowe V. Cadeliña

Introduction

The problem of scarce resources is universal (Bernardo 197 Borgstrom 1967; 1971; Green 1973; Little 1973). Among cou tries, the problem differs only by degrees. The greatest burde however, is felt by people from the Third World. This is aggr vated by the synergestic effect of the absence of appropriate tec nology and the limited and rather sensitive resources to inte sive human activities in this part of the world. Rapid populati growth further complicates the problem.

In Third World countries, like the Philippines, the level resource scarcity is felt in different degrees by peo who come from different regions, localities and social class Relatively speaking, those coming from the upper class who side in the economic and industrial centers of the country te to live in an artificial state of abundance in contrast to th who come from other sectors of the country.

In the Philippines, upland communities are largely fou to be the most advantaged locality on the basis of accessibil to facilities and resources that are essential to the reside existence. Since most upland communities are government serves, the occupants in these areas do not have legal tenure the land. Hence, they are considered squatters.

Since land for private ownership is not available, co quently, the people in the uplands are technically landless. C sidering the rugged terrain of the upland communities, lands these areas are extremely sensitive to human activities usu bringing a rapid deterioration of the ecological balance in area. As a result, agricultural production is below subsiste level, which threatens the existence of local upland population. Its economic welfare declined coupled with already depressed benefits derived from the facilities that are only available in the lowland such as health, education and other services provided by both private and government sectors.

The native tribal populations are the ones extremely affected by the conditions in the upland communities. The resources that are essential to their survival given their technological capability have largely disappeared brought about by the increasing human activity in their upland environment. This is the result of the increasing competition with the lowland migrants who are making farms in the uplands. The absence of cash among the natives prevents them from utilizing the services and goods that are monitized. Resource scarcity has therefore reached its absolute level among most tribal population in the uplands.

The scenario just described represents today's living conditions of the Ata. In the light of this context, the paper attempts to explore ways the Ata handle the problem of resource scarcity both on individual and social levels. The following questions are therefore investigated:

(1) Do the Ata face problem of interpersonal conflicts in the allocation and distribution of scarce resources?

(2) How does the loose sociopolitical system of the Ata operate in resolving conflicts of this nature?

(3) How is the problem of scarce resources met?

(4) Are there differences in conflict levels and in conflict resolution processes involving different consumable and capital resources?

(5) What are the individual and societal resources to the problem of resource scarcity?

The problem of resource scarcity among the Ata is generally constant, interrupted only by a very brief period of availability of food during harvest time. Hence, the Ata problem of resource scarcity is largely a constant issue.

THEORETICAL FRAMEWORK

Goods or services that are either difficult or impossible possess are considered as scarce resources. These resources c either be consumable or capital. Food is largely consumable wh land and tools are capital resources. The population may diff in how these resources are perceived. For instance, food m be valued for its immediate use and satisfaction; while la on the other hand, may be valued for its long term productivi Such perception differential of these types of resources co affect the way goods are valued and the kinds of responses peo generate when conflict of ownership, distribution or allocati of a particular type of scarce resource would take place.

Such conflict may be resolved on different levels. It may settled on an individual basis. Conflicting individuals over allocation of a particular resource may find compromises co take various forms depending on what has been agreed betwe two contracting parties. The essence behind this resolution the willingness of either party to give in some of one's dema in favor of one that is mutually acceptable. An element of sa fice is involved to give priority to eroding conflict between p sons and hence eventually re-established order.

However, when conflicting parties are not in a position find compromise, an intervention from a neutral party may required. Societal level of resolution will have to be establish The sociopolitical system will have to employ the processes conflict resolution established by tradition. Whether the soc political system is loosely or rigidly structured, the process quires the mobilization of personnel and the imposition of r to adjudicate the conflict. Compromises may be arrived at these are normally established after imposing the strength the law either created by tradition or by constitutionally proved legislative procedure.

Competition over use of scarce resources increases w there is greater unpredictability in the societal environment (chim 1981: 212; Weins 1977). This generally happens in a c munity consisting of multi-ethnic population or in a group is characterized by subgroupings having inconsistent concerns and persuasions. Individuals in a community who belong to two different subgroupings tend to compete in the use of resources. Since their societal loyalties are not parallel, conflict interests develop. When confict of interest is brought to a societal level, more social cleavages and alliances are formed. This will incubate more competition within the community while it increases stronger ties and loyalties within one subgroup of the community. Hence, there is a strong positive relationship between intra-subgroup "we-feeling" and inter-subgroup "they-feeling." As the intra-subgroup "we-feeling" increases, inter-subgroup "they-feeling" concommitantly increases. This serves as the basis for more inter-subgroup conflict and competition over the use of resources within the community.

Hence, conflict and competition over the use of scarce resources may happen on two kinds of individuals in the community. First, it may happen between individuals who belong to the same group. Second, it may happen between individuals who come from two different subgroups. In the first, the potential for coming up with inter-personal compromise is great while in the second it is very slim or none at all. Therefore, resolution will have to be established on two levels. For the first, the individual level will be sufficient; for the second, the societal level is necessary.

Scarcity of resources is a crisis condition which requires responses from the population (Lee 1968). As a stimulus, behavioral responses to it are generated. Such responses may be carried on either individual or group basis.

Theoretically, eight possible behavioral resources may be identified. These are the following—employment of compensatory measures, exchange and trade, territorial invasion, population control, generalized sharing, technological shifts and development, reduction of consumption behavior, and mortgage of resources.

Resources that are limited or absent may be compensated by another form which can generate products similar to those produced by the resource being replaced, for instance, farmers who have insufficient lands may compensate for the lac of land by optimally tapping available household labor in th productive activities. Extra household labor may be traded in th market for wages from which food resources are drawn. In the a sence of staple crops, other goods which have similar value with th former are consumed. For instance, root crops are generally ta en as major source of carbohydrates in the absence of stap food, like rice and corn. In the face of increasing cost of tex tiles, the natives may go back to their tradition of using ba cloth if bark sources are still available. Man has been doing a l of compensatory practices in the face of increasing resour scarcity.

Assuming that an individual still possesses some select but limited resources, those he possessed but are not needed m be traded for goods he needs which he does not however, produ This may involve individuals coming from different or simil localities or groups. Individuals coming from two different eth orientations may establish such kind of transaction. Goods w assumed equivalent values may be exchanged or traded (Sahli 1965). Of course, this may involve cash as a counterpart for a ther goods in-kind.

Both capital and consumable resources may be traded in t manner. Land may be traded for cash or tools may be exchan with food resources. Costing of resources are generally det mined by existing local practices. The process is generally le timized and cemented by accepted tradition of the population volved.

In places characterized by multi-ethnic groups and wh locality is rigidly defined by territorial boundaries and cont the scarcity of resources in a particular territory usually lead an organized collective dispersal of military force to a territ perceived to have abundant supply of resources. Territorial vasion through warfare may be employed (Chagnon 1977; Ch non and Hames 1979). Such practice, in fact, could be embed in the people's culture. Hence, religion and their world view support such practice. Expertise in combat and stealth at to assure one's victory is a trait that may be highly valued.

may be expressed in rituals and magic designed to develop those expertise among the warriors. To keep the demographic structure of the population advantageous for warfare, the male children may be preferred over those female ones. Hence, female infanticide may be practiced.

Access and control over limited resources are therefore, achieved by overthrowing legitimate owners. The use of violence as a means of diminishing the negative effect of scarce resource in the economic system of the population is justified by tradition. Hence, it may become one of the ways of living of a population group.

There seems to be a universal understanding of the relationship between human population and the availability of resources. In the face of limited resource, the size of the human population is a factor that has been seriously reckoned by various population groups even those among what has been generally called as "primitive" population. Literature suggests (Dumond 1975) that population groups may employ either preventive or collective measures to bring a balance between people and resources.

Population groups may recognize the impending imbalance between resources and people. As such, the impending imbalance may be aborted by implementing what we might call as preventive measures. These are practices that try to deestablish a condition where the population exceeds the supply of resources. This we may call as population control. Birth control, infanticide, abortion and gerontocide may constitute as some of the forms of population check. In birth control, fertilization of the egg is prevented by practices that are intentionally or unintentionally induced. The use of contraceptives such as herbal medicines is intentional while postpartum sexual taboos are non-intentional. The latter is generally defined by the moral tradition of the people but it has a population control effect. The problem of malnutrition among the people is not intentional but it has a limiting effect on procreation since it may suppress ovulation (Frisch 1980). Prolonged lactation as a tradition, may also bring physiological depression of fertility (Bomgaarts 1980).

Infanticide and gerontocide are considered crimes under o modern laws. But, according to the tradition of some people, i fanticide and gerontocide have been practiced in the face impending economic difficulty (Turnbull 1972). Since the s ciety has still low socioeconomic investment on the infants w are non-productive and the society can no longer draw econom benefits from the old, both the infants and the old are consider socioeconomic liabilities. Hence, some primitive societies murd them in the face of impending scarcity of resources.

Abortion, through the use of massage and herbal plan has been also reported. This is done to prevent the fetus fr reaching its full term birth. Motivations of such practice ha been reported to be varied such as health of mothers or impen ing economic difficulties.

However, in conditions where scarcity of resources has ready taken place, corrective measures on population size m be implemented. This is generally done through the redistributi of people. By migration, people are redistributed. The migrati stream will usually start from places of high level of scarc to places of low scarcity. In this way, demographic pressure scarce resources can be relaxed, thus increasing its availability the local population.

Due to the seasonality of resources, seasonal migration m be implemented and in places where seasonal migration has be already patterned, cyclical migration may take place. In the lat case of migration, the population moves from one place to next until they have completed one annual cycle culminating their return to their own place of origin (Prothero and Ch man 1984).

When the problem of scarcity of resources takes place i given community, its household population may experience va ing degrees of difficulties caused by the household's dome developmental cycle stage. Due to their varying demogra constraints and opportunities some households will be in a atively better economic condition compared to others (Cade 1985). Some may be considered as "haves" while some ot "have nots." Especially between those who are related by consanguinity or affinity, generalized sharing may take place among the "haves" and the "have nots." Such kind of sharing tends to limit its focus to assure survival among those who are intimately related by blood or ceremony. This type of preference has a strong adaptive biological implication.

Due to the high social focussing effect of the process of generalized sharing, the behavior takes place within a particular ethnic group. However, in cases of inter-ethnic marriages, generalized sharing may also cross ethnic boundaries. Such ethnic boundary crossing is legitimized by the marriage ritual.

In other cases, extreme scarcity of resources may convert a social system into a complete anti-social one. Generalized sharing is stopped and a highly individualized system develops. There is a breakdown in fact, of the family as a basic social unit (Turnbull 1972; 1978). Infanticide and geronticide may be encouraged — the family as a social unit, is breaking apart because of extreme economic deprivation. Individualism breaks the procreative function and familial support of the domestic unit.

Technological shift or development is one of the achievements of man designed to improve the efficiency of resource use. In the process, man has increased his level of production to meet his increasing needs. On the other hand, technological shift or development assists man when conditions of resource scarcity take place. It allows man to exploit other available resources in the face of disappearing traditional ones. The disappearance of the forest and its component resources led forest dwellers such as the Negritos to domesticate crops and animals. Since their traditional hunting, collecting and fishing technologies are no longer economically practical under the context of disappearing forest, agricultural and animal husbandry have been recently adopted.

Technological development may involve fine tuning and perfection of techniques to increase its appropriateness under a condition of scarce resources. Such response enables the local population to improve their chances of getting the desired output from a given resource such as a piece of land. While land may be available, its capacity to support plant life could be a very scarce re source. This happens in a highly infertile or sub-fertile soil. B its very nature, soil fertility becomes a very scarce resource. Und this condition, various refinements in the agricultural techniqu may be introduced such as soil conservation and improvement.

When consumable resources get scarce, the logical behavior response is to limit consumption. Through the process of limiti consumption, the availability of a limited resource can be stretch to a certain extent both in time and the number of people serve For instance, food resources may be conserved for a longer peri of time if the level of consumption is reduced. Clothing materi can be saved to clothe a larger number of people by allowing on a minimum covering for every individual.

Different groups of people have done in one way or anoth various ways of limiting consumption to handle the problem resource scarcity. However, the act of limiting consumption m have a negative effect on the practitioner if it is practiced too f For instance, when food consumption is reduced too much, t may lead to an irreversible negative effect on one's health. Su response, therefore, cannot be implemented on an unlimited ba

Assuming that the problem of resource scarcity is not to some members of a community may, therefore, still possess so resources, although may be limited. In the face of extreme n for other resource, an available existing limited resource may mortgaged to individuals coming from similar or other eth groups. Such arrangement could lead to eventual loss of the mo gagor's resource to the mortgagee. Such response only provide temporary state of handling the problem of resource scarcity si it requires a re-investment on the part of the mortgagor in or to get back the resource from the mortgagee. Otherwise, the mo gagor lose his limited resource contributing further to scar of resources.

The argument that we have just claimed, proposes that in context of resource scarcity, the human population will hav respond to the problem of limited resources. Such response tential is varied. However, in the process of adjusting one's havior to the problem, conflict of individual and societal inte may take place. This conflict stems from the inter-individual or inter-group competition over the use of scarce resource. To re-establish order in the society, such conflict will have to be resolved. This package of human adaptation constitutes the people's politics in adjusting to the problem of scarce resource. The attempts at maintaining one's control and access over a scarce resource represent a process of power play and individual struggle for survival.

THE ATA: THEIR PRESENT SOCIOECONOMIC CONDITIONS

The Ata are presently agriculturalists trying to eke out a living from a completely deforested land site. Hunting and collecting are only occasionally practiced at present largely as a diversionary activity from their boring and unproductive farming pursuits. Since hunting and collecting involve too much energy and for travel to reach distant patches of forest, these activities have only served as supplements to the products they derived from their farms.

A farm is generally cultivated by an Ata twice a year. During major cropping season, he plants about one kilo to ten kilos of corn seeds. Major cropping takes place between the months of June to September. After harvest, the farm is cleared again for the second cropping in the months between September to December. In the second cropping, farms tend to be smaller compared to that of the first. In some agricultural years when rains are still available in December, a third cropping may be introduced. However, third cropping is a very rare practice. During the cropping periods, corn is monotonously planted. Very limited amount crop, like camote (sweet potatoes) and cassava are planted. More so with vegetables.

Farms are cleared with the use of garden trowel to uproot the grasses and shrubs. In some cases, valleys are cultivated with the use of plow drawn by an ox or a carabao. Since farms are not given enough time to rest, soil fertility has gone down. Soil erosion has intensified as the human activities on the hillsides increased. Hence, productive soil is a very scarce resource in the Ata community.

The farms of the 18 Ata families in Cangguhub, Mabina
Negros Oriental (around 87 kilometers northwest of Dumague
City), are characterized by rugged terrain accentuated by sm
valleys where soils are good and safe by erosion. In most instanc
however, a farm is situated on sloping grounds where only ve
thin top soil has remained. Through the use of rockwalls and bi
mass production along rockwalls, attempts are now made to re
tore the soil condition and improve soil fertility. Appropriate cro
ping systems are tried towards improving productivity level
the farms.

The Ata do not have any chance at all to expand their la
possession. At present, the Ata families are confined within a 2
hectare plot which has been reserved for them through the inte
vention of Silliman University in a forest reserved area of t
government. Considering the cultural community status of t
Ata, the Bureau of Forest Development recognized the Ata occ
pation in the area as legitimate.

Given the land area available to the Ata and the size of t
Ata population, the 18 families have only slightly over one hect
each to cultivate. Land is now a very scarce resource for the A
With the low fertility of the soil, farm production is usually bel
subsistence level. This has further created the problem of sca
resource among the Ata.

In order to augment the farm income, the Ata have resor
to sell their labor for wages either in cash or in kind. Especi
during the post harvest period, wage labor is a daily activity
the Ata designed to tap the stored food of their lowland-migr
Cebuano neighbors. An Ata generally develops a special kind
relationship with a Cebuano for preferential labor-use by the
buano. This process secures the labor market for a particular A

By tradition, the Ata do not have a rigid, highly structu
sociopolitical system. Its leadership system traditionally consis
of council of elders whose members have a special power of he
ing. At present, these kinds of people are no longer found in
community, hence their socio-political system is getting more lo
ly structured. With the increasing absorption of the Ata se

ment into the greater local barangay government, the Ata socio-political system has become a social fact whose functions are only minimally understood by its present members. Its leadership is now transferred to younger individual members whose qualifications are no longer based on their traditional healing capability but on traits such as aggressiveness, luquaciousness, and cosmopolitanism. This group of elders try to resolve interpersonal conflicts and assures order within the population.

The social sphere of the Ata has expanded at present as a result of intermarriage between the Cebuanos and the Ata. Such inter-ethnic social link has increased the Ata control on the use of resources not available within the Ata community. By crossing ethnic boundaries some of the Ata have succeeded in widening their economic environment from where scarce resources can be drawn.

DATA AND DISCUSSION OF FINDINGS

Although the 18 Ata families in Cangguhub belong to one ethnic group, they do not come from the same village unit. Two village units can be identified. One village unit consists of six families whose individual members were original settlers in the area of 21 hectares. They claimed that they were all born in Cangguhub.

The other village unit has 12 families, composed of individuals who moved into Cangguhub when the 21-hectare piece of land was opened for Negrito resettlement. The migrants generally came from similar neighboring community around 10 to 15 kilometers northwest of Cangguhub. Such group identification has remained to be loosely identified during normal condition and intensified when inter-personal conflict takes place between individuals coming from these two subgroups.

Conflict Resolution

One common problem in the Ata area involves stealing of domestic animals like chicken and farm crops such as corn and root crops. When an Ata from one group has his crop or livestock stolen, the accused is usually the Ata from another group. The Ceb anos are never accused by the Ata. Such accusation will alwa lead to a joint effort between each group to make and deny accus tion. Threats are made like murder accompanied by brandishi weapons in public by the accused group against the accusing grou While it is true that stealing could have been done by one perso the accusation is generally hurled towards a collective unit. Sin it is difficult to identify the individual culprit, the whole gro is accused. This is based on the group's assumption that my o group will protect my own property. Hence, the victims ne accuse one from his own group. It should be one coming fr another group.

Once the steam of anger between groups has already di nished, order seems to be re-established. Each group leader tr to pacify its own group members usually resulting into a co promise of inaction. The ax is buried and forgotten. Usually, the is recalled only when similar incident will happen in the futu and a similar process will take place again.

Since members of each subgroup are generally linked by cl affinal and consanguinal ties, the "we-feeling" with each subgro is very strong and in fact, gets stronger when such "we-feeling" threatened. Hence, individual conflict within a sub-group is allowed to flourish, unlike between individuals coming from different subgroup identity.

This may be substantiated by an incident. The last Ata c who died in 1971 had seven children. The third daughter got m ried to a mestizo Ata in 1969. The chief used to own a piece land which he got back from a Cebuano land grabber through intervention of the extension workers of Silliman Universit 1969. When the chief died, his widow decided to sell land for ₱2,000 to one of her married children. The third daug married to a mestizo Ata, was the only interested party and willing to raise the amount. The arrangement was verbal and th was nothing that was signed by both parties to document the tr saction. Negotiation like this in the Ata tradition is only cov by verbal agreements approved by their traditional legal sys It is a binding gentleman's agreement.

In 1986, one of the brothers murdered a Cebuano. He was arrested and sentenced from eight to 14 years in Muntinglupa after two years of imprisonment in Dumaguete City. While his case was still under investigation, his lawyer needed money. His mother had to raise the amount. Since his mother had difficulty in raising the fund, he finally asked his sister together with her mestizo Ata husband to raise ₱2,000 for the land the couple had already bought in 1971. The murderer claimed that there was no document to support their transaction. Such act is an attempt to undermine their tradition by trying to invoke the present legal system of the government. Also, threats were made against his own sister and brother-in-law.

After a period of deliberation, the couple decided to give in to avoid trouble. "We do not want to break up the family," the couple claimed. Further, they justified the request by recognizing the difficulty the murderer was undergoing.

The conflict was resolved within the family without involving other members in the village. There is an apparent strong desire between individuals of this kind to hasten resolution to maintain order within the extended family.

Another case involved conflict over farm boundaries between two Ata farmers coming from two different subgroups. One was accused by another for tresspassing his farm boundary. While one was accusing, the other was denying. It almost led into a fight using bladed weapons (bolo). Through the intervention of another Ata, the fight was stopped. The individuals concerned were not in the position to resolve their own conflict personally.

The two cases of conflicts cited earlier involved scarce natural resources. The only difference between the two cases are the actors of the incidents. In the first, we have individuals who are related by blood and affinity and belong to the same subgroup. In the other, we have two unrelated individuals coming from two different groups. In the first, there was no tremendous display of anger. Instead there was an apparent strong indication of their desire to resolve between them the conflict amicably. In the second case, there was a tremendous outburst of anger that can only be resolved by a third party. The cases suggest that t basic factor which determines how one can demonstrate his ang over a conflicting issue and how such conflict can be resolved the identity of the persons involved. Basing on these in dents, we can hypothesize that conflicting individu (over scarce capital resources) who come from two differe subgroup identities tend to express conflict with outburst of ang which can only be resolved by the intervention of a third par Otherwise, in cases that involved persons who come from simi subgroup identity, conflict is controlled without expressing ang and with a strong desire of persons involved to resolve conflict the level of the conflicting individuals only.

When an Ata is accused of stealing by a Cebua another system of politics is demonstrated by the Ata. Two ge ral patterns of responses can be discerned. First, all Ata, rega less of their subgroup identity would close rank and provid solid front against the Cebuano. They would easily organize a arm themselves with sharp weapons to engage in an armed c flict with the Cebuano. This, however, has never led into an o fight since nobody between the Cebuano and the Ata would the first salvo. Second, most of the Ata regardless of subgr identity would close rank and provide solid front against Cebuano while few Ata (regardless of subgroup identity a would align with the Cebuano because of a close and special s economic link with the Cebuano. Normally, the latter kind of would simply keep quiet in the midst of anger and fury expre by others. The special socioeconomic link between the few and a Cebuano provides the former access to the resources o by the latter. For this privilege, the few Ata have to keep q and show no support for the rest of the angered Ata.

Within the Ata context, this conflict is left to itself wit resolution. The expressed anger is only left to dissipate by i until the enthusiasm to fight out with the Cebuano dies d At this point, such conflict is forgotten until another similar cident takes place.

When opportunities, like assistance acivities are provided to the Ata, these are usually channelled through the local leadership system. Experiences show that the leader will always see to it that all members of his own subgroup have been taken cared of first. Then, this is followed by those who come from another group. In fact, among those who come from another subgroup, they seemed to be graded by the leader according to his degree of closeness to the other individuals. Those with closest social relation with the leader usually get priority in attention and those otherwise usually get the last attention. Such process of allocating scarce opportunities has never been protested by the affected subgroup. It appears that there is an agreement among members concerning this arrangement. By virtue of the role of a leader, he has the prerogative to choose his own system of resource distribution. In like manner, the leader does not have such control over his own people under such a loosely structured sociopolitical system. It is through this manner of governance that the Ata enjoy a sense of freedom under all the changes they have to face today.

The household is the smallest social unit of the Ata for production and consumption. Possible consumers of the household products are graded according to the degree of biological or social closeness, regardless of subgroup or even ethnic identity. Because of inter-ethnic marriages now taking place among the Ata, biological or social closeness may cross ethnic boundaries. The definition of possible consumer of a household product gradually tapers off to those who have no biological or social closeness to EGO (meaning the speaker or spokesman of the household). Between these politics of resource distribution, EGO will have a better chance of survival if he has established a wider and closer network within and outside the community. In fact, such concerns have already been expressed by some Ata when they aligned with other ethnic group even when their own members were socially attacked by another ethnic unit as we saw earlier.

Considering the low fertility rates of couples (Cadeliña [illegible]: 111-115), an Ata household is on the average, distinctively smaller compared to their Cebuano neighbor (similar counterpart. Hence, during peak seasons in one agricultural cycle, the Ata lacks the necessary labor force to do the work on time.

This is usually compensated by pooled labor. A number of A may agree to work on each other's farm in sequence. The polit of selecting participating members requires that all members closely related to EGO preferably by consanguinity or affini Thus, pooled labor group generally consists of parents marri children, and sons or daughters-in-law. They claimed that un such composition, the working group is easily managed by E This arrangement appears to be a preventive measure towa conflict development. Prevention is a cheaper system of managi conflict than correction when conflict has already taken pla Similar principle seems to be employed when EGO harvests farm products. Participating harvesters are generally scree and the basis employed for screening is similar to those used pooling labor. It is a focused form of altruism designed to incre the genetic survival chances of one's gene pool. As a behavio form of adjustment, it apparently has two social and biologi implications. First, it allows the household to manage competit and conflict economically. Second, it improves the survival chan of one's genetic resource. The second which has an evolutionis implication requires further testing in the future.

The data reveal that the Ata handle the problem of conf and competition on two levels. First, preventive measures are plemented. This is practiced on conditions where EGO has opportunity to make his own choice for his transactors. W perceived competition and conflict of interest anticipated to t place under a condition of scarce resource, EGO may decide select his own transactors who have the least potential for de oping conflict and competition with EGO. In this case, EGO ticipates the conflict and employs means to abort the developm of an anticipated problem.

Second, when conflict and competition have been already curred, a resolution has to be implemented. Between persons have social or biological links and are having similar subgr identity, both or either persons work willingly to arrive at a cer compromise between themselves. For persons who are not in way related and come from different subgroup identity, a t neutral party has to intervene to resolve the issue. This involve the use of local traditional system.

When the conflict is between Ata and another ethnic group, the problem is simply solved by allowing each other's anger to die out. In due time, such conflict is forgotten. Under this circumstance, few Ata may maintain alliance or alignment with the other ethnic group for personal interest.

Processes of Handling The Problem of Resource Scarcity

On the basis of our field data, the following have been implemented by the Ata in handling their problem of scarcity of resources: compensatory measures; exchange and trade; population control; generalized sharing; technological shifts and development; redirection of consumption; and morgage of resources.

Compensatory Measures: The land available to the Ata is limited. At present, 18 families occupy a 21-hectare piece of land. This land is surrounded by lowland Cebuano occupants. Hence. the Ata have no leg room for expansion. Each Ata family has to make a living out of a slightly over one hectare farm. As an Ata family matures, new labor in the household may be added. The need for more land is pressing but due to the absence of available lands such urgent demand is unattainable.

The inadequacy of land supply against surplus labor is met by utilizing the latter in other productive activities such as wage labor. To prevent immediate involution of land use caused by overconcentration of surplus household labor in a small piece of land, this manpower is designed to other farms for wage work. This, of course, will contribute to further scarcity of resources since return from wage labor is usually far below compared to what is usually derived from one's farm.

For consumable resources, compensation is done by substitution. In the absence of commercial textile materials, the Ata may use bark cloth. In the absence of cereals like corn, the Ata may purely subsist on root crops. While corn is considered by the Ata as their staple food, its low production does not allow an sufficient supply. They have to subsist on root crops during most months of the year.

In the absence of protein supply from domestic animals a commercial goods, the Ata have utilized animals found in th limited tertiary forest cover. These are wild cats and monke Also, lizards and birds. These are hunted during occasio collective hunting activity.

Exchange and Trade: The Ata no longer confine econo activities in their own locality. They now have to take go coming from the outside. Such necessity has to be met thro economic transaction with the outside world using moneta currency.

Through trade, the Ata derive cash from their prod from local middlemen. Such transaction is generally character by deliberate attempts on the part of the middlemen to un price the goods sold by the Ata and to overprice the goods s by the middlemen. This practice has further increased the s city of resources among the Ata. Because of their innoce they are exploited.

Through networking, some of the Ata have succeeded having fair dealings with the middlemen. Until this time, h ever, this is still an exception rather than the role. Through network, an Ata may have his own products exchanged with a ther having approximately equal value. Root crops may be changed with salt, soap, salted fish, kerosene and many more

Exchange or trade among the Ata takes place only betw two different ethnic groups. Since the Ata generally have similar category or nature of products, inter-Ata exchang trade cannot happen. The Ata have to seek other ethnic gr whose resources are different from what the former has. has been exchanged, however, should not be considered as sur product. Production is still on a subsistence level. Through change and trade, the Ata are able to bring products into own locality which they do not produce locally. Since the pr works on the basis of replacement and not by addition, exch or trade, therefore, has no role in increasing absolute produ of the Ata.

Population Control: To establish the link between population and scarcity of resources among the Ata is difficult. Likewise, to assume that the Ata are deliberately controlling their population in order to yield their present fertility level is impossible. In short, we cannot make absolute statement at this point that the Ata are deliberately keeping their present population size to enable them to handle their problem of resource scarcity.

At best we can make inferences from the present fertility rate of the Ata in relation to their attempts at handling the problem of scarce resources. We can therefore hypothesize that by keeping their fertility down, the problem of scarce resource must have affected their food supply so that their nutrition is heavily affected bringing sub-fecundity to mothers.

In an earlier study (Cadeliña 1983:112-113), it was concluded that the pure Ata couples have rather low marital fertility ratio compared to mixed marriages. Such findings are still true at present. It was noted that for every 100 mothers aged 15-49, only [illegible] babies are born compared to 750 among mixed Ata couples. Such depressed fertility of the pure Ata couples is only open for speculations.

First, it is possible that the Ata are facing the problem of tremendous scarcity of recources so that attempts at controlling birth are deliberately followed such as postpartum sexual taboos, prolonged lactation and traditional contraception.

Second, the problem of food scarcity among the Ata might have severely affected their reproductive capability so that a good number of the Ata mothers become infertile. This is not intentional but its implication on resource scarcity problem is still the same as if controls were intentionally made.

Dispersion of the population through migration has not yet been documented among the Ata. The problem of deterioration and lack of available land sites somewhere else prevented them from expanding elsewhere. Hence, they have to keep their present residence. Under this condition, the only option they have is fertility control.

Generalized Sharing: Giving for the sake of altruistic c cern is still being observed among the Ata. It is a process of sh ing goods and resources without any expectation for a return is given like a gift (Sahlins 1965).

Generalized sharing usually involves food which are ei processed or unprocessed. A consumable good is usually gi to another person as an expression of good will. It may also given as a recognition of another person's economic diffic which would therefore not require any reciprocation. Relat who have sickly members and cannot work for an indefi number of days are usually the objects of such kindness. The disperses the resource from the "have" to the "have-not" ho holds.

This process of moving scarce resource from one house to another is highly diffused. It is only confined between clo related individuals. Hence, we expect this process to happen mo within the Ata population or within a subgroup of the Ata cases where inter-ethnic marriages have taken place, this form sharing consumable resources crosses ethnic boundary lines.

Diffused sharing of scarce resources has important adap and evolutionistic implications. Adaptively, it provides effe management of scarce resources since within this level of re individuals, there is an intensified form of generalized shar Hence, interhousehold flow of food resources is high, impro one's chance of becoming a giver and a receiver under transaction. There is a good possibility that the act of gi can be approximately compensated for by what one will re in the whole cycle of giving and receiving. There may be no but in time of difficulty, one is able to survive through Households that are most of the time in deficit can be helpe households under a relatively more advantageous economic tion until such time that the former improves its economic st This is expected since a household is a dynamic social unit changes its constraints and opportunities over time (Cad 1983).

The chances for survival of the genetic pool of the transacting individuals under generalized sharing will be higher compared to other non-transacting individuals. However, since every household has its own unit of extended families, various subunits of households establishing generalized sharing are formed.

Technological Shifts: The disappearance of the forest and its accompanying minor resources has forced the Ata to partially abandon hunting and collecting. What has been abandoned is replaced by farming. At present, around 99 percent of their household product has been drawn from farming and wage labor and the rest from occasional hunting and gathering. Lizards and wild cats are hunted at present, while honey is also occasionally gathered.

Before, the Ata employed slash-and-burn agriculture. This was characterized by regular shifting of sites allowing the fields to rest. At present, the Ata have gone into intensive garden annual agriculture without fallowing. Every year, a farm is cultivated, at least once a year, and planted with crops like corn and root crops as we saw earlier.

As a response to intensive soil erosion, the Ata have now improved their agricultural practices through the assistanc of Silliman University Research Action Development Program In The Uplands. Such improvement consists of the introduction of proper soil management and appropriate cropping system. Soil erosion control measures are now put up on their farms designed to reserve soil, control soil erosion and improve soil fertility. As part of the improvement of cropping systems, fruit trees, fuelwood and timber trees are now introduced in their farms to improve farm production and ecological balance in the area. Mixed cropping is now encouraged between corn and leguminous crops such as mung beans, soy beans, peanut and others.

These are fine developments taking place in the Ata agricultural system. These changes are designed to cope with the problem of increasing scarcity of soil and soil fertility. As we noted earlier, while the Ata are facing the problem of scarcity of land to till, they are also facing the problem of scarcity of fertile soil on the lands they own at present.

Reduction of Consumption: The Ata have seen the connec between the availablilty of consumable resources and their consumption pattern. By restricting consumption, the Ata h handled their problem of food scarcity. Normally, the Ata three meals a day. During harvest season, the Ata (both ch dren and adults) are observed to take three meals, at least, in day. In some cases, snacks between meals are even served.

During post harvest period, when harvested crops are alre consumed, the Ata are observed reducing the number of m they eat. Likewise, the children are observed to have reduced However, the Ata give food preference to the younger child During lean months, adults are observed to have taken only meal while the children may have, once in a while, two meals. N ertheless, single meal becomes the rule during lean months both children and adults. While the number of meals one day has been reduced, the quantity of food served in a n is also diminished. This of course, as we mentioned earlier, have an irreversible negative effect on their health. Impressio tic observation on the Ata physique shows more bodily fat ac mulation during harvest season and a reduction of this du lean months. They tend to be lethargic during post harvest sea when food intake is limited. Thus, most bodily activities have b affected by food consumption reduction.

Mortgage of Resources: Emergency needs for cash have to mortgages of the Ata limited capital resource even land clearing. For instance, the procurement of plan seed materials is their usual annual problem. Due to the abs of cash to purchase costly seeds during planting season, mortgage part of their land clearing for one cropping to o ethnic group like the Cebuano. After the cropping, the land cl ing goes back to the Ata. Generally, mortgages are made in su way that the Ata do not have to pay at maturity. It is a measure against the possibility of foreclosure.

SUMMARY

Competition over the use of limited resources, usually l to inter-Ata conflict. This may involve capital and consum resources. Conflict over these limited resources are resolved e on an interpersonal level or via the traditional loose community leadership structure. Conflict between individuals who are related either by consanguinity or affinity is generally resolved on an interpersonal level. On the other hand, conflict between unrelated individuals coming from two different subgroups usually requires the intervention of a neutral third party usually represented by the loose sociopolitical system of the Ata.

Cebuano-Ata conflict is generally left unresolved until such problem is remembered. This is usually forgotten when similar incidents take place. While conflicts of this nature may lead into overt expression of anger on the part of the Ata, this normally does not lead into an open fight since neither of the Ata nor the Cebuano would start the physical confrontation. It is simply a public demonstration of ill-feeling which only dies down later.

Generalized sharing of resources is largely handled by diffusing the transaction to limited households whose members are related either by consanguinity or affinity. It is a preventive form of measure against possible development of conflict in the time of scarce resources.

In handling their problem concerning scarcity of resources, the Ata have implemented seven measures: (1) compensatory measures; (2) exchange and trade; (3) population control; (4) generalized sharing; (5) technological shifts and development; (6) reduction of consumption; and (7) mortgage of resources.

For extension implication, the distribution of resources or opportunities should not be directily channelled through the local leadership system of the Ata. Since subgroup identity is very strong, most likely local leaders would favorably extend all benefits to his own subgroup. Hence, assistance program should directly handle (only with the assistance of local leadership) in channeling benefits to the Ata. The reverse, which is ideal, should not be followed for this particular native population.

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COMMUNITY ORGANIZING IN THE UPLANDS: THE LAKE BALINSASAYAO

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Introduction

In 1983, a community survey was conducted among the farming population living in the watershed area of Lake Balinsasayao.

The survey was an exploratory activity designed to determine problems the farmers were facing and to plot out the possibilities for developmental efforts that may help improve the living conditions of the farmers. The survey had a team of researchers who came from various disciplines. Areas on health, farming practices and productivity, forest condition, beliefs and practices, biophysical condition of the area and local political systems were explored. The survey evolved into a design for developing the upland community of Lake Balinsasayao using "community development" model. The model envisioned an integrated development process where farming systems and health development could be used as entry points. With this approach, three goals were outlined.

First, the development of the farms in Lake Balinsasayao will bring an overall increase in household farm productivity level. By introducing proper soil management system and appropriate cropping practices, efficiency in the use of land and its elements will lead into better performance of crops. Appropriate cropping systems will also serve as a check to possible pest outbreaks reducing the risks and hazards of agricultural production.

Second, improved production will contribute better welfare to the upland farmers, while the health component will further improve the general well-being of the population.

Third, all these improvements will reduce the increasing incidence of illegal logging and *kaingin* activities in the upland areas, thus protecting and conserving the remaining forest cover around Lake Balinsasayao.

Using community development model as our approach quires that the integrated development program be channe through a community organization. Community organization a form of a social structure deliberately established to serve a vehicle through which development efforts can be channe Therefore, community organizing should constitute as an ini step to the whole developmental process of Lake Balinsasay

This paper is an attempt to outline the organizing experi ces that our field personnel went through as we implemented Lake Balinsasayao development project.

THE IMMERSION PHASE

After the exploratory survey, the field personnel gained eral ideas on the Lake Balinsasayao community. However was found out to be inadequate for planning specific strate in approaching the population. For instance, questions like are the characteristics of critical households that can serve immediate target for intervention activities could not be quately answered. It is true that community organization serve as the channel, but information concerning those questi are very important especially for the organizing process.

Hence, community organizing was never attempted du the immersion phase. This phase almost lasted for one year w was designed as a research exercise. Two technical men hired; one was a community organizer and the other was a ciologist.

The two field personnel organized themselves as a rese team trying to explore the developmental characteristics of domestic units of the Lake Balinsasayao farmers. It was assu right at the start that the households of the farmers provide key in understanding the constraints and opportunities u which household members make decision concerning the us the forest and their farms.

The team proceeded into familiarizing all the househol the farmers around Lake Balinsasayao. In the familiariz process, three basic household information were sought: (1)

of the household; (2) age distribution of household members; (3) labor supply in the household in relation to household farm size. On the bases of these data, the following household types were adopted:

Type Number	Characteristic
1	Newly married couple without children
2	Couple with young non-working-age growing child or children
3	Couple with one or more working-age children
4	Couple without children anymore (all are married and are living in thier own separate dwelling units)

A specific household was selected to represent each of these four types. These households were systematically observed by the team every month using participant observeation. The immersion process of the team consisted of efforts towards understanding the dynamics of household decision making under different demographic characteristics and land resource availability. Information on food needs, food supply, use and need of household labor activities on land and forest use, and interhousehold exchange of goods and services were closely monitored. Since these four household types observed were under different demographic and land availability characteristics, the research team was able to identify the opportunities and constraints underpinning each household toward farming systems development.

As the team began to fully understand each of the four household cases, the team also started to get a good picture of the rest of the households around Lake Balinsasayao which have similar characteristics to the four cases. The research process exposed the team to the local population thus creating and improving the social acceptability of the team to the farmers. This, in a way, was a means of preparing the social ground for the later processes to take place.

While the regular informal visitation of the farmers' ho holds by the research team provided the latter to see the proce that are involved in various upland farming activities, this vi tion also serves as the initial channel of comunication to the fa ers concerning the project that was just about to start.

THE SOCIAL PREPARATION PHASE

When the immersion phase of the field team was over, atter were made at determining whether the farmers adequately k what we are going to introduce to the Lake Balinsasayao farm The result was negative. The farmers were neither aware of plan nor knowledgeable about the benefits they can get from project and their responsibilities to the project. The farmers t need prior exposure to the planned project.

Hence, after the immersion phase was completed, the so preparation phase started. While the immersion phase was marily designed to orient the field personnel to the socioecon processes of the Lake Bal'nsasayao farmers, the social prep tion phase was designed primarily to prepare the farmers cerning the implementation of the development project for L Balinsasayao.

For social preparation, two methods were used. One household-to-household visitation and discussion. The other through community meetings. The team that went through the mersion phase was also used to do the social preparation of farmers. The rapport that the team had gained during the im sion phase was very useful for their activities during the so preparation phase.

To maintain the level of naturalness in the household envi ment during the household-to-household visitation, the visits done randomly. Neither appointments nor arrangements were prior to the visitation. Since we wanted to talk to the farmers der normal setting, the farmers were not given the opportu to prepare for the team's visit. The discussion was carried o informal basis, touching on various issues that unfolded as discussion progresses. When the issue on the developmental a the program for the uplands evolved during the discussion, the team immediately injected the Silliman University plan for the uplands. There were essentially three kinds of information that were transmitted to the farmers during this contact: (1) the objectives of the project; (2) the benefits that the farmers will get from the project; (3) the responsibilities of the farmers to the project. We assumed that these data were very essential for the farmers in making decision concerning participation in the project.

During these household visits, the team always prefers to discuss with the people. Since it was learned during the immersion phase that the husband and the wife take farm work as their joint activity, it was decided that the couple had to be involved during the social preparation phase. The field experience of the team showed that wives tend to be more open and vocal during the discussion than their husbands.

The household-to-household visitation was done first as a preparation for a community meeting or assembly. During the household-to-household contact, the farmers were informed to prepare them about the future community assembly that had to be held. This sequence of contact was considered logical since the household-to-household visitation was assumed to have initially developed interest on the part of the farmers in the project. Hence, it was expected that community assembly can be easily implemented after the household-to-household visitation had been made.

In the household-to-household contact, the farmers had no chance to listen to, and interact with other farmers' ideas. A farmer had to relate only with the team and he had no chance for the issues to be clarified with depth since possible reactions from other farmers could not be made available. This problem was solved by implementing a community assembly or meeting.

During the social preparation phase, community assemblies or meetings were essentially initiated by the field team consisting of a community organizer and a sociologist.The excellent attendance during these meetings was attributed to the prior household-to-household visitation by the team. Sometimes, the meetings were manned by the team only, and in some cases the meetings involved faculty members from Silliman University. involvement of various faculty members during these meeti was to add further impetus toward our multidiscipilnary p pective for the implementation.

The meetings were managed in such a way that optimum actions from the farmers were elicited. It was noted that contradiction of ideas between the farmers generally led in better understanding of the problems and opportunities the fa ers faced. These information also prepared us to modify som the strategies that we had to employ when we implemented project.

Like what the team did during the household-to-household c tact, the series of meetings or assemblies also provided basic three kinds of information to the farmers: (1) objectives of project; (2) benefits that the farmers will get from the pro (3) responsibilities the farmers have to the project.

The team's experience showed that there were substa questions raised by the farmers during the community meet which were never raised during the household-to-household tact. These questions emerged as results of interaction of i between the farmers.

While these series of community assemblies or meetings vided the farmers the opportunity to collectively present doubts, misconceptions and reservations about the project, t activities also allowed additional inputs of ideas on various re issues concerning the project. The faculty members from Silli University who attended these meetings rendered lectures on ious areas such as ecology, farming systems and forest cons tion. These information enabled the farmers to appreciate or appreciate" more the project. Positively, knowledge on these helped improve the attitude of the farmers toward the proje

After the household-to-household contact and the comm assemblies or meetings were completed, the team went back t farmers and asked once more the following three questions:

(1) What are the goals of the Project that we plan to i ment soon in Lake Balinsasayao?

(2) What are the benefits that the farmers can expect to obtain from the Project?

(3) What are the farmers' responsibilities to the Project?

When the answers of the farmers to these questions were considered adequate by the team, the community was considered socially prepared to implement the project. In the early part of 1984, the team declared the farmers in Lake Balinsasayao as socially prepared. Hence, after the social preparation phase, community organizing followed.

COMMUNITY ORGANIZING

Since, as mentioned earlier, a community development model was employed for Lake Balinsasayao, community organization was considered to be an essential component of the project. Community organization would serve as a vehicle through which our development processes could be channeled.

Both the community organizer and sociologist who had completed the immersion and social preparation phases in the area facilitated the organizing process of the Lake Balinsasayao farmers. A series of seminars were held on community organization and leadership system, after which an organization was formed.

BANAGBANAG

In the later part of 1984, the Lake Balinsasayao farmers finally decided to organize themselves. More than 74 farmers signed to become members who later on constituted as the core members. It was decided that the group should be opened for additional membership to upland farmers as long as they pay the membership fee of ₱5. As a member, they will also have to pay a monthly due of ₱1 and an annual due of ₱2.

Through a community assembly, the organization decided to adopt a name. The one selected was: *Balinsasayao Naghiusang [illegible] nga Nagbaul*. For its acronym, *BANAGBANAG* was selected which means a new dawn or life for the upland farmers in Lake Balinsasayao.

BANAGBANAG served as the umbrella association for developmental activities and organization in the area. It trie raise funds for its own operation through its fees, dues, and c tribution. Its fund was deposited in the bank under the name the association.

In 1985, the first election of officers was made. They w the following:

Name	Position
Pedro Ingo	President
Silvano Sotillo	Vice-President
Gilda Peras	Secretary
Dolores Yayong	Treasurer
Cristituto Batal	Forest Protection Counc
Estanislao Bulagoa	Forest Protection Counc
Alberto Quizil	Forest Protection Counc

In 1986, the second election was conducted and the offic were the following:

Name	Position
Maximo Silorio	President
Eduardo Pegarum	Vice-President
Victoria Orcia	Secretary
Dolores Yayong	Treasurer
Ricardo Sotillo	Public Relations Officer
Aguido Montegrejo	Public Relations Officer
Agapito Ruiz	Public Relations Officer
Cristituto Batal	Forest Protection Counc
Alberto Zerna	Forest Protection Coun

The last election was in 1987 and the officers consisted of the following:

Name	Position
Maximo Silorio	President
Estanislao Bulagoa	Vice-President
Victoria Orcia	Secretary
Dolores Yayong	Treasurer
Celso Yayong	Public Relations Officer
Romy Bormilado	Public Relations Officer
Alvis Sotillo	Public Relations Officer
Arguido Montegrejo	Public Relations Officer
Mary Tagud	Auditor
Eduardo Pegarum	Auditor
Sixto Yayong	Forest Protection Council
Marcelino Orcia	Forest Protection Council
Ester Taqui-ang	Forest Protection Council
Catalina Taqui-ang	Forest Protection Council

At present, the membership of the organization has gone down by 14%. We only have 64 members at present in contrast with [illegible] in 1984. The decline is caused by a number of factors such as death, military job and transfer of residence. The data show— from 1984 to the present, four have died. Another two had left the area and joined the Civil Home Defense Force (CHDF) which is a paramilitary unit. Since the area is a New People's Army (NPA) resting place, some farmers were threatened by the presence of the former. Another four had transferred residence without necessarily joining the paramilitary group.

With the formation of the *BANAGBANAG* Association, team (community organizer and the sociologist) relinquished the responsibilities related with community affairs to the offic of *BANAGBANAG*. The *BANAGBANAG* officers now serve the frontline.

The distribution of planting materials (hardwood trees fruit trees) was now channeled through the association. Likew the planting of trees was carried through *BANAGBANAG*. E the process of pooling labor, the association provides a very portant integrative function.

Forest Protection Council

One of the objectives of the Lake Balinsasayao projec the protection of the remaining forest cover around the Around 40% of the total forest cover within the watershed of the lake is still intact. The rest are gone caused by illegal ging and *kaingin*.

To assume the task of protecting the remaining forest, a est Protection Council was formed. Members of *BANAGBA* automatically become members of the Forest Protection Cou Since *BANAGBANAG* does not have the legal strength to enf the law against *kaingin* and illegal logging, the Forest Pr tion Council only monitored illegal logging activities within area and transmit the information to the locally constituted which is the Philippine Oil Company to prosecute the law brea

The Forest Protection Council works on the basis of z Each zone is under the jurisdiction of a farmer who reside that particular zone. Since members of *BANAGBANAG* are ly distributed around the lake area, each zone can be under responsibility of at least one or more farmers. These far within each zone will take care of their own respective area any incidents noted on their respective zones were immedi reported to the legal authorities for appropriate actions.

The Forest Protection Council is therefore an arm of *BA*-*LIBANAG* in conserving the remaining forest cover around the lake. Its basic function is largely monitoring since it does not have any legal status to enforce the law.

Working Groups

Since the implementation of various soil conservation measures on the respective farms of the Lake Balinsasayao farmers are labor intensive, the farmers have to draw labor outside of their respective households. This could be done through hired labor. However, in the absence of money and labor for sale in their households, additional labor had to be drawn in through a voluntary collective process.

A group of farmers occupying a contiguous area was encouraged to form a working unit. This was found out to be a convenient mode of collectivization since the farmers in this area are generally related either by blood or marriage. It was found during the im-plementation phase that related households or families tend to congregate themselves in one place for very obvious economic, social and security reasons. This kind of alliance prevailing among the members in one contiguous area provided a very effective control mechanism in getting the full cooperation of its members.

A working group consisted of some 15-20 farmers cultivating one contiguous area. They agreed to pool their labor together to work on their respective farm in a series or cycle. Each member got an equal number of labor force to work on his farm during an agreed number of days. When all the members have been completely served, a cycle again begins. The working group generally concentrated on the construction of soil conservation measures on their farms.

Three working groups were organized since three contiguous farming areas were identified. These were the southern area, the central area and the northern area. The three working groups took these names—*Bolhon*, *Alayon* and *Tambayayong*.

Bolhon: This name of a working unit evoke the idea o working-bee group. It represents a collective unit of work organized around one task to be performed and accomplish Generally, the unit is informally organized and is only for when there is a demand for a relatively larger volume of la to accomplish a given farm task within a short period of ti

Alayon: The term suggests a shared labor provided by household to another domestic unit. Such shared labor may necessarily have to be replaced or compensated for immediat It could be a form of a generalized sharing of labor without specified form and schedule of return.

Tambayayong: Tambayayong represents the act of gi assistance to needy individuals without any solicitation. It lar stems from the altruistic consideration of the individual. act of assisting is assumed to be spontaneous without any con eration for replacement or compensation.

Mothers Club

Among the Lake Balinsasayao farmers, the wives consti as major partners of the husbands in farm work. They consti major labor input in the planting maintenance and the harv ing of the farms. Hence, mothers serve as a significant per nel in a household farm.

To provide support to the working group which is lar consisting of male workers, the Mothers Club was organi Since the Working Group needs substantial food supply du labor session, the Mothers Club worked together to provide

Other support services to farming systems development also channeled through the Mothers Club. For instance, he nutrition and educational development programs for the dren were coordinated by the Mothers Club. Mothers orga themselves in providing the necessary local resources for he and the nutritional developmental activities. With the assist of the health and nutrition technical personnel of the pr the Mothers Club draws the regular services from the govern rural health unit for the Lake Balinsasayao population.

The Youth Club

The other significant group of the Lake Balinsasayao population is the youth. Assuming that there will be no significant emigration of the youth, they consist of the succeeding generation that will be using the land and forest resources in the uplands of Lake Balinsasayao.

While it is true that the youth assumed only peripheral role in the utilization of the land and the forest at present, they are already in the position to understand any process of development that was implemented in the area. It was therefore decided that the youth should be drawn into the focus of the developmental process as a preparation for their future takeover in the management of the upland resources.

To facilitate the process of exposure, the youth was organized into a club. The club had to provide additional pooled labor to the various working group when additional labor was needed. In the construction of infrastructure unit such as fishponds for the working group, the youth was heavily tapped.

The development of the mini-nursery was largely the responsibility of he Youth Club. The group also served as the facilitator in various reforestation activities which the project did.

It was assumed that the involvement of the youth in those activities just outlined would expose them to the concept of forest conservation and the application of appropriate farming system in the upland.. Such exposure, hopefully, would allow the youth to fully internalize the necessity and the techniques of appropriate management of upland resources.

EMERGING IDEAS CONCERNING COMMUNITY ORGANIZATION

Traditionally, community organizing involves a top-down process of putting in ideas from the community organizer to the people to be organized. The possible model of community structure and the manner by which community power and control can be drawn are inputs that flow from the organizer down the clientele population. The clientele population absorbs pro esses and assimulates the inputs and eventually integrates the inputs into the organizational process that will take place lat In short, community organizing is a one way process of learnin The clientele population being the learner. As the populati learns the nuances of community organization, they put up the own community structure. In this case, community organizati is defined as a sociopolitical structure deliberately designed the population through the assistance of a community organiz Hence, community organizers come into the community primar as mentors of the people toward community organizing. Ther fore, community organization as a structure is fashioned by th community organizer as a vehicle through which community de elopment process can be channeled. It is a monalithic proce where the community organizers serve as the mentors while t clienteles serve as the learners.

As such, when organizers approached a community, th are assumed to be equipped with all the information and tools t ward community organizing. On the other hand, the client population is assumed to have at least only minimal amounf information about community organizing which will have to enriched by the ogranizers.

Our Lake Balinsasayao experience, showed otherwise. Co munity organizing requires a dual process of learning. It w perceived that a community organizer is both a mentor an learner. Likewise, the clientele population is considered as teacher and a student.

It was assumed that community organizing is a contin of processes which involves community organizers learning critical social events and units in the clientele population re vant to community organization. In our project, we call the pr cess as social immersion. The organizer came into the commun as a learner while the populace served as her mentor. She explo both the household and the community level processes rele to the socioeconomic life of the people. Since our Lake Balin sayao projects' focus was farming systems development, the organizer was essentially searching for relevant social conditions and processes in the household that would facilitate the implementation of the project. Such information were put in into the organizing process when various structural units were identified and established.

The immersion process was essentially a research activity designed to enable the community organizer to understand the social dynamics of the whole community. To allow depth in the information, participant observation was used as the method. While the process allowed the community organizer to have adequate bases for fashioning the community organization, the process also allowed the community organizer to develop more rapport and trust with the farmers. This provided a firmer background to the community organizer when she finally went into community organizing.

Since community organization had to be structured according to the context of the project, the community organizer had to start preparing the clientele population for the coming project even during the immersion phase. This was found to be a handy way of justifying the presence of the community organizer during the immersion period. As the community organizer absorbed selectively the information about the community as revealed by the population, she also began exposing plans for developing the population as generally designed from the outside. Information on objectives of the project, the benefits they could derive from the project and the responsibilities they would have to the project were shared by the community organizer with the farmers. These gave ideas to the farmers on the developmental activities they would have to do after the community organization was established. Also, the farmers were placed in a position to figure out how they could form their organization according to the needs of the project they would implement later.

When the community organizer was already equipped with the necessary and adequate understanding of the social dynamics of the households and the community, she proceeded toward the process of community organizing. This time she shifted her role from that of a learner during the immersion and the social pr aration phases to that of a teacher. Her inputs were necess in the formation of various structures necessary for commun organization. Later on, she served only as a facilitator tow the formation of various social aggregates whose functions w to carry out various activities relevant to the goals and objecti of the projects.

Community organizing, therefore, was a dual process in L Balinsasayao designed to prepare both the community organi and the farmers toward the final phase of community org izing. It was a continuum of activities starting from social i mersion of the community organizer, social preparation of farmers, and finally to the community organizing phase.

SUMMARY

The Lake Balinsasayao project demonstrates that com nity organizing is a dual and dynamic process where the com nity organizer takes a dual role of a learner and a teacher a learner, she employs a systematic method of research us participant observation. Her unit of investigation is appropria selected on the basis of the need of the project. As a teache community organizer provides the necessary inputs toward establishment of a community organization. The dual pro allows both the community organizer and the farmers to pre themselves adequately for appropriate structuring of the com nity organization.

LEADERSHIP DEVELOPMENT: THE SURADPU EXPERIENCE

Merlinda C. Cepeda
Ester C. Delfin
Mervencia L. Ligutom

Introduction

The Silliman University Research Action Development Program in the Uplands (SURADPU) has been in operation since [illegible]. In the beginning of the sixth year, an integral approach was introduced. This was the only time when the Social Work Department got involved in the area. To take off on the given task, the following activities were undertaken:

a. Review of existing documents — the annual report and Constitution and By-Laws of the association;

b. Interview with the present community organization workers; and

c. Field visits and interview with people in two upland areas — Balinsasayao and Cangguhub.

The same set of activities were undertaken in both project sites. Such activities were instrumental in providing the research team with insights as to the status and level of leadership development and community involvement of people in both areas. Also, the field visits included research as well as action components to redirect the community organizing efforts.

Problems

The field activities were aimed at determining the leadershi levels of the two community associations organized — BANA BANAG in Balinsasayao and ALAYON in Cangguhub. Speci cally, the following problems were raised:

1. Are the people aware of the existing project?

2. Are they aware and involved in the activities undertak by the association?

3. If so, what is the level of their community involveme

4. Do officers pass the leadership qualities that are nee ed for an effective organization?

5. In what manner are meetings conducted?

6. How are decisions made?

7. In project implementation, are there committees? A they mobilized?

8. What is the quality of committee work?

9. Have members participated in the making of the Cons tution and By-Laws?

10. How do people relate to the Community organizer and project staff?

11. Do they have proper recording of minutes of their me ings?

12. What are the association members' problem-solving ski

Theoretical Framework

This study adopts the definition of community organization by Ross and Lappin (1967). "Community organization is the process by which a community identifies its needs for objectives, orders or ranks these needs or objectives, finds the resources (internal and/or external) to deal with these needs/objectives, takes action in respect to them and in so doing extends and develops cooperative and collaborative attitudes and practices in the community."

Community organization seeks to achieve the following goals:

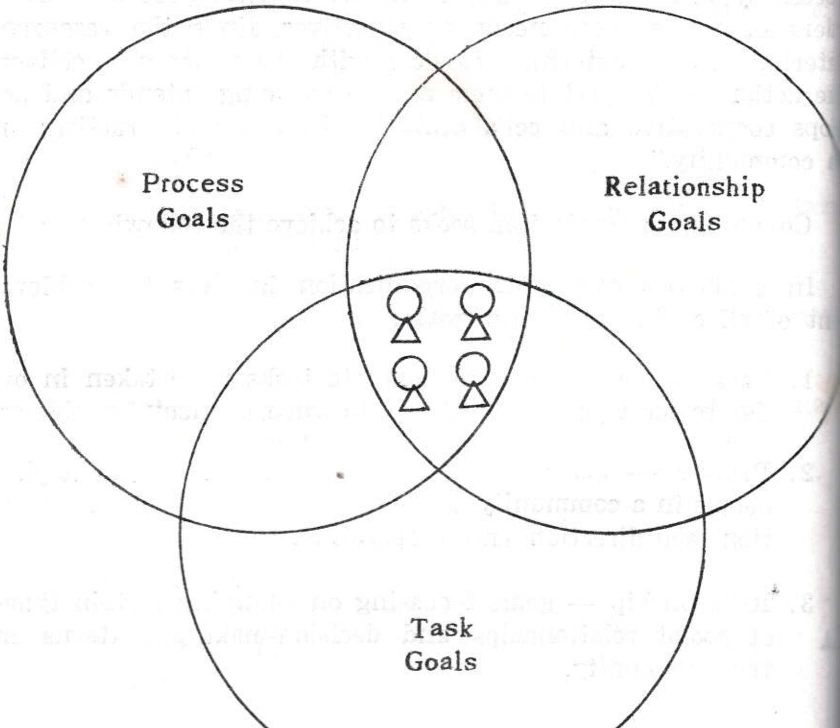
In summary, community organization involves the achievement of all of the following goals:

1. Task — concerned with concrete tasks undertaken in order to meet specific needs or to solve particular problems.

2. Process — goals concerned with the process of helping people in a community strengthened qualities of participation, self-direction and cooperation.

3. Relationship — goals focussing on changing certain types of social relationships and decision-making patterns in the community.

In other words, community organization involves concrete tasks/projects in meeting identified needs in the community. However, in the process of identifying these needs and the corresponding tasks/project to be undertaken, the people are already involved. In the process of doing these tasks with people's participation, there is enhancement of people's competence and problem-solving skills. These will lead to change in social relationships of people — e. g. they are no longer dependent on external agents. Paternalistic relationship is abolished. People become group-oriented rather than individualistic. The diagram below illustrates the interlocking of these goals:


Process
Goals
Relationship
Goals
Task
Goals

Assumptions

1. Man is the center of all development efforts.

2. Participation is the key to development.

3. Community organization is rooted in the local indigenous leadership — the local organizations. In short, the local people are, if not leaders at the beginning, can be developed into leaders.

4. Energy is generated by the self-interest of the local residents for the welfare of their families.

5. Its program and action develop hand in hand with the organization of the community council.

6. Any community organizing effort should move toward the goal of self-financing. Local residents support their own organization financially. At the same time, it ensures the local council the acid test of independence: "the ability to pay one's way."

Field Method

Home visits and interviews of household members were employed. Interviews were conducted in an informal manner. A structured data collection instrument was not employed.

Data and Discussion

Balinsasayao is an upland community belonging to the municipality of Sibulan. Silliman University came in with the SU-[illegible]PU program. It was able to organize BANAGBANAG, an organization composed of 64 members — 32 of whom are from the project site while the remaining 32 have decided to live outside the site due to insurgency problem.

There are three working groups. These are in Danao, in Kabilin-an and in Mahilum. The working groups in each area are the following:

Danao — *Alayon*

Kabilin-an — *Tambayayong*

Mahilum — *Bolhon*

People in Balinsasayao and Cangguhub are aware of the existence of the project. However, not all the people are aware of the project's objectives. This could be the reason to some of the people's responses toward project activities — e. g. low attendance in meetings, lack of participation in group discussions. In development work, awareness is not enough, there must be active involvement of people in all activities.

From the records reviewed as well as conducted interviews, Balinsasayao, as a community organization project, did not have the necessary social education and leadership training seminars. We only see a few people responding positively to the project's activities. Of the few who are involved, leadership qualities are still needed to be developed.

There is a general feeling that the community organization component of the project has been merely reduced to the putting up of an association. Such is not what we call Community Organization (CO) in development work. While it is the structure through which the CO inputs are channeled, the formation of an association is just thc beginning and not the end.

Looking at the association, there were scheduled regular meetings, but because people's initiative was not developed, the scheduled meetings most of the time did not materialize. If ever there were meetings, these were called by the CO worker and the agenda were prepared by her. This was shown by the association leaders' dependency on the CO worker in terms of decision-making or mere scheduling of meetings and preparation of the agenda.

The CO worker's records are needed for monitoring and periodic evaluation for subsequent planning and redirection of change efforts. However, the CO worker is not keeping such files. She may have reasons for this.

The association is still in its beginning stage — dependent on the CO worker. It has not taken off despite the number of years the project has spent in the sites.

Committees have been created like the three working groups mentioned earlier and other *ad hoc* committees. Committee work is an integral element in a democratic process in community ization. This calls for committee members' responsibility. Committee mobilization depends on the sense of responsibility of those concerned. This aspect needs improvement.

The association has been able to come up with its Constitution and By-Laws.

In terms of funds, the association has ₱1,700 deposited in the bank. This amount includes ₱5 membership fee, ₱1 monthly dues and ₱2 annual fees. The total income of the association is very small considering the number of years the association has been operating. We can generalize that not all members are paying regularly. The basic reason is the survival level of people's economic living condition and possibly they have not developed the will to work at the objectives that they have set for themselves.

The last aspect that we would like to look into is the problem-solving capacity of members — their making plans of action. Looking back at the theoretical framework, the definition by Ross and Lappin says, CO is a problem-solving process itself with the people taking initiative in all the steps in the process. This experience, if at the very beginning was already consciously provided to the people, it would develop their confidence and will to work on their problems and it would prepare them for independent problem-solving during phase-out. This is the essence of CO, the impact any CO project would want to see achieved at the end. This is the qualitative impact of any development endeavor and it has to be the underlying philosophy which starts at the onset of the whole effort and consciously built into the day to day processes. This aspect is not very visible in the Balinsasayao and Canggu- projects.

Actions Taken

Some actions taken in the project areas in the duration of the research period:

1. Balinsasayao

A review of the Constitution and By-Laws was made. It was known that the association was not meeting regularly as provided in the by-laws.

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Actions Taken

Some actions taken in the project areas in the duration of the research period:

1. Balinsasayao

A review of the Constitution and By-Laws was made. It was discovered that the association was not meeting regularly as provided for in the by-laws.

The team found it logical to begin with needs identificati since there was no ongoing activity in the community. The fo lowing needs were expressed:

a. Peace and Order Situation — This made difficult t holding of regular meetings. Some members have relocated them selves to safer grounds. Thus, quorum is always a problem. Som people are afraid to drop by the center for fear of a clash betwe the military and the NPA.

b. Plan of Action — The BANAGBANAG association d not have a concrete development plan of action. There were n activities undertaken by the association in relation to a pla The team feels the need for the association to come up with least three-year development plans. A development planning se sion is scheduled with an anticipated good attendance. This where the team left off in the action component of its work.

2. Cangguhub

In a community assembly, the people were asked about th pressing needs. The following were presented:

a. Need to be able to read and write which calls for an ad literacy program.

b. Distance from the barangay elementary school — t children find it very far. This has affected their regular atte ance and enthusiasm for school. During rainy season, the pa is impassable and dangerous to the children. The community, wi the research team's facilitation, thought of presenting a propo to the municipality of Mabinay to conduct classes in Canggub

c. Need for income-generating activities to augment inco from farming. The people express that during lean months June-July — families literally go hungry. Some family heads w go as far as the boundary of Sta. Catalina to offer farm labor exchange for some shares in the harvest and take home some fo for the family. The people feel that something has to be done ab this. Further brainstorming has revealed the existence of a pot resource for the community — the Office of Southern Cult Communities (OSCC). One community leader has informed

The OSCC offers loan assistance for any income-generating activity upon submission of a viable community proposal. The people feel eager to take the opportunity offered by the agency. A proposal writing has been scheduled to develop such. The team still has to follow this up.

Recommendations

1. On the method, if community organization has to be the project's philosophy, it should be built into the daily activities undertaken by the CO worker with the people.

2. For the Cangguhub project, the team strongly feels the need for a full-time CO worker. Once a worker is hired, with some supervisions, he can pursue the action plans arrived at by the research and action team.

3. For the Balinsasayao project, the social worker has to do more community organizing work. Closer supervision is needed. Where the team left off, the social worker should pursue the association's formulation of a development plan which shall serve as a guide for the next year's activities.

4. On the integration approach, the attempt is a laudable and refreshing effort. The multi-faceted nature of problems of communities really need an integrated approach. We notice, however that the units involved are operating on its own. Integration calls for the weaving in of the different efforts to be systematically delivered to the communities, not on the basis of "to each his own."

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CONTRACTUAL AGROFORESTRY SCHEME: AN EXPERIENCE TOWARD AGROFORESTRY DEVELOPMENT AMONG THE ATA OF NEGROS ORIENTAL

Rowe V. Cadeliña *

Introduction

Native tribal population constitutes a major group in t uplands. Their traditional hunting and collecting activities c flict with the demand for sedentary life necessary for agro estry development in the uplands. Spatial mobility is a necess strategy for the natives to bring them to various resource ba within their habitat.

Among population groups, like the Ata, the desire to m around space is still their major preoccupation despite the dis pearance of the forest. In places where their forest habitat been completely eliminated, the Ata still do not store enough f in their households, hence, their food base is situated in the ho holds of their technologically superior neighbors, the low Christian farmers. To tap this resource, they regularly move f one household to another to sell their labor to the Christian fa ers for food. As a consequence, their own farm developm suffers. Intensive labor requirement for agroforestry deve ment of the Negritos' farms in the upland is usually not adequa provided.

This paper proposes a scheme of what we call a contrac agroforestry development in the uplands. On the basis of own experience with the Ata in Central Negros Oriental, I argue that contractual agroforestry provides an effective a native strategy in achieving the necessary farm developmen the denuded hilly lands. Such strategy is also considered ap priate for non-tribal population in the uplands especially w there is competing demand for immediate food production ag labor demand for long term development of the farm.

* The author expresses his thanks to the following field personne keep the field work smooth and field data collection effective: Ms ginia Dioso, Ms. Veliña Cadelina, Ms. Elvisa Yrad, Ms. Juvy Gr Danilo Sollesta and Rodrigo Puracan.

Let me first socially situate our Ata experience in the light of our own action-research program in the uplands.

The Negritos and the Research-Action Development Program of Silliman University in the Uplands

There are two areas that concern us here: first, the Ata; second, our research action program in the uplands.

The Ata

The Ata are native tribal population group. They used to be the aboriginal population of the island, hence, the island has been known as Negros. As a people, they used to inhabit our lowland areas but as the Malayan lowland population group began to come in, the Negritos voluntarily retreated to the interior part of the island.

As a people, their lifestyle is characterized by a very simple form of technology and social organization which largely depend on what nature provides them. Through hunting, collecting and foraging, the people provided themselves with food. Consequently, their social organization has to be kept very loose to provide the necessary flexibility required for a hunting and foraging lifestyle. Leadership is not rigidly defined and the sense of community or village unit is rather weak.

A Negrito village therefore, usually consists of units of individuals who are never attached to a particular space. His attachment to it is as brief as its local resource can last. Once the local resource is consumed, he has to move. He is on the go. He is a jet-setter in the forest. You find him today in one part of the forest, the next day he must be somewhere else. This is his life and he loves it. There is nothing better to it that you can offer to him.

Surplus production is meaningless to him since nature stores his food. The forest takes care of everything he needs. The carbohydrate, the protein and the vitamins that his body needs are found in the forest by the wild root crops, faunal species and wild fruits.

For centuries this has been his life. He goes from one p to another for food. Since the beginning, he did not control food supply; he was controlled by his food supply. Yet, he happy. The forest provided him the shade and the cover necess for his hunting and foraging activities.

The forest is his life as water is for the fish. Hence, to h the forest has spirits and power that can affect his life. Thi Ata. This is his lifestyle.

Suddenly, the forest was gone. The wave of lowland pop tio whose lifestyle is completely different from that of the Ne to, overrun the lowland and finally the highlands. They h cleared the forest and the Negritos have suffer. The Negrito te nology and economic system is structured for the forest. T were unprepared and not ready to adopt to the disappearing est. They are now like fish thrown out from the sea gasping breath. He is literally dying. But his life has to keep movin he is now eking a living in an unfamiliar environment.

The technological system as well as the political, and socio-economic system of the Negritos in Negros Oriental yet adjusted for a non-forest sedentary life. There is a m process of deculturation. They have lost their traditional re toire for living without the necessary and appropriate rep ment. Hence, a cultural vacuum is created bringing confusio the local Ata.

Food production is very low. Their annual per capita duction from 1983 to 1984 showed that it was far below the rage per capita caloric requirement to hold body and soul ther for a functional average Filipino. From what a Ne produced, only approximately 21,200 calories are available in year. He supplements this limited available food through va processes of exchange (like wage labor, sale, loan, barter, from harvests and gifts). This medium yields only around additional calories annually on a per capita basis. This sh that in one year, an average Negrito will only ha total caloric supply of around 25,400 calories. Ideally, he n around 718,219 calories annually if we take the dietary allow for an average Filipino recommended by the Food and Nutrition Research Institute. What is available to Ata is only slightly less than four percent of the requirement, indicating a deficit of 96 percent. Indeed, that is terrible!

Apparently, there is no surplus that can be stored in the house, and hence, everyday his major concern is just to bring additional calories into his stomach to survive.

In contrast, his lowland Malayan neighbors (whose economies is geared toward storage of surplus food), are able to keep some calories in their store room ready for use when needs arise. Through exchange, a Negrito tries to make use of his lowland neighbors' resource. Ata "migrates" from one Cebuano household to another selling his labor in return for the needed calories. Everyday is a struggle for survival. His need is immediate and he is no longer capable of putting time into his own farm for long term development. Any input he has to make in his own farm will surely compete with his daily activities for subsistence. Poverty begets poverty. This marks the beginning of a various cycle on poverty.

This is the present picture of the Ata in central Negros Oriental. Under this circumstance, we introduce our assistance to this native tribal population.

Action Research Program In The Uplands

The action-research program of Silliman University, funded by the Ford Foundation, is designed to document the processes and the results of an intervention activities for upland population. These activities are intended to achieve a number of things. First, in the site where patches of forests are still available, the program initiates efforts toward the protection of the remaining forests. In places where trees are gone, community reforestation is introduced. Second, through the introduction of appropriate farming practices in the uplands, the program hopes to increase household income. Third, since soil is basic in agriculture the program recommends effective soil use and conservation on the hilly lands. Appropriate soil fertility control and rehabilitation are introduced. Fourth, considering the complexity of upland problems, an integrated approach is employed which ta into account the health, education and other related services ai to improve the accessibility of the upland population to vari social services. Fifth, through the integrated Social Fores scheme, the upland beneficiaries are provided with secured te rial arrangement to their land occupation.

The program has been implemented on two sites. On around Lake Balinsasayao in the municipality of Sibulan. site is about 25 kilometers northwest of Dumaguete City, occu by lowland Malay population who had migrated to the upla searching for land. Members of this group are generally the located lowland population.

The other site is in Barangay Cangguhub in the municip of Mabinay. The site is approximately 87 kilometers north of Dumaguete City. It is occupied by Ata families.

The program considers the two sites as different type laboratories where we can monitor the processes and the re cf upland intervention in different human ecosystems. The is an upland community where few patches of forest are still available while its soil base is still intact and occupie sedentary lowland migrants. The second is another upland com nity where trees are completely gone, with soil erosion al reaching in its advance stage and occupied by an aboriginal g

Two different methodologies are employed. In Lake Ba sayao, non-contractual agroforestry is employed since the fa are migrant lowland Malay population who practice the stora surplus products. This practice allowed the farmers to i their time for long-term development of their farms withou cessarily having to compete with the need for a day-to-day getting activity to feed themselves.

In the Ata site, where there is no practice of food st a contractual agroforestry is employed. Since food getting a this people is a day-to-day activity, long-term development of farms will compete with their daily struggle to produce food. Contractual agroforestry development was then considered as appropriate for their particular type of population.

Contractual Agroforestry Development

Contractual approach in agroforestry development is designed to accomplish the introduction of labor input into a cooperator's farm under a shared basis of costing. Normally, the cost of labor in the development of a cooperator's farm will be largely his contribution.

Instead, the contractual arrangement will only require the cooperator to assume part of the labor cost. Depending on the arrangement, the program may underwrite 50% of the total labor cost and the farmer takes the rest. The farmer is paid by the program either in cash or in kind. Our experience with the Negritos shows that in kind remuneration provides the program a better control of the population on the proper use of the resources. Cash can easily be spent for vicious activities like gambling and drinking.

Contractual approach is employed based on four assumptions.

First, labor supply in the household is not sufficient.

Second, farm development is labor intensive, and as such, it will usually lead into the development of boredom.

Third, labor inputs for long term development may compete with the immediate short-term needs of daily subsistence activities of the population.

Fourth, long-term development implications are not easily understood by the farmers. These have to be supplemented with immediate short-term considerations.

Our field data from Lake Balinsasayao show that only around [illegible] of the households have at least one additional household member of working age. The rest are either newly wedded couples without children, or with growing young children, or old r ing couples whose children are already married. Since develop of upland farm is highly labor intensive, 60% of the househ may not be able to implement farm development activities lack of manpower. Contractual system allows a farmer to additional labor.

The boredom that is associated with labor intensive activ can be minimized if a number of labor force work together. C tractual arrangement allows a farmer to draw in additional la into his farm employing certain remuneration scheme. This increase the speed of work and at the same time, the compan ship of various workers will maintain the enthusiasm of the gr

The rationale behind farm development is the long term efit that the farmers will get from the effort. Soil conserva measures such as rockwalling, contouring and tree planting activities that do not yield benefits to the farmers overnight. farmer has to feed himself and his family members today w waiting for positive results to come. Long term benefits not solve his present requirement. Most upland farmers are ready caught up in this cycle of the problem. Foremost is his n for daily food supply. Hence, farm development on the basi own-household labor provision will not achieve the result wi a given time frame. Once there is a competition between mee the short and long term needs, the former always prevail. La will always be utilized first for the provision of goods that needed immediately. Only when time allows that a portion of labor shall be used for long term consideration. In short, anyt that is for the future is given the second choice. Most often choice is not properly implemented or not implemented at Since farming development in the upland is largely future ori ed, it is destined to fail in almost all instances. Certainly contractual approach will solve the problem.

Contractual approach takes a very strong consideration recognition of the immediate needs of the upland farmers wh tries to take into account the future demands from the popula It is an objective recognition of the fact that the farmers' c giving priority to meeting immediate needs is a result of the realistic evaluation of his household needs. The farmer does not need the hay when his horse is already dead.

The upland farmers cannot be blamed for this. It is our responsibility as academicians, researchers or policy makers to put our feet into their shoes so we can appreciate their needs. Sometimes development theories are unreasonable and irrational. Generally development has to come from within and as such the client communities should pay the prize of development so that they will value what has been developed. Why should a farmer be paid for developing his own farm? This would mean dole out. This would make contractual agroforestry development, counter development.

I already have outlined earlier my argument why conractual agroforestry development provides an effective alternative strategy in our upland development efforts. In this section may I finally lay down my last arguments.

It was argued that contractual agroforestry scheme is not a dole out. First, dole outs are largely short term oriented and they usually include consumable goods. Second, the needs considered are short-term and hence there is no chance for those goods to have a multiplier effect on the community. Third, the impact is limited, normally focused at a particular good made available to the client farmer.

The proposed contractual approach in agroforestry development does not share the characteristics of dole out which I have outlined. First, contractual agroforestry takes into account long term benefits to the farm and to the household. Development investments in the farm will continue to help conserve the soil and its fertility and rehabilitate the ecological characteristic of the farm. Investments such as rockwalls, contour hedgerows, contoured terracing and the fruit trees planted are permanent capital investments in the farms.

While these developments are permanent on the farms, they have multiplier effect in the long run. Anything that will be seen by the farmer right on his own farm as beneficial will not

surely be abandoned; instead, will have a good chance for expan-
sion. Slowly, it will cover wider area over time. Since this kind of
development will grow on a cumulative basis, its multiplicati
effect on the farm will take place in the future. What we need t
do is to start the development process and let it happen and wo
right on his farm. He will do the rest for expansion.

As the development on his farm takes place, other aspects
of his life will be affected. Diet will improve, material possessio
begin to accumulate overall health condition will be better, sen
of security and satisfaction begins to develop, and the overa
well-being is enhanced. Its effect is multifaceted unlike the effe
of a particular dole. The question we now ask is: Wh
is the result of this scheme in our own experimentation?

Results of Field Experimentation

Agroforestry development is experimented on two sites. On
in Lake Balinsasayao and the other in the Negrito area in Ca
guhub, Mabinay. One major component of the program is the pr
er use of the hilly lands. This consists of the introduction of co
trol mechanisms that will hold both the soil and its fertility. T
contractual approach was not used in the Lake Balinsasayao si
in the Negrito site, the method is employed. The reason were a
ready indicated earlier.

Toward the end of 1986, the accomplishments on the establi
ment of soil protection mechanisms were assessed. The length
contoured hedgerows, canal system, rockwall, terrace and ot
related soil protection practices were measured in the two si
The number of farmers employed and the area of the farms de
oped were also recorded. The result of this exercise is shown
Table 1.

Table 1 shows that, in absolute terms, the Lake Balinsasa
site has more cooperators working on a larger hectare compa
to those coming from the Negrito area. This is expected since m
farmers are involved in the former compared to the latter. W
the population is bigger, the land area involved is also bigger
Lake Balinsasayao. Here, the program is operating on a 300-h
tare land surrounding the Lake (Balinsasayao). It has more t
70 farmer-cooperators.

Table 1

Extent of Accomplishment In the Introduction of Various Soil Control Devices Between Two Sites Using Two Different Approaches

	Lake Balinsasayao (Non-contractual)		Negrito Area (Contractual)	
	No. of farms	Land Area involved(Ha.)	No. of farms	Land Area involved (Ha.)
Contoured Hedge Rows	13	11.16	2	2.5
Contoured Canal system	1	.33	5	6
Contoured Rockwall	15	11.31	7	7
Contoured Terrace	1	.50	1	.5
Contoured [illegible] System	3	1.25	0	0
Total Farmers	33	24.55	15	16
[illegible] Rate per person		.74		1.1

The Negrito component, on the other hand, has only 18 fam-ilies involved, operating on a 21-hectare piece of land. Such dif-ference in scale must have provided a more personalized conta between the farmers and the field personnel in the Negrito pro-ject compared to that of the Lake Balinsasayao site.

However, a glaring difference is reflected. In Lake Balinsa-sayao, only around 47% of the cooperators have introduced th soil control mechanisms in contrast to 83% among the Negrito In terms of land area, the Lake Balinsasayao site has only in-volved around 24% of the total land area occupied by the farmer while in the Ata site, we have covered around 76% of the tot land area.

The more convincing indicator for the positive effects o contractual agroforestry development scheme is the occupati rate of farmers on developed farms (i. e., with soil protecti inputs.) The occupation rate per farmer in Lake Balinsasay is only less than a hectare (around 7,400 sq. m.); in the Ata are the occupation rate is larger by around 35% to that of Lake Ba-linsasayao. On the average, a Negrito who has introduced so conservation measure developed around 10,100 sq. m. This sho that the contractual approach must have improved the perfor-ance of the Ata farmers. If the approach worked very well amo the Negritos, there is no reason why this will not work among t lowland Malay Cebuanos. More impact can be expected from t latter population group.

An intensive study on the Ata scheme in farming develo-ment was implemented and a number of findings are worth sha-ing in this paper. The cost analysis and the comparative perfor-ance of the male and female labor sectors have to be noted; th provide the support in planning this labor intensive activi among the tribal population. Cost analysis is likewise impleme-ed in order to determine the viability of the contractual approa

In order to measure the relative labor cost in the constructi of soil protection devices (rockwall, canal, hedgerows, terraci number and sex of workers were noted as well as the total num of hours spent by the workers. To see whether land size of farm will have an effect on the construction of these devices, attempts were made to correlate these variables (see Table 2).

Using ±.5 as an acceptable level of correlation coefficient, Table 3 shows the variables that are affecting each other; hence, can be used as predictor for the other variables.

Table 3 suggests that the total number of workers does not necessarily indicate the total length of soil protection installed on the farm. Its correlation coefficient does not reach our acceptable level (see Table 2). Instead, a higher correlation coefficient is shown between total number of hours spent and the total length of soil protection device installed (r=.5561). This is expected since work efficiency is actually measured in the total number of hours spent by each worker rather than on the total number of people *per se* who may not work fully during the working session. This suggests that a huge number of workers does not necessarily, quarantee to yield a huge output. Instead, it is the workers' efficiency in using their time productively that determines the output. There must be a possible threshold point for optimum number of effective working force, beyond which output may begin to decline. It should be noted that control becomes more difficult as the number of workers increases. Table 3 shows the regression equation between the total length of soil protection device installed and the total number of hours spent by the workers in the installation of these soil protection devices.

When the total number of hours spent were disaggregated according to sex participants, the data showed very low correlation between the total number of hours spent by the males and the total length of soil devices installed (r=.4492). On the other hand, when the total length of soil protection devices installed were correlated with the total number of hours spent by the females, a higher correlation was yielded (r=.5790). This suggests the female workers are more efficient than the males in constructing soil protection devices. For practical considerations, it is more cost-effective, therefore, to include women in the working group. In fact, the data seem to suggest that the more female workers we

Table 2

Correlation Matrix Between Variables Related to the Construction of Soil Protection Devices

	LCHR	LCCS	LCRW	LCT	TLSPD	ASPD	TNW	NMW	NFW	TNHS	NHSM	NHSF
LCHR	1.0000											
LCCS	-.1833	1.0000										
LCRW	-.1632	.2911	1.0000									
LCT	-.0464	-.1238	-.0167	1.0000								
TLSPD	.0025	.8403	.6982	.0222	1.0000							
ASPD	-.1666	.4032	.6364	-.1243	.5818	1.0000						
TNW	-.3655	.3391	.5770	.0654	.4879	.6959	1.0000					
NMW	-.3995	.1833	.4029	.0822	.2776	.5441	.9388	1.0000				
NFW	-.2678	.4690	.6908	.0354	.6583	.7646	.9143	.7189	1.0000			
TNHS	.1082	.5207	.2821	-.0717	.5561	.1042	.1079	-.0321	.2554	1.0000		
NHSM	.2328	.4419	.1322	-.0695	.4492	-.0464	-.0929	-.1874	.0328	.9548	1.0000	
NHSF	-.2296	.4952	.5155	-.0511	.5790	.4211	.5378	.3509	.6729	.7080	.4675	1.0000

LCHR = Length of contoured hedgerows
LCCS = Length of contoured canal system
LCRW = Length of contoured rockwall
LCT = Length of contoured terrace
TLSPD = Total length of soil protection device
ASPD = Area of farm installed with soil protection
TNW = Total number of workers
NMW = Number of male workers
NFW = Number of female workers
TNHS = Total number of hours spent
NHSM = Number of hours spent by males
NHSF = Number of hours spent by females

have in a working group, the more output it can produce. The total length of soil conservation installed has a correlation coefficient of .6583 with the number of female workers in contrast to only .2776 with the number of male workers. Female working group is therefore cheaper to operate than male working group among the Negritos. The female workers tend to be more dedicated and conscientious in their work compared to their male counterpart. This is partly a product of their tradition. Negrito men are largely travelers (hunting and collecting or gathering), while the women are generally associated with maintenance in horticulture.

Table 3 shows that the best predictor for the total length of soil protection device installed is the total number of female workers in the working group (r=.6583) and followed by the total number of hours spent by the females (r=.5790). The regression equation in Table 3 shows that for every unit of increase in the total number of hours spent by the females, the length of the soil protection device increases by almost three units. On the other hand, the total length of soil protection device increases by around [illegible] units for every unit increase in the total number of female workers in the working group (see regression equation in Table 3).

Larger farms tend to have more soil protection devices installed. The regression equation in Table 3 suggests that for every unit increase of land area, the total length of soil protection device installed would increase by more than 269 units. Therefore, we can expect that owners of larger farm areas will tend to employ more labor in order to cover larger protected area from erosion. There is a high correlation between area of farm protected from soil erosion and total number of workers employed (r=[illegible]). It can be predicted that for every unit of increase in the total area of land covered with soil protection devices, the total number of workers needed to construct soil protection devices increases by 13 units. This includes both male and female workers. However, there seems to be a higher need to increase female workers (r=.7646) than to increase male workers (r=.5441) in

Table 3

Selected Variables with Various Levels of Correlation Coefficient

Variables Y	Variables X	Correlation Coefficient	Regression Equation of Selected Correlated Variables
LCCS	TLSPD	.8403	-
LCCS	TNHS	.52007	-
LCRW	TLSPD	.6982	-
LCRW	ASPD	.6364	Y=45.44 + 160.58X
LCRW	TNW	.5770	-
LCRW	NFW	.6908	Y=35.13 + 18.40X
LCRW	NHSF	.5155	Y=61.00 + 1.32X
TLSPD	ASPD	.5818	Y=115.25 + 269.29X
TLSPD	NFW	.6583	Y=92.87 + 32.16X
TLSPD	TNHS	.5561	Y=103.36 + .88X
TLSPD	NHSF	.5790	Y=123.74 + 2.72X
TNW	ASPD	.6959	Y=8.61 + 13.31X
NMW	ASPD	.5441	
NFW	ASPD	.7646	

order to achieve a given unit or increase in the land area covered with soil protection devices. This is expected since female workers tend to be more efficient than the males, as we noted earlier.

There is a general tendency for the Negritos to select less labor intensive soil control measure. One can have high predictability of having contoured canal system introduced given a total length of installed soil protection device (r=.6982). Rockwall construction is more labor intensive than the construction of contoured canal systems.

The construction of rockwall is generally associated with bigger land area. The larger the farm area, the more likely that farm will have rockwalls (r=.6364). This is expected since the larger the farm area, the more likely you will find portion of the land in the Negrito area with adequate rocks for rockwall construction. Regression equation shows that for every unit increase in land area installed with soil protection, there is 160-unit increase in the length of rockwall.

There is a higher predictability for longer construction of rockwalls with female working group (r=.6908) than with other working group (r=.4029). This consistently proves that the women are more productive than men. This is further strengthened by the fact that we find a fairly good correlation between length of rockwall constructed and the number of hours spent by women ([illegible]55) compared to that we found for men (r=.1322). For every unit of increase in the number of female worker, we can expect an increase of around 18 units in the length of rockwall constructed (see regression equation in Table 3). Furthermore, for every unit increase in the number of hours spent by females, there is also one unit increase in the length of rockwall constructed.

The combination of female and male working groups still yields a good predictability for the length of rockwall constructed. It is obviously the high efficiency level of the women in the use of their time that improves the overall performance of the working group, i. e. composed of men and women. With women, the men can improve their performance tremendousl For practical consideration, the women should be part in th working group.

Within the involved area of approximately 16 hectares, 9,0 meters long of soil protection devices, were installed; 5,366 ma hours were spent for constructing rockwall. Around 27% these manhours were provided by women and the rest by me Assuming that only eight manhours were spent per day to con truct this soil protection device, the total device must have tak around 671 man-days. This indicates how labor intensive th development activity is. At a subsidized daily wage labor of t persons a day, the soil protection device spread out in a hectare piece of land must have costed around ₱6,710.

Collective labor is very essential in this development eff to shorten the construction time period as well as to elimin the boredom associated with slow moving labor intensive j Our data show that of the 41 cases of plots studied, each p employed approximately 14 workers, on the average. This mea the job which should take 671 man-days to complete, was on completed by the Ata in 48 days using the contractual meth This is approximately 1½ months.

This suggests that the more workers on the farm, the bett However, one should be very careful with time use manageme Earlier, discussion showed that it is not necessarily the num of workers *per se* that determines the extent of accomplishm of the working group. Rather, it is the amount of time th each worker actually spent in working. A manager sho keep the size big enough to manage, so that each worker optim the number of hours spent in working. He should know w size he could afford to manage effectively.

In our Ata experience, the women perform better than m Hence, a working group should have women to maintain cer level of efficiency. However, men still serve as the core grou the construction of soil protection devices. The women const ed only around 28% of the working group. The rest are me

To construct a rockwall including the determination of the contour line, the collection of rocks and the establishment of the canal base take approximately one man-hour for every half meter long. The rockwall should be around 2 ft. wide and around 2 ft. high. On the other hand, to put up a hedgerow including the determination of contour line and the planting of plant hedges, takes around one hour per seven meters.

For contour canal system and contoured terracing, 4 m./hr. and 3 m./hr. are produced, respectively. This includes the determination of the contour line and the planting of the necessary buffer crops.

However, the choice between these techniques is not necessarily determined by the relative cost differential in the installation of these soil protection devices. A host of factors are taken into account, such as the slope of the farm and the availability of rocks. In farm sites where rocks are abundant, rockwalling is preferred despite its cost since removal of rocks and piling them systematically will increase the planting spaces of the farm. While it is true that rockwalls are costly to construct, it is, however, durable. Hence, rockwalls tend to stay more permanently in the farm compared to terraces or canal.

Summary and Recommendation

The data have convincingly showed that the installation of soil protection devices is labor intensive. As such, it is costly. Realistically, farmers actually need outside support in order to provide this input. Since such input is lasting and non-consumable, its results will be permanent. Since it is a permanent change in the farm, such outside support does not necessarily contradict the principle of development from the inside-out.

Sex composition of the working group seems to have an effect on working efficiency among the Negritos. If this finding has a wider geographical and ethnic implication, it is recommended that a working group should have women, in addition to men, as members.

Among the four soil protection devices introduced, contoured rockwall is the costliest while contoured hedgerow is the cheapest. However, the selection among the four techniques tried among the Negritos should not necessarily depend on cost but on other factors such as slope and the availability of rocks on the ground. While rockwalling is the costliest, it is however the most permanent of all the systems if constructed very well.

By necessity, labor has to be pooled together to shorten the time period required to install soil control devices. Pooling labor can be more effectively done with the use of minimum cash. For an area of around 16 hectares we spend only around ₱7,000 to construct the necessary soil protection devices. It is cheap in the context of permanent farm development. It is an investment for a permanent change on the farm with long lasting effect on the lives of the upland population.

ALTERNATIVE EXTENSION STRATEGIES FOR NATIVE POPULATION IN THE UPLANDS: A CASE OF THE ATA IN CANGGUHUB, MABINAY, NEGROS ORIENTAL

Rowe V. Cadeliña *

Introduction

The unique cultural characteristics of the native upland tribal population requires a unique approach in bringing extension services to this particular population group. The usual Community Organization (CO) approach requiring local population's labor counterpart appears inappropriate for the natives. With the political organization of the natives, the CO approach will generally contradict with the philosophy of the indigenous political system of the native tribal population.

The requirement for local labor contribution runs counter to the natives' daily process of food procurement. In the light of realities, this paper asks an essential question, how can we bring extension services to the native upland population without necessarily running the risks of contradicting the natives' peculiar cultural characteristics? Put in another way, what alternative strategy or approach in extension can we use in our attempt to reach the natives?

The alternative ideas proposed in this paper were derived from our experience with the Ata in Barangay Cangguhub in the Municipality of Mabinay, Negros Oriental. The site is around 87 kilometers northwest of Dumaguete City. The project in this site is part of the Silliman University Research Action Development Program in the Uplands (SURADPU). It is an experimental project designed to test various extension strategies and agroforestry models appropriate for agriculturally marginal upland communities. The project has been in the site for slightly over four years and our regular monitoring effort on the developmental processes now provides adequate data from which we can infer alternative approaches compared to present classical extension strategy.

* The writer acknowledges the assistance of Danilo Sollesta and [illegible] Puracan for the field data collection.

CLASSICAL PARADIGM FOR EXTENSION PROGRAMS

Community development project has to be community bas As such, it is recommended that the evolution of communi development project should take a bottom-up direction. There a a number of motivat'ons why such process of evolution is pr ferred. It is argued that such condition will improve communi participation since a strong sense of community ownership project will be developed. In addition, members' participation w be long-lasting since the local members' involvement in the pr ject is not artificially caused by an exogenous factor such as t presence of the project's technical men.

In order to anchor development project in the communi community organization approach has become the by-word extension effort. In fact, it has become the panacea to all dev opment activities. It is a must to all extension programs. Fundi agencies always require the existence of community organizati as pre-requisite for fund approval for fund request or at lea forming it at the initial activity of a project after its fund su port has been approved. Hence, community organization ten to be generally considered as a foolproof ingredient for develo ment undertaking in the community.

Such perspective has led extenison workers to believe that co munity organization is a requisite for all development progra It has prevented the extension workers from critically analyzi such view in the context of a specific project and a specific gro of clientele population.

Since the development technicians have already develo bias towards community organization, they tend to impose t requirement on the clientele population. The very essence of t process is already inconsistent with the philosophy of involvi local population in planning to determine their own resolution and processes of development. As a consequence, the local po lation has not been given adequate assessment concerning th own desire for community organization in the context of t local people's existing indigenous political system. Under t paradigm, the people's existing political system is taken for gra in the interest of meeting the requirement for community organization. Hence, the approach, in principle, becomes top-to-bottom. While this paradigm assumes the practice of a bottom-up process as an ideal approach to development, it has in fact indeed, taken that ideal.

The classical paradigm denies the significance of the specificity of project and the specificity of people. It tends to lump all projects and people together without regard to the peculiar nature of a project and a people. Hence, the requirement of community organization is universally expected from all development efforts. It tends to unify development process and approach even under a condition of diverse potential clientele population and development projects. Such model is reductionistic hence it tends to disregard specific nature and qualities of a population and specific requirements of a specific project. Actual conditions, however, require strong need to adjust general development process and approach to specific conditions of people and of projects.

On the basis of input, the classical model strongly denounces dole out since it will only develop overdependence of people on the project. Hence, any inputs by the project in terms of goods or cash are always considered as dole outs. The classical model only recognizes tecnological input as legitimate contribution of development project to the local population. Under all circumstances, the model assumes that consumable inputs of project should be the people's counterpart. This universal demand on project is realistic since it does not recognize the context which particular input is required.

Project demands and requirements have to be situated contextually and under such consideration cash and good inputs may not necessarily constitute as dole outs. In short, the nature of the project and the nature of the clientele population have to be understood to properly identify whether cash and goods inputs are legitimate or not. The classical model does not require this kind of evaluation. Instead, on an priori basis, it universally assumes that all consumable inputs are dole outs. Cash should be extended only in a form of loan. Under this definition, subsidized labor contribution of farmers is not considered a legitimate input.

It is a dole out. Since the only counterpart that the local popu tion can afford to contribute is labor, subsidized labor contrib tion should not be encouraged. It should totally come from t clientele population. The critical question that has to be asked i "is clientele population under all circumstance capable of provi ing the necessary labor for development efforts?" Put it in an ther way, the following questions have to be asked seriously:

1) Under what circumstance of clientele population wh subsidized labor contribution of the people is legitimate?

2) Under what circumstance of a project when subsidi labor contribution of the people is legitimate?

There are questions that are never asked under the classi cal model of development process when specific strategies a identified for a particular project. As its philosophy, it is accep ed without critically assessing the context under which sub dized labor takes place.

THE ATA: THEIR BACKGROUND

The discussion on the background of the Ata in the imm diately preceding paper provides the context under which t project has been implemented. Hence, this discussion is n longer repeated in this paper. For reference purposes, the rea is advised to relate this paper to the preceding one.

THE ATA FARMING SYSTEMS DEVELOPMENT PROJE

SURADPU involves two sites for testing farming syste development approach. One is in Lake Balinsasayao of the m nicipality of Sibulan and the other is in the Ata settlement Cangguhub, Mabinay, Negros Oriental.

Since one of the concerns of SURADPU is to explore t reactions of various population groups under different eco gical setting, the selection of the Lake Balinsasayao farme and the Ata as the recipients of the program is appropriate. F the Lake Balinsasayao farmers are culturally different from t Ata. The first group consists of lowland Malay Cebuano farme from the coastal areas of Negros Oriental who migrated to the uplands searching for farm and farm opportunities. On the other hand, the Ata are native Negrito tribal population who were born and grew up in the upland communities. The first group is largely known as Christians while the second, animists.

Second, the two sites are ecologically different. The Lake Balinsasayao area still has around 40 percent of its forest cover intact while the rest have been cultivated by the farmers through slash and burn technique. The farm lots are under different stages of ecological succession since farmers try to fallow their plots sequentially. The Ata site, on the other hand, is completely deforested. Farm plots have been cultivated for a number of years without the benefit of fallow. As a result, vegetational cover of farms between cropping period largely consists of shallow-rooted shrubs and ranked grasses. On the basis of altitude, the Lake Balinsasayao area is higher than that of the Ata site. The former is around 800 meters above sea level while the latter is between 300 to 500 meters.

Farming systems development were introduced to both sites around four years ago. While the farm inputs introduced in the two sites were generally the same, the approaches employed were different. In the Lake Balinsasayao area, a strong community organization was established. In fact, around one year was spent in socially preparing the farmers for a community organization. Forming such organization among the farmers in Lake Balinsasayao had no competition with traditional social systems since the farmers have no such form of tradition. In a way such organization provided the farmers a vehicle for more social interactions during meetings. Through the organization, collective actions and activities were undertaken.

Among the Ata, on the other hand, community organization was not introduced. This was followed since the Ata has a tradition of a loose sociopolitical system that maintains social order among the population. For possible competition with tradition, the project proceeded without creating a new system of community organization. As a cultural group, we have to respect their tradition. Tradition should not be eroded by imposing on them a new sociopolitical structure.

Another methodological difference between the Lake Balin-sasayao and the Ata farming systems development project is on the labor input of the farmers into the farms. The Lake Balinsasayao farmers provided all the labor require-ments in the development of their farms without any subsidy from the project. Since they practice food storing, they do not have to face the problem of starvation when their labor is com-mitted to the development of their farms which does not provide immediate production. In short, the Lake Balinsasayao farmers can afford to invest their labor on farm development for future return without facing the hazard of hunger. Under this context full labor counterpart from the farmers can be appropriately ex-pected.

On the other hand, the Ata do not store food since there is not much to store. As we saw earlier, their food production is low. Hence, food quest remains to be a daily activity of the Ata just like when they were still nomadic hunters, collectors and fishers. Unlike the Lake Balinsasayao farmers, the Ata cannot afford to invest their labor on the farm that does not provide them imme-diate food reward. Labor inputs into the development of their farm for an extended period of time will surely compete with their daily food quest. Hence, subsidized labor for farm develop-ment among the Ata is most appropriate. The Ata context, there-fore, requires that they should not be expected to fully shoulder the labor cost in farm development since they cannot afford.

The classical approach in extension program is employed in the Lake Balinsasayao farmers while an alternative method is employed for the Ata. The choice of these particular methods for the two groups of subjects is legitimated by the respective social context of the two groups of population.

The farming systems development of the Ata involves two phases. The first phase consists of the introduction of soil con-servation measures. When the first phase is over, the teaching process moves to to the second phase, cropping systems develop-ment. The unit of approach is the household farm. Since the decision making concerning farm use and development is largely handled by the household, the plan and the implementation of farming systems development were targeted to the household and to the community. This is based on the assumption that a household has a peculiar food need, labor capability and farm constraints and opportunities. Therefore, plans for farming development have to be seen on the basis of the household.

Soil conservation inputs include a number of techniques. These techniques are designed to achieve three results. *First,* to prevent the remaining top soil from eroding. *Second,* to restore the lost soil through decomposition of biomass derive from vegetations that are used to help keep the soil from erosion. *Third,* to maintain and improve soil fertility by trapping runoff soil and by nutrient cycling from various vegetations introduced to prevent soil from erosion.

On sloping farms where abundant rocks are available, the Ata are encouraged to introduce contour rock walling. Otherwise, contour terracing or canal system is introduced. On a subsidized labor basis, the Ata is paid 50 percent of the usual wage labor charging the community to construct these measures. The subsidy that the Ata get during their employment is used to provide them the necessary food.

Contoured rockwalls, terrace and canal systems are strengthened with the use of various plants along their sides. As feed support for livestocks, the Ata are encouraged to plant napier grasses as buffer plants together with *Leucaena leucocephala* and *Gliricidia sepium*. At a certain interval, fruit trees are also planted to keep the rock walls and canals intact. Planting activities of buffer vegetation are no longer subsidized by the project. It is totally the responsibility of the Ata.

On cropping systems development, the Ata are encouraged to introduce mixed cropping to reduce the risks or hazards of mono cropping, to improve the utilization efficiency of soil nutrients, to prevent the outbreak of certain diseases. Under this condition, it is assumed that the Ata will be able to improve their production success level. The cropping systems development has also other multiple concerns. First, the introduction of appropriate cropping systems is assumed to also help reduce so erosion. Second, it will improve soil fertility. And third, it wi help restore the lost soil through its organic decomposition.

Contoured alley and strip planting utilizing leguminous cro together with non-leguminous ones are encouraged. Throu the use of an agricultural worker, the Ata are taught the tec niques of employing the practice. The technical agent stays i the site for 21 days a month directly relating with, and taking the Ata farmers.

Aside from the subsistence crops that are grown, the farme are advised to plant trees on areas where subsistence crops d not grow well. This usually happens on steep rocky slopes whe more intensive agricultural activities are difficult to impleme These trees will eventually provide the Ata building materials a fuelwood in the future. Considering that there are no more fore in the area, the planted trees can also restore the vegetatio cover of the non-arable spots.

All these development activities are implemented on a hou hold level. The field technician interacts with an individual farm concerning the latter's plan of activities for his own farm de opment. The plan is designed on the basis of the farmer's co traints and opportunities. Likewise, the implementation of t plan is also done on a household level, not on the community. S activities which are the major thrusts of the Ata project can implemented without necessarily having a community organi tion support. This is very appropriate for the Ata where a tra tional loose sociopolitical system exists.

Farming systems development for the Ata is a direct int vention on their progressively declining farm production. T entry point is food production through the introduction of a propriate soil management and cropping system. As an extens activity, it is intentionally implemented without the use of co munity organization. The deliberate exclusion of community o ganization from the thrust of the project has been justified the following reasons. *First*, farming systems development be adequately implemented without having community organization since the activities and plans are operationalized on a household level as mentioned earlier. *Second,* as noted elsewhere in this paper, the Ata have a traditional loose sociopolitical system which provided them the freedom they need. Such sense of freedom should not be eroded by forcing them to form community organization. The bottom-up principle of extension planning requires that such tradition of the Ata should be respected.

The Ata project allows the farmers to have only 50 percent of their labor as their counterpart in the construction of measures that conserve the soil. The rest is subsidized by the project to allow them to survive at the time when the erosion control devices are constructed. This is justified by the fact that they do not store food as we saw earlier. To help the Ata help themselves, we have to keep them alive first. This, I think, is an ethical responsibility of any extension program. People first is a just policy.

So, what has been achieved in the farms of the Ata using the approach we just have described? Let us first look into the soil conservation devices constructed. Four types of soil protection measures have been established on the Ata farms. These are contoured hedgerows, contoured canal system, contoured rockwall and contoured terrace. Considering the strong character of the soil, contoured rockwalling became the prevalent measure of soil conservation put up. This is followed by the contoured canal system.

The construction of these measures covers 18 hectares which is around 86 percent of the total land area of the Ata settlement. Forty-eight percent of the protected land from erosion (18 hectares) is provided with contoured rockwalls, 44% with contoured canal system, 5% with contoured hedgerows and 2% with contoured terrace.

Along the sides of these soil conservation measures are various buffer plants grown. Thse include napier grasses, *Leucaena leucocephala* and fruit trees like jackfruit and mango. *Glerecedia sepium* was tried but not one survived after one summer period.

For cropping systems, various leguminous plants have been introduced for mixed cropping with their staple crop, corn. These leguminous plants include peanut, mung bean, pegion, pea and bush beans. Mixed cropping is being practiced in almost all of the 18 hectares developed by the 18 families.

In addition, vegetable production has been introduced to improve their nutrition. Few farms have tried using compost as fertilizers. As part of the soil fertility improvement program, the Ata are taught on making compost and they have been involved in the process of constructing a compost site.

The accomplishment of the Ata project is comparable to that of the Lake Balinsasayao farmers. Just on soil conservation alone the Ata have covered 85 percent of the land area to be developed. In fact, this is bigger than what the Lake Balinsasayao project has accomplished. The latter has only covered slightly over percent of its total target area.

The output of the Ata project suggests that its implementation was not hampered by the absence of community organization. The individual household approach proved to be just as effective as when the point of entry and implementation is made through the community organizaton as what we noted for the Lake Balinsasayao Project.

THE ALTERNATIVE EXTENSION APPROACH FOR UPLAND TRIBAL POPULATION

The Ata group of people is not necessarily a peculiar group of upland tribal population. It is one of the numerous groups of native population from the north, central and southern Philippines. While these native populations are at present in their different degrees of change, the conditions are the same. They have their own traditional sociopolitical system while they are all trying to make a living under the condition of rapid and extensive deforestation. Hence, the food production level of these people has declined tremendously affecting their daily food supply. For most upland tribal population therefore, food production for immediate consumption is a daily activity.

This is the context of upland tribal population under which upland development programs for the natives are implemented. This context should be seriously considered in designing the approach for extension activity. Also, the thrust of extension program for the upland tribal population should address at the immediate food production problem of the upland native population.

Since the upland farms are generally marginal for agricultural purposes, and farms are the life support systems of the upland natives, extension program or these people should be designed towards the development of farming systems. This farming systems development should have at least two components as the Ata project suggests. First, it should have soil conservation and development component. Second, cropping systems development should be introduced either simultaneously with soil conservation development or after it, as what had been experienced with the Ata. Of course, it is assumed that with this nature of development program, a provision for land tenure system for the natives is already provided for.

The extension approach for the upland tribal population should deemphasize the development of community organization because the natives have their own traditon which is either loose or highly structured. Such tradition should in fact, be supported and nourished to provide certain element of cultural continuity to the people in the face of massive sociocultural change. The absence of community organization in extension approach would simultaneously provide the desired freedom usually experienced in groups where loose sociopolitical system exist or a continuity of traditional structured sociopolitical systems such as those among the natives in Mountain Province or the Muslims in the south. The creation of community organization designed for extension program purposes will only create conflict with tradition and generate confusion on the part of the local native population.

The Ata experience demonstrated a case where extension program can still be implemented without necessarily having formed any community organization. Since development programs for upland tribal population need to be addressed at th development of appropriate upland farming technologies to mak assistance programs relevant to the local upland condition, com munity organization becomes more unnecessary. As we saw ear lier, farming systems development can become appropriate an effective approach on a household level. Hence, community or ganization should not be the *sine-qua-non* for the implementatio of farming systems development for upland tribal population.

The other very important aspect of extension approach fo the upland tribal population is on labor subsidy. The questio that the classical extension approach will raise against labor su sidy will be on dole out. The alternative approach which we ha employed for the Ata, on the other hand, argues that such su port is not a dole out. Under the socioeconomic context of the u land tribal population, labor subsidy is an essential support to ke the natives alive while we are in the process of helping them he themselves. As stressed earlier, any extension program design for the upland natives has the moral obligation to protect the li of the subject. This is the underlying philosophy of labor subsi for upland tribal population.

As we saw earlier, labor subsidy in farming systems dev opment is not a doleout. For emphasis, the following reaso have to be noted:

1) The amount used to subsidize labor, produces inputs th are not consumable. Rockwalls, canal systems and terraces, j to mention a few are permanent inputs on farms which will ha long term and lasting effect on farm production;

2) Any positive effect that these measures will bring i their farm production will have a multiplier effect towards e pansion of farm lands installed with soil conservation measur and

3) The subsidized activity produces a farm lot where int sive cropping systems can be implemented to improve farm p ductivity.

A dole out assumes that whatever goods or cash extended to the farmers are considered as consumables. They do not generate opportunities for bigger return in the future. The labor subsidy we provided to the Ata obviously does not belong to the category of a dole out. It is a positive investment for future generation of income bigger than the subsidy that the Ata received. It is therefore for self income-generating.

SUMMARY AND RECOMMENDATIONS

The paper has demonstrated that the alternative approach to extension work among the Ata is just as effective, if not more, compared to the classical approach employed for the Lake Balinsasayao farmers. The alternative approach is basically designed for native tribal population in the uplands whose traditions have established either a loose or a rigid sociopolitical system and whose economic system is generally characterized at present with low productivity. Under such circumstance, the approach has been found very appropriate as demonstrated by our own experience with the Ata project. This approach is characterized by the emphasis of community organization as a requisite for extension activities and the encouragement for the use of subsidized labor in implementing development activities in the farm. As discussed earlier, this labor subsidy is not a dole out since it has the capacity to generate more income from the farm in the long run. It is a form of investment designed for long-term payoff.

In the light of planning and implementing extension program, the following are recommended:

1) Extension programs should be critically evaluated on the basis of the nature of the program and the culture of the people to be involved for appropriate approach identification;

2) This critical evaluation should look into the appropriateness of community organization and full labor counterpart from the whole population as requirement for program implementation;

3) The concept of dole out has to be reevaluated in the context of the capability of goods or cash extended to either directly or indirectly generate income in the long run. This long-run dimension of payoff is very critical for programs that are designed to stabilize and sustain productivity. Any subsidy that produces this result should not be considered as a dole out.

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PRODUCTION AND CROPPING STYLES: AN ANALYSIS OF RESULTS OF INTERVENTION ON COOPERATORS AND DEMONSTRATION FARMS IN LAKE BALINSASAYAO

Rowe V. Cadeliña *

INTRODUCTION

The Silliman University Research Action Development Program in the Uplands (SURADPU) has two major concerns on the aspect of technological development: first, to improve the farmers' cropping and land use practices that will enable them to conserve soil on their farms; second, to increase the productivity of their farms. After two years of implementation of SURADPU in Lake Balinsasayao area, data on the following from farming cooperators have been collected: crops planted annually; total annual production; total number of crop varieties planted in one year; total length of soil protection devices installed (i.e. rockwalls, hedgerows, contour canals, bench terrace, etc.); number of varieties of nitrogen fixing crops planted; number of years farm has been cultivated; percent slope of farm cultivated; total area of farm; length of stay of farmer in the community; number of labor force in the household; and number of persons in the household of farmer cooperators.

Assuming that rainfall and other biophysical factors are the same in various farm communities of the area, we wanted to find out how the socially based factors affect each other to produce a particular profile of cropping styles and production level.

The intervention that SURADPU has implemented on the cooperators' farms is assumed to be a given factor which is uniformly accessible to the subjects of this study.

THEORETICAL FRAMEWORK

Land management style is complex involving a number of components, such as, crop sequencing, intensity of cropping, crop mixing and conservation practices, among others.

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Such complex could be altered by some intervention activities that may be introduced into the community. Considering that subjects of the study are farmers who comprise the clientele of SURADPU, the present land use practices of these farmers can be assumed mainly to be the results of these interventions.

What inhibits or what facilitates implementation of the present land use practices are relevant questions to pursue toward our concern for the development of farming systems in the island. Sociologically, factors such as household size, number of labor force in the household, length of stay in the community, number of years farms have been cultivated and total area of farms cultivated, could affect the overall patterns of land use practices. The acceptance of various soil protection systems will surely hinge on a number of these sociological factors. Some biologically related conditions in the farm such as farm slopes may also serve as a significant limiting factor on land use practices.

Hence, a number of these characteristics will have a predictive value on farming activities, vis-a-vis production. Obviously such value will allow one to design plans and programs intended to improve land use practices and production. The assumption is — the higher the level of our understanding of the nuances of land use systems traditionally practiced or introduced, the more effective and the more successful in intervention designs.

LAND USE STYLE

The data bases were collected: (1) case data from two farmers; (2) census data from 12 cooperating farmers.

Case Studies

Two case farmers were studied. One case farmer was born and raised in the area. His father migrated to the community in the 1920s. His (the case farmer) wife with whom he has five children, the eldest of which is 12 years old, was also born in the same community. The children next to the eldest are below 10 years old. By using age 10 as the cut-off point for classification of household members in the labor force, this indicates that there are 3 members in their productive working age.

The other is a migrant who came to the community with his family around three years ago. They cultivate a farm that was already claimed by an earlier occupant. With his social network, the farmer managed to arrange for free use of a portion of the land with the owner. He works in a 1.5-hectare land.

The couple has five children one of whom is already in a productive working-age category. Like the first case, this couple has three members in the household labor force.

Case 1: The farm was first opened in 1968. After its first clearing, it was planted with corn. Toward the end of the first year of occupation, root crops such as *karnabal* (*Xanthosoma violaceum* Schott) and *ubi* (*Dioscorea esculenta* Crantz.) were planted. Then, the farm was left to rest. In 1972, *abaca* (*Musa textilis* Nee) was planted. Since then, various crops were planted (see Figure 1).

His plot has an area of 22,000 square meters with various soil protection devices, such as contoured hedgerows, rockwalls and contoured bench terraces. In a period of 14 months (February 1985 to March 1986), 23 different crops were planted in the farm. There were 96 planting times made during this period (see Table 1). This suggests an average of seven planting "episodes" per month.

Certain crops have high frequency of planting "episodes.' Such crops have usually high market price and are easy to transport. For instance, sweet pepper (*Capsicum annum* L.) has the highest frequency during the whole period of observation (15 times). Such high frequency of planting does not, however, provide enough time to cultivate wider area hence its minimum area (... sq. m.) of cultivation is considered rather low, although the maximum is 320 sq. m. (see Table 1).

The reason for low acreage of cultivation of crops like sweet pepper (*Capsicum annum* L.) can be explained by factors other than the frequency of planting. For instance, the mungbeans (*Phaseolus radiatus* L.) which has one of the lowest planting frequency, has also a very low acreage. This suggests that other factors affect acreage. Productivity, sensitivity to pests an market price affect the decision to maintain or expand far acreage, the farmer reported.

Capsicum annum is one crop that commands a very high pri in the market but because of its extremely high susceptibility t local pests, the farmers reduce the risk by not planting too lar an area separated into different plots. Since those plots cann be cultivated at the same time, the farmer produces a system whe plots are not in turn, planted at the same time. The farmers repor ed that schedule of planting can also affect the incidence o local pests on crops. By planting crops at different times, th distribution and the spread of pests can be controlled.

There is one apparent lesson we can learn from the farmin style of Case farmer no. 1. Pests risk is handled by diversifyin space sites of a particular crop as well as by distributing tempo ral incidents of the planting episodes. Since pests occur in cycle, staggering the planting episodes of a highly marketab crop, reduces the risk attendant to a synchronic system of plan ing. Another risk and hazard the farmer faces emanates from socioeconomic source. As discussed in another paper (see Cad liña 1986), even subsistence farmers in the upland depend on market system to allow them to convert their products into cas for goods they do not locally produce but are very essential fo their survival. Hence certain products with very high mark value is preferred (see Table 2). These preferred crops are plan ed more often than others. Prices of these crops depend on th manner the middlemen fix the prices. However, even for mos preferred crops, prices of farm products are fluctuating. The are times when prices go up or down and the farmer prefers t have the products available when the price is high. The proble is they do not know exactly when the price will go up.

Case farmer no. 1 handles this problem by planting the mos preferred crops as often as possible but on different dates. Suc scheme allows the farmer to harvest his crop during differe times hence allowing the farmer to hit the best price durin any harvesting period. Such strategy improves his chances o getting higher cash return from his crop.

Another apparent style of cropping is the continuous planting of various crops during the whole year (see Figure 1). Case farmer no. 1 planted his crops throughout the year except in the month of July. The absence of planting activities during this month may be explained by the extremely high rainfall during this period. Rainfall data collected in 1983 showed that the months of July and August had the highest participation level (see Table 1). However, the ability of the farmer to plant continuously during the whole year depends on the availability of rainfall. Since Lake Balinsasayao physically allows precipitation to take place even during summer months, farmers still have better chances to grow crops during these months. Figure 1 shows that even during the summer months (January to May), a tremendous variety of crops can still be planted. It is only in the months of February during 1985 and 1986 when the lowest number of crops planted was registered. Such fluctuation is explained by labor availability in the household and other commitments of the farmer.

There is one crop that has been reported to be planted only once before but continues to surface in the list of products sold by the farmer at present. This is "sayote" (*Secheum edule*). Figure 1 shows that the last time this crop was planted was in 1984. During the last two years, this has never been reported as being planted again. This crop deserves a special report in the light of farm management around the Lake Balinsasayao area.

Secheum edule is a vine. The very ripe fruit with seed still intact is usually planted on the edge of the farms, or on ecotones toward the end of a cropping period. In this zone, part of the primary forest and the secondary vegetation areas provide the planting site. It loves the shade that the primary and the secondary forest cover provides. Once it starts to grow, it keeps on germinating new plants (as the nature unharvested fruits drop to the ground) even without maintenance. As long as wild animals cannot destroy the stock, the crop grows forever and continues to produce the vegetable fruit. Its vines creep and continue to seek diffused lights. A farm that is not subjected to firing will continue to produce *Secheum edule*.

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Secheum edule is a vine. The very ripe fruit with seed still intact, is usually planted on the edge of the farms, or on ecotones toward the end of a cropping period. In this zone, part of the primary forest and the secondary vegetation areas provide the planting site. It loves the shade that the primary and the secondary forest cover provides. Once it starts to grow, it keeps on germinating new plants (as the nature unharvested fruits drop to the ground) even without maintenance. As long as wild animals do not destroy the stock, the crop grows forever and continues to produce the vegetable fruit. Its vines creep and continue to seek diffused lights. A farm that is not subjected to firing will continue to produce *Secheum edule*.

For more than a year, Case Farmer No. 1 never replanted (February 1985-March 1986) *Secheum edule* but still continues to harvest the fruit and leaf tops. Farmers consider the crop as an insurance crop during the time when they are not able to work. It is therefore a mainstay crop in Lake Balinsasayao farms. Although its price is one of the lowest, the limited labor input that is required after it has been planted makes the overall returns still a little bit higher. The major problem is its transport to the market place. The fruit vegetable is quite heavy and the price per kilo is low (see Table 2). One has to bring a tremendous volume of the product before a substantial amount can be produced. Its transport cost further reduces the profit margin of the farmers.

Nevertheless, in unexpected events such as illness and other emergency cases, *Secheum edule* provides a suitable buffer against cash shortage. Despite its low market price and high transport cost, the product still allows the farmer to draw in the badly needed cash and other goods. Hence, it has to become a regular feature in the crop repertoire of the farm. In this case, the farmer does not necessarily keep the plant for profitability but for security. In this regard, cropping involves two major considerations: profitability and security.

Needless to say, there are trade-offs to take into account. The farmers can be assumed to know exactly which side of the trade-off he should stand after evaluation of the pros and cons are done.

If we take the sum of the areas for all plots planted to various crops in Table 1, it is very apparent that the farmer does not cultivate the total farm area of 22,000 sq. m. in 14 months. During this period, the farmer has only cultivated 14,497 sq. m. which is 66% of the total. Considering such factors as fallowing, shifting farm sites and farming scale, the farmer needs around two years before he can make use of his entire farm area. With his present cropping style, the farmer can allow his farm to fallow for around one year to restore partly its natural fertility.

Permanent crops like abaca (*Musa textilis* Nee) were planted on his farm in 1972. Other permanent crops were planted very lately along the side of contoured rockwalls. These trees serve as suitable support system to the rockwalls. Tree crops like *Coffea arabica* L., *Theobroma cacao* L., breadfruit, *atis, chicos,* and *lanzones* (*Lanzium domesticum*) are lined along rockwalls. Eventually, the crown of these trees will help protect the ground soil underneath from direct rain drops reducing splash erosion. These permanent crops are envisioned by the farmer to increase his level of farm production.

Case No. 2: His farm was opened by the original cultivator in the 1930s but was abandoned in the 1960s. It has not been cultivated again until the farmer came in the early 1980s. With a friendly arrangement, the farmer was allowed by the owner to cultivate part of the site. He requested to make use of only 15,000 sq. m. The site has no permanent crops and was all covered with cogon grasses when he started cultivating it.

In his farm, the following soil protection devices are found: (1) contoured rockwall; (2) contoured hedgerows; (3) contoured bench terraces.

Case Farmer No. 2 is different from Case Farmer No. 1 in the kind of crops planted and the extent of the diversity of crops. While Case No. 2 farmer has maintained a certain level of diversity of crops planted in his farm, Case No. 1 farmer has gone into a kind of specialized farming by concentrating on the production of vegetables (see Figure 2). For instance, he has planted root crop only once; corn, twice (see Table 4). Only 600 sq. m. was planted with corn and another 600 meters with root crops.

Just like Case No. 1, Case No. 2 seems to be responding to the marketability of products when a particular crop is chosen for planting (see Table 5). The top three crops that are planted (tomatoes, corn and *carnabal*) are also the top three crops "pricewise." Profitability as the motivation for the selection of crops is very apparent.

Unlike Case No. 1, Case No. 2 has never planted *Secheum edule,* considered the cheapest crop. However, as we saw it earlier, *Secheum edule* serves as an excellent insurance crop. Since Case Farmer No. 2 has not planted this security crop, does he consider only profit and not security?

This can be answered by looking at the kind of crops that he has planted. Eggplant (*Solanum melongena* L.) ranks last in the line of crops for Case No. 2. Unlike other crops planted by Case No. 2, *Solanum melongena* L. is semi-perennial. It can last for two years if properly maintained. It is more pest resistant compared with other crops. It is capable of having a sustained increasing production for almost two years before it finally stops bearing fruit with lesser input. Hence, it still serves as a security crop for Case No. 2. Asked why he is not planting *Secheum edule,* he said that the crop is too difficult to transport and is cheap compared to *Solanum melongena* L.

Case No. 2 is a good example in point where the trade-offs between profitability and security concerns are handled. Since he cannot have his cake and eat it too, he opts for a crop that provides some amount of security and profitability. He takes *Solanum melongena* L. more seriously than does Case No. 1. Case No. 1 cultivates only, on the average, 124 sq. m. of plot for *Solanum melongena* L., with a range of 56 to 371 sq. m. for production. Case No. 2, on the other hand, cultivates significantly wider area than Case No. 1. On the average, he cultivates 313 sq. m. with a range of 100 to 420 sq. m. (see Table 4). The details of his cultivation acreage are seen in Table 5.

While Case No. 2 has a unique strategy of maintaining crop diversity in his farm, he has also maintained a specialized motif for his farm. For Case No. 1 we saw an obvious attempt to keep crop diversity at a high level. Oddly enough, no specific motif can be discerned. Case No. 2 maintains a prevailing motif (that of "vegetable line-up"), and still keeps a certain level of diversity. Case No. 2's farm can therefore be considered as a vegetable producing farm. For this reason, we see only something like eight varieties of plants in his farm while around 23 different varieties were noted for Case No. 1. Such varieties does not seem to provide any sense of direction for his farm. In fact, one is led to believe that production will be decreased although very high level of security can be expected.

For Case No. 2, a sense of direction is manifested. The goal is to improve productivity and profitability. There is still a certain amount of security although not as high as what we might find for Case No. 1. For instance, Case No. 2 has not yet planted any permanent tree crops for long term security and productivity while Case No. 1 has already moved farther in this area. Case No. 2 is highly engrossed in assuring for himself a good profit margin by concentrating his efforts on crops with high returns. In addition, extensive soil protection devices are put up. This latter activity is, however, also undertaken by Case No. 1.

Like Case No. 1, Case No. 2 does not cultivate his entire 15,000 sq. m. of land. Under the present cropping style of Case No. 2 only around 38% (5,669 sq. m.) of his total land area is cultivated. With this, it will take him around three years to cover the entire farm area. Given this period, his cultivated plot can have at most around three years of resting before it has to be cultivated again. This fallow period is very much longer than his Case No. 1 counterpart.

It was mentioned earlier that Case No. 2 is more profit-oriented rather than security-oriented. This is an impression we get from the way the two farmers manage their farms. Let us see whether this is demonstrated by the production level of the farmers.

For 11 months, the total farm production of Case No. 2 was documented by weighing all the products. Similar procedure was done for Case No. 1, but the process went on for only 10 months. The data revealed that Case No. 1 produced only 1,131 kilo of various products while Case No. 2 produced more than twice as much as Case No. 1. Around 2,943 kilograms of various farm products was produced by Case No. 2 during a period of 11 months. Even if we give an allowance of one month for Case No. 1 (an average monthly production of 113 kilograms), the difference still showed the same magnitude.

Production data sugest that the farming style of Case No.2 wa more profitable than that of Case No. 1. This confirms our im pression of higher advantage probably due to the latter's croppin style and choice of crops.

Given the farming experience of the two cases, two styles o farm management are also apparent. One is profit geared wi minimum security consideration and the other is security geare with minimum profit consideration. Theoretically, a third sty must be possible (i. e. high profit and high security consideration However, considering that it is difficult to have both at the sam time, farmers usually end up with trade-off that will allow the to provide an optional survival chances.

From the two cases considered, security measures are st imperative. However, the manner and intensity of implemen tion differ. Again, such differences can probably be explain by the way they reckon waiting time for outcome. It appears th for Case No. 1 long-term results are enough while Case No short-term results matter more. Considering that Case No. 2 is recent migrant, the more pressing need should be satisfied im mediately.

Assuming that these impressions are valid, the results differentiated philosophies can be tested over time. The questi that we can ask at this time is: Will the production level of th long-term oriented farmer turn out to be higher than that of th short-term oriented farmer five years from now? Given o present research program in the University, this condition c be documented in the next five years. Five years is an adequ time to measure changes in the production level between the t cases since most of the long-term crops will already be product during this time. Assuming that these farmers will not move t other places, we hope these data can be documented five ye hence.

Census Study

While case study allows us to see the details of the proce involved in the way the farmers manage their farms, it howe does not allow us to see the relationships between a numbe factors operating on a macro level. The applicability of certain observations to a larger population can only be achieved when a larger number of cases are observed and monitored.

After a census was made to get a profile of the 12 participating farmers, it was found out that a farmer cultivates an average of 1.4 hectares. An average of 6 persons live in each farming household. Around four of them belong to the labor force, the rest are dependents. They have been living in the community for 36 years on the average and their farms have been cultivated for around 24 years. This suggests that their present farms were not originally theirs.

On the average, their farms are found on areas with a percentage slope of 43 %. These comprise a marginal land which is very sensitive to erosion caused by human activity.

On the average, these farms consist of 452 meters protected by various forms of soil protection devices. These are planted to a number of varieties of crops, on the average, 14. Among these plants, three different varieties, on the average, are nitrogen fixers. The following table summarizes the general characteristics of three farmers.

Somewhere in the initial part of this paper, a number of variables were identified as possible factors affecting various farm management styles. Ten variables were identified: number of persons in household (NOPH); number of labor force in household (NOLFOH); length of stay of farmer in the community (LOSFAC); total area of farms (TAF); percentage slope of farm (PESFARM); number of years a farm has been cultivated (NOYFAC); number of varieties of nitrogen fixing crops planted (NOVIFIX); total length of farm covered by soil protection devices (TOLSOP); total number of crops planted (TONCROP); and total weight in kilograms of all products produced in one year (TOWALL). The question we have to raise is: How are these variables related to each other?

A census was made for 12 farmers who are active participants of the project. Planting and production patterns of farming activities of these farmers were monitored for 12 months.

Table 7 shows our initial statistical analysis to determine the level of correlation between these 10 variables. Using .75 and above as cut-off point for acceptable coefficient value of correlation, Table 8 lists these correlated variables, and the nature of their correlations and the percentage of the variance of the dependent variable as explained by the independent variable.

The way a farmer manages his farm is assumed to be affected by the size of the farm. Table 8 shows, however, that farm area is negatively correlated with the slope of the farm. In other words, as the farm gets steeper, the farmer tends to generally get a smaller area of farm on the sites. This is expected considering the increasing marginality of the farm as its slope gets steeper. The utility value of the land diminishes reducing the interest of the farmer to till this type of land. Since there is no direct correlation of percentage slope of farms with other variables of land management styles, this suggests that its effect on the way the farmer manages his farm is indirect. The correlation coefficient of percentage slope of farm with other variabels on land management such as number of varieties of nitrogen fixing plants planted, total length of soil protection devices installed, and total number of crops planted is, however, very weak and negligible.

The longer the farmer stays in the community, the more likely he is going to introduce more varied types of nitrogen fixing pants on his farm. Similar kind of relationship between the number of varieties of nitrogen fixing plants and the total area of farm own exists. Positive correlation exists between these variables. This may be due to the fact that there is a tendency for farmers who have stayed in the area longer to have accumulated more farm land. However, the correlation coefficient between total area of farm and the length of stay of farmer in the community is quite low ($r = .411$). Such coefficient of correlation suggests a very low coefficient of determination taking only around 17% of the total variance of the dependent variable explained by the independent variable.

Farmers who have stayed in the community longer tend to have planted more varied crops in their farms. This would be a result of the cumulative effects of gradual planting of permanent tree crops. And, as the number of crops in the farms increases, the more number of varieties of nitrogen fixing plants are introduced. This could be due to the "exhaustion effect" (i. e. when almost all possible plant varieties shall have been planted), so that a good number of the new plants tried could only be the nitrogen fixers. Plants that were introduced earlier were non-leguminous ones. As the project encourages the farmers to try new ones, most of those who have already maintained a highly diverse crops in the farm will have little option but the leguminous ones, which are considered to be popular as soil enrich (nitrogen fixers).

One of the assumptions held earlier was that the availability of labor force in the household can largely affect the activity of farming households for the introduction of soil conservation measures on their farms. Statistical test does not support this assumption. Table 7 shows an extremely low negative correlation of these variables (r=.092). Instead, it is the total household size that has a better correlation with the implementation of soil protection devices. Total length of area covered by soil protection devices installed (TOSOP) when correlated with number of persons in household (NOPH) yielded a rather high correlation coefficient (r=.641). The bigger the household size, the more soil protection devices are put up on the farm. Since putting up of soil protection devices is easier done when people work in groups, the bigger the household size, the more excellent the psychological support provided to the farmers compared when a farmer puts up the devices by himself. It appears that it is the conviviality of people during the process of working that encourages the participants to accomplish more work in putting up the soil protection devices.

It was, however, thought initially that the availability of labor in the household is a function of household size. If this is correct then we can assume that perhaps those larger households have better chances of deploying labor force to the farm to do the work. Statistical test, however, does not confirm this. Table 7 shows that the number of labor force in the household has a very weak correlation with household size.

Attempts were made to establish some predictive values of the various independent variables on the dependent variables. Table 9 presents this. The total number of crops planted in the farm has the best predictor for planting more varieties of nitrogen fixing plants. The more crops a farmer plants in his farm, the more likely that he will have planted more varieties of leguminous plants and vice versa. The total land area of the farm ranks next and followed by the length of stay of farmer in the farm as predictor for the number of variety of nitrogen fixing plants.

Demonstration Farm (Demo farm)

Aside from monitoring the cropping styles of the farmer cooperators, we also documented the manner by which our demo farms were cropped. The purpose of our demo farm is to test a number of cropping systems and to measure actual production, length of time for crops to mature, cropping and harvesting "episodes" and production level.

Three demo sites were developed. Each site has an average area of 3,000 square meters. One has a percentage slope of 60, the other 70, and the third 10. Soil fertility of these demo sites were exhausted and hence soil needs rehabilitation. In a period of four months, 14 different crops were planted on an area of 1,786 square meters (see Table 10). These were 21 different times or episodes of planting involving differentiated areas of plot. The largest, 224 sq. m. were planted to cassava; and the two smallest plots having an area of 17 square meters each, were planted with tomatoes and bush beans.

For the 21 different planting "episodes," around 85 sq. m. on the average, were planted for every planting activity. Considering that there are only, on the average, five planting episodes in one month, this suggests that more plants can still be planted during this period if a farmer really wants to optimize plot utilization. Remember that with this rate, he is only cultivating 85 sq. m. for every plot of crop. Since there is an interval of around 6 days between planting activities, this further indicates that a farmer is still in a position to expand his clearing larger than 85 sq. m. Hence, under the planting rate from our three demos, there are two possibilities that the farmer can do which in either case would increase his production considering other factors equal. First, he can increase his cultivation so that it will be larger than his present size of 85 sq. m. Second, he can have more varieties of crops planted such that increase in diversity of crops may improve the quality of his farm by increasing fertility and production eventually.

One lesson we have learned from our demo farms' system of cropping is that there is still much room for improving the optimal level of cultivating the farm for maximum production. Since the demo farm was operated on a one-man labor basis, this suggests that a household with two members of the labor force can double the rate of cultivation of our demo. This would logically suggest doubling of production.

Since diversity of crops (especially when leguminous plants are introduced) has been found in other places to be more advantageous to production than the specialized ones, this would suggest an increasing improvement of the farm productivity. Our data somewhere in this paper suggest that as the crops in the farm get more diversified, the more likely that these farms will have more leguminous crops planted. In totality, a highly diverse cropping system will always be a more profitable style of utilizing land.

Since most subsistence crops are early maturing ones, it is therefore possible that a number of crops can be planted in a series on the same plot. Table 11 shows the number of days that keep a plot occupied before it is ready for another crop.

A plot could be planted a number of times depending on the kinds of crops a farmer plants. Table 11 shows that some crops will require less than 100 days which include harvesting and field preparation before a plot can be made ready for second cultivation if the scale of production is kept at the level of our demo plot. For larger cultivation, it will require a little longer period. On the basis of our experience with the demo plots, a factor of two-man days at most including drying is required to cultivate a 500 sq. m. plot.

Since it is not advisable to plant similar crops in a series in the same piece of land, a farmer therefore can combine a number of crops which have short maturing time thereby increasing the frequency of cropping. Assuming that there is a cumulative effect of production from frequency of cropping, the higher the frequency, the larger will be its absolute total production. Since this serializing of crops will emphasize rotation of different crops, not repetition, it is anticipated that the level of production can be kept at an optimal level. Various leguminous crops (see Table 10) can easily be rotated with other non-leguminous ones.

PRODUCTION

Given the farmers' cropping style, how much are they producing from their farms? To measure production, crude weights of products were taken. No attempts were made to determine the relative caloric efficiency of different crops.

Three categories of studied units will again be analyzed separately, i. e. case studies, census study and demo plot study.

Case Number One: Table 12 shows the level of production of Case No. 1 for every crop and for all crops on a monthly basis. The total producton for every crop during a period of 10 months is also shown.

In a period of 10 months, the farmer produced more than one ton (1,130.975 kilograms). Assuming that he is producing around 113 kilograms per month (see Table 12), in a period of 12 months he must be producing approximately 1,357 kilograms of food crops. Since there are 7 persons in the househod, the per capita annual production for this household is approximately 194 kilograms. This suggests that for every member in the household, there is only around one-half kilogram of food products coming from 21 different crops available to a person every day. Considering the diversity of these crops, the nutritional value of these crops must be relatively good.

The greatest bulk of his production comes from a major carbohydrate producer root crop (*Xanthosoma violaceum* Schott.). This is followed by a fruit vegetable rich in vitamins, squash (*Cucurbita maxima* Duch.). Slightly over 5% of its total production comes from a protein rich vegetable, Baguio beans (*Phaseolus vulgaris* L.). If we take all the products derived from various varieties of leguminous or bean products (see Table 13), its contribution to the total household production is something like 7%.

The monthly production pattern is, however, not constant. Figure 3 shows that the highest production took place in September 1985; and the yowest — in July 1985, November 1985 and February 1986 during the period when the household production was monitored. It should be noted that the months of January and February 1986 were abnormal months. A strong rain and wind hit the area continuously during the last two weeks of January and continued toward the first two weeks of February. Plots on valleys were inundated by deep waters and the crops on the hillside were leveled to the ground by strong winds. In fact the center of the Project was covered by water up to its rooftop. Farm activities and field activities of the farmers and the field workers respectively have to be suspended temporarily.

It took the farmers another month to recover from the calamity. This suggests that our production level during this period of monitoring had been abnormally reduced.

Case Number Two: Unlike Case Number 1, Case Number 2 has fewer crops than Case Number 1 but with more production than the former. The production level of Case Number 2 is more than twice that of Case Number 1. However, this does not necessarily disprove our contention that crop diversity increases production. We should remember that Case Number 2 has actually diversified his crops (with nine crops) but on a level lower than that of Case Number 1. While Case Number 1 has planted 21 different crops, Case Number 2 has only nine. This seems to suggest that crop diversification requires certain level to be reached beyond which no much difference can be experienced between the number of varieties: Beyond this threshold diversification the only factor that will make the difference in their level of producion will be maintenance of the farm. Our qualitative observation seems to support this for the two case studies we made. For practical considerations, therefore, farmers should be warned that diversification of crops alone is not a sole guarantee for increased production. There are other factors to consider and one of these is farm maintenance.

Table 14 shows the level of production for every crop and all crops on a monthly basis. While Case Number 1 had his largest production in *Xanthosoma violaceum* (a carbohydrate—rich rootcrop). Case Number 2 has no production from this crop as yet. It was noted earlier that Case Number 2 planted this rootcrop very lately only. Case Number 3 has a completely different farming style and interest from Case Number 1 (see Table 15). Tomato (*Lycopersicon esculentum* L.) has the highest contribution to his total production followed by eggplant (*Solanum melongena* L.), some of the lowest from the farm of Case Number 1. This level of crop diversity has provided him (Case Number 2) certain amount of security and his choice of crops and the maintenance of his farm have provided him some amount of profitability.

Case Number 2's farming style is surely more profitable than Case Number 1. With its production level of 2,928 kilograms in 11 months, this suggests an annual yield of approximately 3,194 kilograms. With his seven members in the household, this provides a per capita annual supply of 456 kilograms. This provides a daily supply of food per household of 1.2 kilograms, more than double than that of Case Number 1.

A question that may be raised for Case Number 2 is: Where does he get his carbohydrate supply? It is very apparent that of the total yield of 11 months, Case Number 2 produced only 18 kilograms of corn (*Zea mays* L.). The rest are vegetables. This is surely not enough for his carbohydrate needs. As mentioned earlier, Case Number 2's choice motif in farming is "vegetable production." He has mainly specialized in vegetable production but diversified it by planting those vegetables that provide better price and yield security. The first three crops, as we saw earlier have more stable and higher price and less sensitive to pests. *Capsicum annum* L. which has the highest price, although fluctuating, is also very sensitive to pests unlike *Solanum melogena* L., Baguio beans, and *Lycopersicon esculentum* L. If we look at Table 15, it is very apparent that it has the lowest ranking. Case Number 2 converted his higher cash returns from high priced vegetable by purchasing corn grits for his carbohydrate needs. He claims that this is more efficient.

Case Number 2 is an excellent example where trade-offs are adequately handled to bring optimal profitability to his household. Evidence on production suggests that the style of farming he has selected, as we saw earlier, provided him a better deal for his concern for survival.

How fluctuating is his production during the entire 11-month of documentation? Figure 3 shows a highly erratic production for Case Number 1. Case Number 1 and Case Number 2 are exposed to the same climatological factors. They all had to go through the one-month conflagration discussed earlier. Hence, their difference is only in their style of managing their farms. Figure 4 is telling a lot.

Security is usually measured on the basis of frequency and acuteness of dip or fluctuation of production level. While Figure only shows one major fluctuation or dip in production, it reflects a highly acute one. For instance, in the month of February, when a strong rain and wind hit the area, its production for the whole month went down to as low as 12 kilograms; while for Case Number 1, production during this month went down to only 60 kilograms. The fluctuation for Case Number 2 went down to five times lower than that of Case Number 1.

After the fluctuation, the recovery rate for the two cases seems to be the same. It is difficult to assess what happened between the two cases during the next few months since we were forced to stop the monitoring of the first case due to the worsening peace and order condition in the area where Case Number 1 resides. These two case studies were purposely done on two farmers inhabiting the two opposite sides of the lake, situated around three kilometers apart. For Case Number 2, its production during the second month after the February calamity went to as high as seven times that of February. In May, the third month after this went up to around 14 times.

In the fourth month, however, fluctuation in production again took place but this time within the manageable level of the farmer. This low production still provides a per capita production for the household members around 39 kilograms of food resources. This means a daily supply for every household member of more than 1 kilogram. This is still twice as much as what Case Number 1 produces during the entire period of monitoring.

For Case Number 2 on the whole, it seems to suggest that there is more certainty in the generation of food from a more diverse cropping system. This is reflected by the intensity in the dip of its production during the flood months. The highly diverse cropping system still produces five times more than the less diverse one during this period of difficulty.

This is precisely the point we want to make. Different farmers have different ways of handling contingencies. The issues of profitability and security will have to be dealt with in a more balanced fashion. While it is true that the absolute production in February went to as low as 12 kilograms only, the savings that the farmer must have been making from the good months allowed him to absorb the deficit during the month of misfortune.

Census Study

From the 12 farmers who have been monitored on production on a monthly basis beginning August 1985 to July 1986, 23 different crops have been produced and recorded. Table 16 shows the level of production of these crops by the 12 farmers.

Our two case studies are typical farmers of the locality as reflected by the pattern of production from the 12 farmers. The top producing crop of our census is *Xanthosoma violaceum* Schott (which is also the top product of Case Number 1), while *Lycopersicon esculentum* Mill, is the second top producer for the 12 farmers

ers (which is also the top product of Case Number 2). There is a certain degree of agreement between our case and census studies on the prioritization and choice of crops by the farmers. This suggests a certain degree of commonality between farmers in the Lake Balinsasayao area in the way they select and produce crops.

However, the mean production level between our case studies and the census study is quite different. The mean production of Case Number 1 is within the range of the mean production of the 12 farmers while that of our Case Number 2 is outside and higher than the maximum limit for mean production of the 12 farmers. This suggests that Case Number 2 is an extreme case representing the most successful farmer in terms of productivity of his farm.

On a gross level, what are the factors that affect production level in the household? Nine different variables were tested with production level: number of persons in household (NOPH); number of labor force members in household (NOLFOH); length of stay of farmer in the community (LOSFAC); total area of farm (TAF); percentage slope of farm (PESFARM); number of years farmer is cultivating farm (NUYFAC); number of varieties of nitrogen fixing trees (NOVNIFIX); total length of soil protection devices installed (TOLSOP); and total number of crops planted (TONCROP). Table 17 shows the results.

If we use .5 as a minimum acceptable value, there are only four variables that are correlated with total production. These are LOSFAC, NUYFAC, NOVNIFIX and TOLSOP. The negative relationship between production level and LOSFAC as well as NUYFAC is expected since it was assumed that the longer the farmer cultivates his farm without proper conservation measures, the more degraded his farm becomes. Hence lower production is expected. Since there is a positive correlation between LOSFAC and NUYFAC (see Table 17), there must be a negative correlation between these two variables and production level.

An unexpected negative correlation between production and number of varieties of nitrogen fixing crops planted, however, exists. This is puzzling since it was assumed initially that the leguminous crops planted, the better the soil condition will be. The present soil condition may be explained by the following possible conditions:

(1) Since the soils are already degraded as indicated by the relationship between NUYFAC, LOSFAC and production, it is possible that the increasing number of leguminous plants on their farms are recent developments as results of the Program and hence its effects on production are not yet demonstrated. Thus low production on degraded farms will still continue until the effects of the nitrogen fixers are felt by the crops;

(2) Since the nutrient rehabilitation process by nitrogen fixers is a complex process, its effects on the farms cannot be immediately felt. Closer observation on the farm shows that most of these nitrogen fixers are very recent introductions;

(3) It is possible that these nitrogen fixers may not actually be fixing nitrogen since other necessary elements are absent. Some plants do not fix nitrogen when rhizobium is not adequate; and

(4) Other nutrients which nitrogen fixers cannot provide could be inadequate (i. e. molybdenum).

Since these conditions are still hunches, they call for further investigation in the field.

There is a positive correlation between total production and total length of soil protection devices installed. The more soil protection devices put up on the farms, the higher the total production experienced. Since the effects of the soil protection devices are immediate, i. e. soils being trapped from erosion including its nutrients; the effect on plants, especially for the short term subsistence crops, must be immediate. Personal experience with their farmers showed that in areas where soils are trapped and preserved, there is a great physical difference of crops with those growing on eroded farms.

Of the four factors affecting total production, number of years farmer cultivates his farm is the best predictor for total production. This factor explains around 67% of the variance on the household production. The following figure shows the various regression curve of total production as affected by the three independent variables (LOSFAC, NUYFAC, TOLSOP). The change in production caused by the increase in the total length of soil protection devices installed on the farm is still very slight. Although the relationship is positive, we can expect only a very slight increase in production at present. What does this imply? Does this mean that soil conservation input will have only very limited impact on production? Not necessarily. While it is true that the impact as of the moment is still negligible, at least the beginning of its impact can already be felt. Most of these soil protection devices are barely a year old. It should be remembered that the effect of conservation is cumulative and this can be better assessed using longitudinal measures rather than synchronic micro measurements.

Demo Farm

As mentioned earlier, one of the concerns we wanted to measure is the productivity of certain crops per area and per unit of time. With this, we hope to identify the most productive crop in the area. The argument is that the farmers will have a better deal with their life if the most adapted crops in the area are chosen for optimal production.

The performance of the crops in our demo is not really challenging. This is not surprising since we have purposely selected a site that is marginal in fertility and in slope. Nevertheless, our data still show that different crops indeed have different levels of productivity.

Of the 15 crops we have tried under three different slopes (see Table 18), *Lycopersicon esculentum* Mill. has the highest production, yielding more than six tons per hectare in one year. This is assuming that a farm is cultivated continuously in one year and planted with tomatoes. This is followed by bush beans (*Phaseolus lunatus* L.), more than five tons. *Zea mays* L. planted in three different slopes consistently produced more than 2 tons although the one that was planted on a less sloping plot produced around 500 kilograms more than that planted in a more sloping plot. Habicrueles (*Dolichos lablab* L.), another leguminous plant yielded more than one ton on a 60% slope demo plot while a 70% slope yielded only one ton less than that of the 60% slope farm. Although the slope difference between these demo farms is negligible, the difference in the soil condition (i. e. fertility) between these sites is tremendous. The one with the steep slope has a highly degraded soil.

The most productive crops in the demo plots represent the ones with a rather complete nutrient composition (i. e. with carbohydrate, protein and vitamins). If these crops are picked out by the farmers, these will be nutritionally beneficial to them and to their farms. Two leguminous crops are top producers and they are highly marketable with profitable prices.

IMPLICATIONS FOR DEVELOPMENT

The farming styles delineated in our study are indicated in at least any of these forms; proft orientation, security orientation and combination of profitability and security orientation. High diversity of crops on the farm provides adequate buffer to failure hence even in periods of critical conditions, certain amount can be expected. Our data show that fluctuation of products in this case is not very deep compared to the less diverse cropping system.

Profitability orientation is short term based but this can be achieved to a certain degree by conservation measures. Developing a particular theme or motif on the farm means that a farmer can concentrate production of highly marketable crops with better market price but keep a number of related crops so that certain amount of crop diversity is maintained on the farm. This a style that attempts to combine security and profitability.

Among subsistence farmers, however, profitability is not their major concern. Our data show that among the Lake Balinsasayao farmers nobody has gone into profitability considerations as a basis for selecting a particular cropping system. Profitability tends to develop a cropping style that concentrates on very few crops with high yield and market price. On the basis of our production data from our demo, *Lycopersicon esculentum* Mill. is a top producer with a fairly good price but nobody has ever concentrated on this crop. Bush beans (*Phaseolus lunatus* L.) rank test but still this not come up as the cropping focus for our farmers. While it is true that the first crop ranks high for Case Number 2. the rest of the crops he planted indicate that he does not concentrate on one variety.

Hence, among subsistence farmers, it appears that the combination of profitability and security should be the major consideration when adaptive cropping style has to be developed. The motif of cropping for Case Number 2 is ideal but it is still sensitive to extreme physical and social conditions. It can still go down to nothing on production when a number of stresseors take place. Case Number 1 tends to perform better than Case Number 2 on extreme conditions. While it is true that fluctuation still iakes place in Case Number 1, yet it is not as deep as in Case Number 2 (see Figure 6). Even during illness of a farmer, it is very apparent that production can still go on.

Monthly production that are lower than the mean are sources of problems. The mean issue for security measures is how to reduce the production decline from the mean and keep its frequency of occurrence very low. This can easily be checked by increasing the variety of crops.

One strategy of increasing diversity of crops is to introduce number of security crops on farm edges which are less disturbed by cultivation. Short maturing crops are usually planted at the center or strategic site of the farm. These constitute the profitable ones while those on the fringes are the security ones. Case Number 1 has introduced crops such as *Secheum edule* L. and *Xanthosoma violaceum* L. at the fringes of his farms.

Another strategy is to plant cash tree crops on boundaries. Many fruit bearing trees can be inroduced such as *Coffee arabica* and *Theobroma cacaea* L. Case farmer Number 1 has planted good amount of these crops along boundary lines and edges of contoured rockwalls, contoured canal, and contoured bench ter-

While there is a rather low correlation between the effect of soil erosion and fertility control measures and a negative one the planting of leguminous crops and its effects on production, this does not necessarily negate the fact that these factors should be taken seriously. Considering that these measures have been introduced only very lately, their effects are still quite difficult to assess. More and continuing efforts toward measuring these phenomena are therefore imperative.

The data strongly suggest that there is a need to double up intervention efforts on farms that have been cultivated for a long time. It is not surprising therefore, to find these farms at this time to be having the lowest production level due to soil degradation caused by continuing human activity without proper conservation mesaures introduced. These farms should be given top priority by any programs that assist farmers to increase their production and conserve their resources. This does not, however, suggests that the new clearings be left out. In fact similar attention should be given to these sites before production begins to decline. Needless to say, as the cultivation period is lengthened without introducing appropriate soil conservation measures, production will eventually be reduced.

As farmers are encouraged to diversity crops on the farms, the more likely they are going to plant more leguminous crops. This will obviously allow them to provide enough restorative crops for soil fertility and productivity. Therefore, extension workers should provide them a list of the names of leguminous plants and the seeds. This list should put priority on nitrogen fixers for nutrient improvement of the soil as well as for improving the food quality for human consumption. Since farmers shall have planted all that are available to them as they diversify, any assistance programs that will provide such list of crops with the corresponding seed supply will be very useful to farmers. In this way, we are creating an opportunity for the farmers to increase the number of leguminous crops in their fields.

SUMMARY AND RECOMMENDATIONS

The following major points should be emphasized:

(1) subsistence farmers in the upland prefer those cropping styles that provide security and profitability;

(2) Cropping styles that provide profitability only, entail greater risks and hazards to the farmers;

(3) Cropping styles that will allow opportunities to obtain profit and security for the farmers should be developed;

(4) Production decline is associated with length of cultivation of the farm without proper conservation measures hence activities should be geared toward rehabilitation of such farms;

(5) New farms need similar attention so that soils can be conserved before they are lost. The longer the farms tilled without protection measures the more losses it will incur;

(6) Since there is no relationship yet existing between percentage slope of farm and the total length of soil protection measures, this suggests that there is a need for more efforts to encourage farmers owning sloping lands to install these mechanisms. In fact, a negative correlation coefficient is existing between these variables;

(7) While it is true that there is less interest of farmers in highly sloping lands (negative correlation between area of farm owned and percentage slope of farms) there are still farmers who have cultivated highly sloping lands. They should be given more attention in implementing soil protection measures.

The inconclusive evidence concerning the relationship between total production and the implementation of the soil protection devices and the increasing variety of leguminous crops planted on the farm requires further documentation. If these factors do not in fact highly affect production then we may be wasting our efforts in installing these measures and diversifying crops using leguminous crops as the diversifiers. Intuition and common sense suggest that they do not in fact affect production. For more authoritative claims, however, we need more empirical evidence.

Land Ar

Crops

1. Caps
2. Bagu
annu
3. Cucu
maxi
4. Habic
5. Zea
6. Lycop
escul
7. Xanth
violac
8. Manil
escule
9. Pecha
10. Phase
radiat
11. Allium
12. Nicoti
tubacu
13. String
14. Sword
15. Millet
16. Cajanu
17. Alogba
18. Ananas
comosu
19. Sacchar
officina
20. Oryza s
21. Musa
paradisi
22. Solanum
melonge
23. Okra

APPENDIX

Table 1

Land Area Distribution of Crops on a 2.2 Hectare Farm Case During a 14-Month Period

Crops	Number of Times Crop Planted or Number of Plot Crop Planted From Feb. 1985 to March 1986	Minimum Area (Sq. Meters)	Maximum Meters) Area (Sq.	Mean Area (Sq. Meters)	Coefficient of Variation
Capsicum					
Baguio beans	10	20	320	112.9	.85
annum L.	15	12	323	109.7	.97
Cucurbita maxima Duch.	6	66	371	198.5	.52
Habichuelas	5	20	234	112.5	.83
Zea mays L.	12	16	192	82.1	.66
Lycopersicon esculentum Mill.	8	19	371	225.5	.53
Xanthosoma violaceum Schott.	7	42	1,125	331.1	1.12
Manihot esculenta Schott	4	20	66	43.0	.62
Pechay	9	40	371	210.0	.47
Phaseolus radiatus L.	2	10	66	38.0	*
Allium cepa L.	2	75	100	87.5	*
Nicotiana tabacum L.	1	NAP	NAP	90.0	*
String beans	1	NAP	NAP	236.0	*
Sword beans	1	NAP	NAP	132.0	*
Millet	2	9	192	100.5	*
Cajanus cajan L.	2	66	68	67	*
Alogbati	1	NAP	NAP	371	*
Ananas comosus L.	2	20	175	97.5	*
Saccharum officinarum L.	1	NAP	NAP	175	*
Oryza sativa L.	1	NAP	NAP	65	*
Musa paradisiaca L.	1	NAP	NAP	130	*
Solanum melongena L.	2	56	371	213.5	*
Okra	1	NAP	NAP	378	*

Table 2

Frequency of Episodes and Rank of Planting Compared With Prices Per Kilogram and Rank of Prices of Selected Products Commonly Marketed (Case 1)

	Planting Episodes		Price Pattern (Pesos)	
Selected Crops	Frequency in a period of 14 Months	Rank	Range of Price Per Kilogram	Rank
1. Capsicum annum L.	15	1	P12-P25	1
2. Lycopersicon esculentum Mill.	8	3	P 5-P12	3
3. Cucurbita maxima Duch.	6	4	P 2-P 5	4.5
4. Baguio beans	10	2	P 6-P15	2
5. Secheum edule	NI	NI	P 3-P 4	4.5
6. Solanum melongena L.	2	5	P 5-P 8	6

Table 3

Rainfall Pattern During 1983

Months	Rainfall (Mm)
January-February	308
March-April	37
May-June	217
July-August	984
September-October	668
November-December	674

Table 4

Area Distribution of Crops in a 1.5 Hectare Farm Case During an 11-Month Period

Crops	No. of Times Crop Planted or No. of Plot Crop Planted From August 1985 to June 1986	Minimum Area (Sq. Meters)	Maximum Area (Sq. Meters)	Mean Area (Sq. Meters)	Coefficient of Variation
1. Lycopersicon esculentum Mill.	7	10	310	182	.72
2. Zea mays L.	2	300	315	308	*
3. Xanthosoma violaceum Schott.	1	NAP	NAP	600	*
4. Baguio beans	5	10	600	134	1.94
5. Solanum melongena L.	3	100	420	313	.34
6. Momordica charantia L.	1	NAP	NAP	30	*
7. Pechay	1	NAP	NAP	30	*
8. Capsicum annum L.	5	20	600	134	1.94

Table 5

Specific Schedule of Planting and Acreage of Plots for Various Crops (Case No. 2)

Crops Planted	Area Planted (Sq.M.)	Date Planted
1. Tomatoes	300	15 June 1986
2. Tomatoes	300	16 June 1986
3. Corn	300	17 June 1986
4. Carnabal	600	23 April 1086
5. Baguio beans	600	30 April 1986
6. Baguio beans	16	10 Feb. 1986
7. Corn	315	17 Feb. 1986
8. Tomato	147	19 Feb. 1986
9. Eggplant	420	24 Feb 1986
10. Ampalaya	200	2 Jan. 1986
11. Tomatoes	200	2 Dec 1985
12. Baguio beans	10	2 Dec. 1985
13. Baguio beans	20	18 Dec. 1985
14. Pechay	30	18 Dec. 1985
15. Bell pepper	150	30 Dec. 1985
16. Tomato	310	16 Oct. 1985
17. Bell pepper	142	15 Oct. 1985
18. Baguio beans	24	1 Oct. 1985
19. Bell pepper	315	1 Oct. 1985
20. Eggplant	419	12 Sept. 1985
21. Tomatoes	10	11 Sept. 1985
22. Bell pepper	20	4 Sept. 1985
23. Tomatoes	10	29 Aug. 1985
24. Eggplant	100	29 Aug. 1985
25. Bell pepper	32	14 Aug. 1985

Table 6

Descriptive Statistics or Selected Variables of the 12 Farms Censused

Selected Variables	Mean	Minimum	Maximum	Coefficient of Variation
Number of persons in household	5.67	4.00	7.00	.21
Number of labor force available in household	3.50	2.00	6.00	.47
Number of years farmers live in the community	36	3	60	.59
Total area of farm	1.42	1.00	2.00	.35
Percentage slope of farm	43	28	55	.25
Number of years farmers cultivate farms	23.50	10	45	.58
Number of varieties of nitrogen fixing trees	2.50	0	5	.83
Total length (in meters) of various forms of soil protection devices installed on farms	45.67	230	800	.42
Total number of crops planted on the farm	13.83	7	24	.51

Table 7

Correlation Matrix of 10 Selected Variables

	NOPH	NOLFOH	LOSFAC	TAF	PESPFARM	NUYFAC	NOVNIFIX	TOLSOP	TONCROP	TOKILALL
NOPH	1.000									
NOLFOH	.201	1.000								
LOSPAC	-.078	.578	1.000							
TAF	.448	.186	.411	1.000						
PESFARM	-.300	-.331	-.049	-.756	1.000					
NUYFAC	.158	.830	.696	.128	.033	1.000				
NOVNIFIX	.319	.382	.812	.834	-.436	.409	1.000			
TOLSOP	.641	-.092	-.531	.150	-.415	-.481	-.108	1.000		
TONCROP	.062	.266	.820	.799	-.410	.303	.960	-.258	1.000	
TOKILALL	-.082	-.400	-.767	-.184	-.321	-.816	-.532	.681	-.479	1.000

Table 8

Identified Correlated Variables and the Level of Variance Explained by Independent Variables

Variables	r	r2	Percentage of Variance of Dependent Variable as Explained by Independent Variable
Percentage slope of farm and total area of farm	-.756	.572	57.20%
Number of years farming the farm and number of labor force in household	.830	.689	68.90%
Number of varieties of nitrogen fixing plants and length of stay in the farm	.812	.659	65.90%
Number of varieties of nitrogen fixing plants and total area of farm	.834	.696	69.60%
Total number of crops and length of stay of farmers in the community	.820	.672	67.20%
Total number of crops and number of nitrogen fixing plants	.960	.922	92.20%
Total number of crops and total area of farm	.799	.638	63.80%
Total kilograms of products produced and length of stay in the community	-.767	.588	58.80%
Total kilograms of products produced and number of years farmer stay in the farm	-.816	.666	66.60%

Table 9

Correlation Coefficient (r), Coefficient of Determination (r^2) and Regression Equation of Various Variables

Independent Variable	Dependent Variable	r	r2	Regression Equation
Percentage slope of farm	Total area of farm	-.756	.572	Y=2.932+-.035X
Number of persons in household	Total length of soil protection device	.641	.411	Y=122.727 + 101.364X
Number of labor force in the household	Number of years cultivating the farm	.830	.869	Y=-.481+6.852X
Length of stay in the farm	Number of Varieties of nitrogen fixing plants	.812	.659	Y=-.349+.079X
Total area of farm	Number of varieties of nitrogen fixing plants	.834	.695	Y=-2.483+3.517X
Total number of crops	Number of Varieties of nitrogen fixing plants	.960	.922	Y=-1.388+.281X
Length of stay of farmers in the community	Total number of crops planted on the farm	.820	.673	Y=3.988+.273X
Total area of farm	Total number of crops planted	.799	.639	Y=-2.483+11.5[illegible]

Table 10

Cropping and Production Patterns of Demo Plots (Lake Balinsasayao)

[illegible] Planted	Demo Site (2)	Date Planted (3)	Area Planted (Sq.M.) (4)	Harvesting Episodes: No. of Episodes (5)	First Day of Harvest (6)	Last Day of Harvest (7)	Total Quantity Harvested (Kg) (8)	Estimated Quantity Harvested From One Hectare 10,000/ Col. 1 x Col.8) (Kgs) (9)
[illegible] L.	1	4/17/86	168	1	8/23/86	8/23/86	2.5	149
[illegible] L.	1	7/85	224	1	8/23/86	8/23/86	3	134
[illegible]	1	4/18/86	60	1	6/27/86	6/27/86	.5	83
[illegible] L.	1	5/2/86	80	1	7/30/86	7/30/86	2.5	313
[illegible] L.	1	5/2/86	44	1	8/29/86	8/29/86	2	455
[illegible] L.	1	6/2/86	44	3	9/13/86	9/24/86	7	1,591
[illegible]	1	4/1/86	60	1	7/30/86	7/30/86	2	333
[illegible] Mill.	1	6/27/86	80	2	9/8/86	9/19/86	.4	50
[illegible]	1	5/20/86	44	2	9/9/86	9/19/86	2.5	568
[illegible]	1	4/18/86	20	4	7/28/86	9/19/86	.9	450
[illegible]	1	4/24/86	18	7	7/29/86	8/30/86	3.4	1,889
[illegible]	1	5/18/86	60	1	7/14/86	7/14/86	.5	83
[illegible] Mill.	1	6/23/86	18	9	8/5/86	9/13/86	5.3	2,944
[illegible] Jacq.	1	5/23/86	155	1	7/25/86	7/25/86	5.5	355
[illegible] L.	1	4/9/86	155	2	8/19/86	9/4/86	4.0	258
[illegible]	1	4/28/86	155	1	9/4/86	3.5	236	
[illegible] Mill.	1	6/19/86	60	7	8/18/86	9/14/86	2.5	417
[illegible]	1	7/8/86	44	2	9/7/86	9/10/86	.25	57
[illegible]	2	5/29/86	117	1	7/25/86	7/25/86	1.50	128
[illegible] L.	3	4/22/86	160	1	8/4/86	8/4/86	15	938

Table 11
Estimated Number of Days Required for a Plot Before it Becomes Ready for Another Crop.

Crops	Number of Days Required From Planting to Final Harvest	Number of Man-Days Required to Cultivate a 500 Square Meter Land (Including Drying)	Total Number of Days Required To Make a 100 Square Meter Plot Ready For Planting	Estimated Number of Croppings Per Year
1. Colocasia esculenta L.	126	2	128	3
2. Manihot esculenta L.	395	2	397	1
3. Baguio beans	63	2	65	5
4. Zea mays L.	107	2	109	3
5. Bulb onion	119	2	121	3
6. Lycopersicon esculenium Mill.	84	2	86	4
7. Habitchuelas	88	2	90	4
8. Leafy onion	151	2	153	2
9. Bush beans	80	2	82	4
10. Phaseolus radiatus L.	78	2	80	4
11. Cucurbita maxima Duch.	62	2	64	6
12. Ipomea batatas L.	145	2	147	2
13. Peanut	126	2	128	3
14. Okra	62	2	64	6

Table 12

Production Pattern of Case # 1

Months Harvested (Kilograms)

[illegible]	June 1985	July 1985	Aug 1985	Sept 1985	Oct 1985	Nov 1985	Dec 1985	Jan 1986	Feb 1986	Mar 1986	All Months
[illegible] beans	12.25	9.5	0	.125	0	1	0	20	8	10	60.875
[illegible]ita [illegible] Duch.	19.50	22	58.5	53	49.5	0	12.5	9	0	0	224
[illegible] L.	29.8	0	0	0	65	10.5	0	0	2	0	107.3
[illegible]chuelas	2	0	.125	0	0	0	0	0	0	0	2.125
[illegible]	10	0	5	16	44	24	48.5	4	12	70	233.5
[illegible] L.	4	0	0	.125	4.75	5	0	7	10.8	9	40.675
[illegible] L.	.5	5.25	16.25	15.5	5.63	0	0	0	16.5	0	59.630
[illegible]ersicon [illegible]	3.0	4	.75	.625	0	0	0	0	0	0	8.375
[illegible]	16	14.25	6.5	2.5	0	0	0	0	0	0	39.250
[illegible] beans	5	3	1.125	0	0	0	0	0	0	0	9.125
[illegible] L.	2	0	0	0	0	0	0	0	0	0	2
[illegible] L.	0	0	19	0	0	0	0	0	0	0	19
[illegible]	0	0	.87	12	0	0	0	0	0	0	12.87
[illegible]	0	0	0	30	0	0	0	0	0	0	30
[illegible] L.	0	0	0	3.5	9	5	7	0	0	0	24.5
[illegible]	0	0	76	58.5	0	0	0	10	0	0	144.5
[illegible]	0	0	0	30	0	0	0	0	0	0	3
[illegible]	0	0	0	0	0	2	0	0	0	0	3
[illegible] L.	0	0	0	0	0	.5	0	0	3	0	3.5
[illegible]	0	0	0	0	0	0	8	0	8	11	27
[illegible]	0	0	0	0	0	0	51.75	26	0	0	77.75
[illegible]	104.05	58	184.12	194.88	177.88	48	127.75	76	60.30	100	1,130.975

Table 13

Relative Proportion and Ranks of Products to Total Production During 10 Mon
of Participatory Monitoring (Case No. 1)

Products	Percent of Product to Total Production	Ra
1. Xanthosoma violaceum Schott.	20.6	1
2. Cucurbita maxima Duch.	19.8	2
3. Secheum edule L.	12.8	3
4. Zea mays L.	9.4	4
5. Pechay	6.9	5
6. Baguio beans	5.4	6
7. Momordica charantia L.	5.3	7
8. Colocasia esculenta L.	3.6	8
9. Capsicum annum L.	3.5	9
10. Alogbate	2.7	10
11. Ipomea batatas L.	2.4	11
12. Manihot esculenta L.	2.2	12
13. Musa paradisiaca L.	1.7	13
14. Allium cepa L.	1.1	14
15. String beans	.8	15
16. Lycopersicon esculentum Mill.	7	16
17. Solanum melongena L.	.4	17
18. Sikwa	.3	18
19. Habitchuelas	.2	19
20. Phaseolus radiatus L.	.1	20
21. Cajanus cajan L.	.1	21
	100.0 (1,130.975 kg.)	

Table 11

Production Pattern of Case # 2

Months Harvested (In Kilograms)

Crops Harvested	Aug 1985	Sept 1985	Oct 1985	Nov 1985	Dec 1985	Jan 1986	Feb 1986	Mar 1986	Apr 1986	May 1986	Jun 1986	All Months
1. *Lycopersicon esculentum* Mill.	197	174	3	45	49	4	0	0	10	540	10	1,032.00
2. *Zea mays* L.	0	0	0	0	0	0	0	0	0	80	0	80.00
3. *Xanthosoma violaceum* Schott.	0	0	0	0	0	0	0	0	0	0	0	0
4. *Capsicum annum* L.	0	2.5	9.5	9	17.25	3	0	0	0	0	0	41.25
5. Pechay	0	0	0	0	0	6	10	0	0	0	0	16.00
6. Baguio beans	39	13	90.5	64.5	22	6	0	0	101	26	10	372.00
7. *Solanum melongena* L.	0	0	11.5	91	106	12	2	60.5	309	209	90	891.00
8. *Momordica charantia* L.	109	50	19	1	0	0	0	0	0	6	141	326.00
9. *Cucurbita maxima* Duch.	0	0	33	43	57	0	0	0	0	16.5	20	169.50
All Crops	345	239.5	166.5	253.5	251.25	31	12	60.5	420	877.5	271	2,927.75

Table 15

Relative Proportion and Ranks of Products to Total Production During 11 Mon
of Participatory Monitoring (Case No. 2)

Crops Harvested	Percent of Product to Total Production	Ran
1. Lycopersicon esculentum L.	35	1
2. Solanum melongena L.	30	2
3. Baguio beans	13	3
4. Momordica charantia L.	11	4
5. Cucurbita maxima Duch.	6	5
6. Zea mays L.	3	6
7. Capsicum annum L.	1	7
8. Pechay	.5	8
9. Xanthosoma violaceum L.	0	9
Total	99.5	

Mean Household Production Leve (In Kilograms) of Various Crops From 12 Farmers Censused on a MOnthly Basis From August 1985 to July 1986

Products	Minimum	Maximum	Mean	Coefficint ofVariation	Rank
Xanthosoma violaceum Schott.	0	1,462	588.6	.99	1
Cucurbita maxima Duch.	3.5	224	133.0	.70	4
Secheum edule L.	0	257	123.3	.81	5
Zea mays L.	0	295	92.1	1.19	9
Pechay	0	78	15.6	1.99	15
Baguio beans	0	372	95.0	1.46	8
Momordica charantia L.	0	326	79.1	1.56	10
Colocasia esculenta L.	0	123	36.7	1.21	11
Capsicum annum L.	0	56	26.8	.86	12
Alogbate	0	30	5.0	2.44	18
Ipomea batatas L.	0	225	109.4	.87	6
Manihot esculenta L.	0	52	12.8	1.69	16
Musa paradisiaca L.	0	399	108.3	1.36	7
Leafy onion	0	13	4.1	1.56	19
String beans	0	65	12.4	2.10	17
Lycopersicon esculentum Mill.	0	1,032	215.9	1.89	2
Solanum melongena L.	0	891	159.6	2.25	3
Sikwa	0	3	.5	2.40	22
Habitchuelas	0	2	.7	1.57	21
Phaseolus radiatus L.	0	2	.3	2.67	23
Cajanos cajan	0	18	3.5	2.09	20
Dioscorea esculenta Crantz.	0	69	19.5	1.59	13
Other Products (Miscellaneous)	0	78	16.8	1.89	14
Total Production	1,043	2,848	1,852.3	.35	

Table 17

Coefficients of Correlation (r) and Determination (r^2) Between Production Le
and Nine Other Selected Variables.

Other Selected Variables	r	r^2
NOPH	-.082	.0067
NOLFOH	-.400	.1600
LOSFAC	-.767	.5883
TAF	-.184	.0339
FESFARM	-.321	.1030
NUYFAC	-.816	.6659
NOVNIFIX	-.532	.2830
TOLSOP	.681	.4638
TONCROP	-.479	.2294

Table 18

Estimated Annual Production From A One Hectare Demo Farm (Lake Balinsasayao)

Crops Planted (1)	% Slope of Demo Site (2)	Length of Time From Planting to Harvesting (Days) (3)	Estimated Number of Cropping In One Year With Estimated 30 Day Cultivation Period (4)	Estimated Quantity Produced Per Harvest Per Hectare (5)	Estimated Annual Production From One Hectare (Col. 4 x Col. 5) (6)
1. Colocasia esculenta L.	60	128	3	149	447
2. Manihot esculenta L.	60	418	1	134	134
3. Baguio beans	60	61	6	83	498
4. Zea mays L.	60	114	3	786	2,385
5. Bulb onion	60	60	6	333	1,998
6. Lycopersicon esculenium Mill.	60	59	6	1,137	6,822
7. Habitchuelas	60	112	3	568	1,704
8. Leafy onion	60	102	3	450	1,350
9. Bush beans	60	97	3	1,889	5,667
10. Phaseolus radiatus L.	60	80	4	63	252
11. Cucurbita maxima Duch.	60	64	5	355	1,775
12. Ipomea batatas L.	60	133	2	258	516
13. Peanuts	60	130	2	236	472
14. Okra	60	61	6	57	342
15. Habitchuelas	70	57	6	128	768
16. Zea mays L.	10	105	3	938	2,814

				1985					
1972	1982	1083	1984	Feb.	Mar.	Apr.	May.	Jun.	Jul
Musa textilis Nee	Coffee arabica L.	Coffee arabica L.	Theobroma cacao L.	Capsicum annum L. (2)	Baguio beans	Baguio beans	Habichuelas	Habichuelas	
		Capsicum annum L.	Bread fruit	Theobroma cacao L.	Cucurbita maxima Duch.	Zea mays L. (2)	Baguio beans (2)	Zea mays L. (2)	
		Theobroma cacao L.	Ananas comosus L.	Ginger	Habichuelas (7)	Cajanus cajan L.	Xanthosoma violaceum Schott. (3)	Baguio beans	
			Nicotiana cabacum L.		Zea mays L. (3)	Lycoparsicon esculentum Mill.	Momordica charantia L.		
			Capsicum annum L. (2)		Phaseolus radiatus L	Habichuelas.	Habichuelas		
			Colocasia esculenta Scott.		Allium cepa L.	Cucurbita maxima Duch. (3)	Capsicum annum L. (5)		
			Manahot esculenta Schott.		Nicotiana tubacum	Xanthosoma violaceum Schott.	Nicotiana tubacum L.		
			Scheum edule		Capsicum annum L. (2)	Millet			
					String beans	Momordica charantia L.			
					Sword beans	Capsicum annum L.			
					Lycopersicom esculentum Mill.	Phaseolus radiatus L.			
					Manihot esculenta Schott.				
					Momordica charantia L.				
					Millet				

Figure 1

A Panoramic View of Cropping Style of Cas

1985						1986		
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
	Xanthosoma violaceum Schott. (3)	Capsicum annum L.	Pechay (4)	Pechay (3)	Okra	Pechay (2)	Zea mayss L. (2)	Manihot esculenta Schott.
	Atis	Xantho soma viola ceum Schott.		Ananas comosus L.	Ananas comosus L.	Lycoparsicon esculentum Mill.	Baguio beans	Momordica charantia L.
	Chicos	Manihot esculenta Schoot.		Capsicum annum L.	Pechay (2)			
	Lanzones	Lycoper sicon esculen tum Mill. (3)		Baguio beans (2)	Ipomea batatas			
	Musa paradisiaca L.	Solanum melongena		Cajanus cajan L.	Allium cepa L.			
	Lycopersicon esculentum	Momordica charantia L. (2)		Xanthosoma violaceum Schoot.	Colocasia esculenta Schott.			
	Capsicum L. annum L.	Zea mays L. (3)		Saccharum offici narum L.	Rambutan			
	Solanum melongena L.	Sikwa		Oryza eative L.	Baguio beans			
		Baguio beans		Zea mays L.	Capsicum annum L.			
		Alogbati			Mahinot esculenta Schott.			
					Coffea erabica L.			

of Case Farmer Number 2

1985

Au g	Sept	Oct.	Nov.	Dec.	J
Capsicum annum L.	Capsicum annum L.	Capsicum annum L.	—	Capsicum annum L.	M c
Solanum melongena L.	Lycopersicom esculentum	Baguio beans	—	Petchay	
Lycopersicon esculentum Mill.	Solanum melongena L.	Lycopersicom esculentum Mill.	—	Lycopersicom esculentum Mill.	

Fig

A Panoramic View of Cropping

1986

lan	Feb	Mar.	April	May	June
lomordica harentia L.	Solanum melongena L.	—	Baguio beans	—	Zea mays L
	Lycopersicon esculentum Mill.	—	Xanthosoma violaceum Schott.		Lycopersico esculentum Mill.
	Zea mays L. Baguio beans	—			

ure 2
Style of Case Farmer Number 2

Figure 3

Graph Showing Monthly Production Level During A Period of 10 Months (Case # 1)

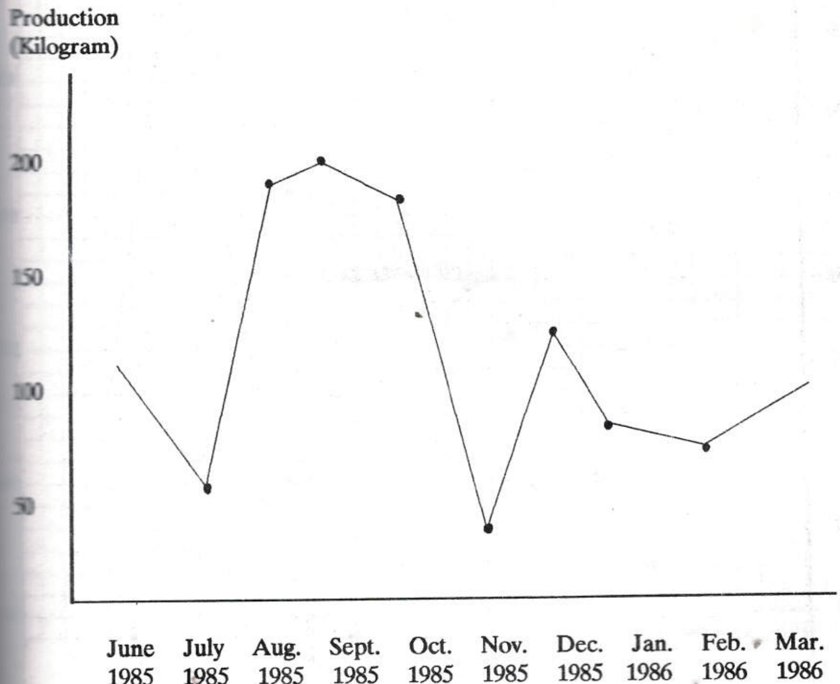
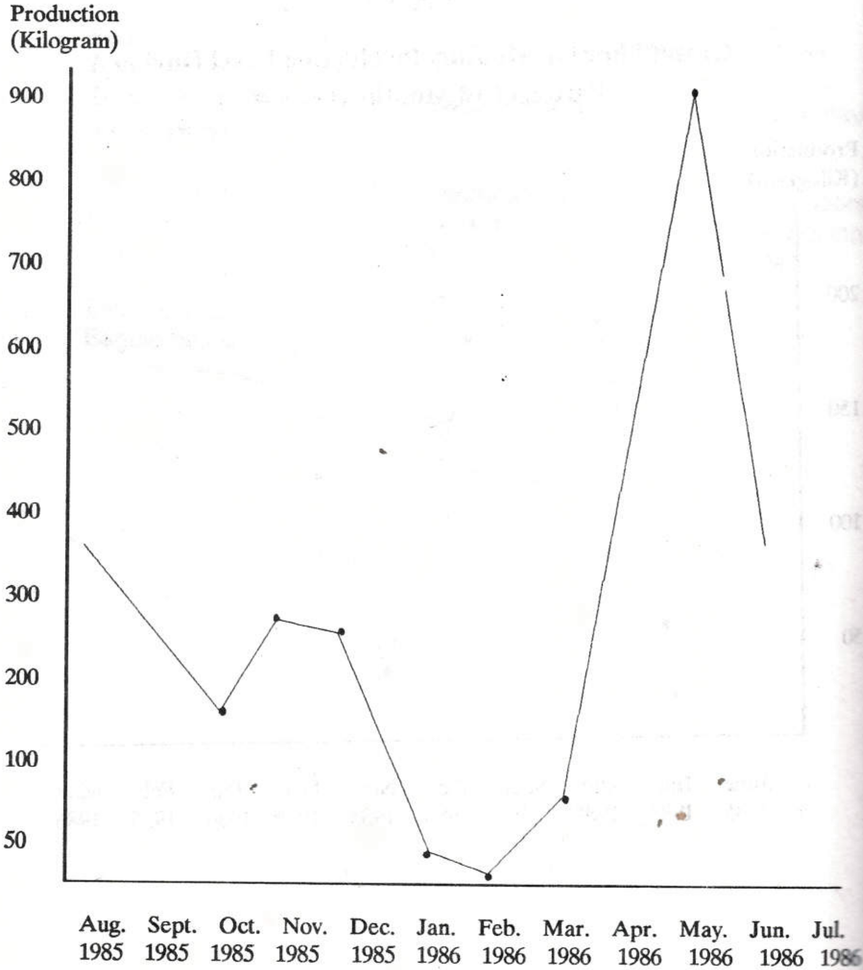


Figure 4

Graph Showing Monthly Production Level During A Period of 11 Months (Case # 2)



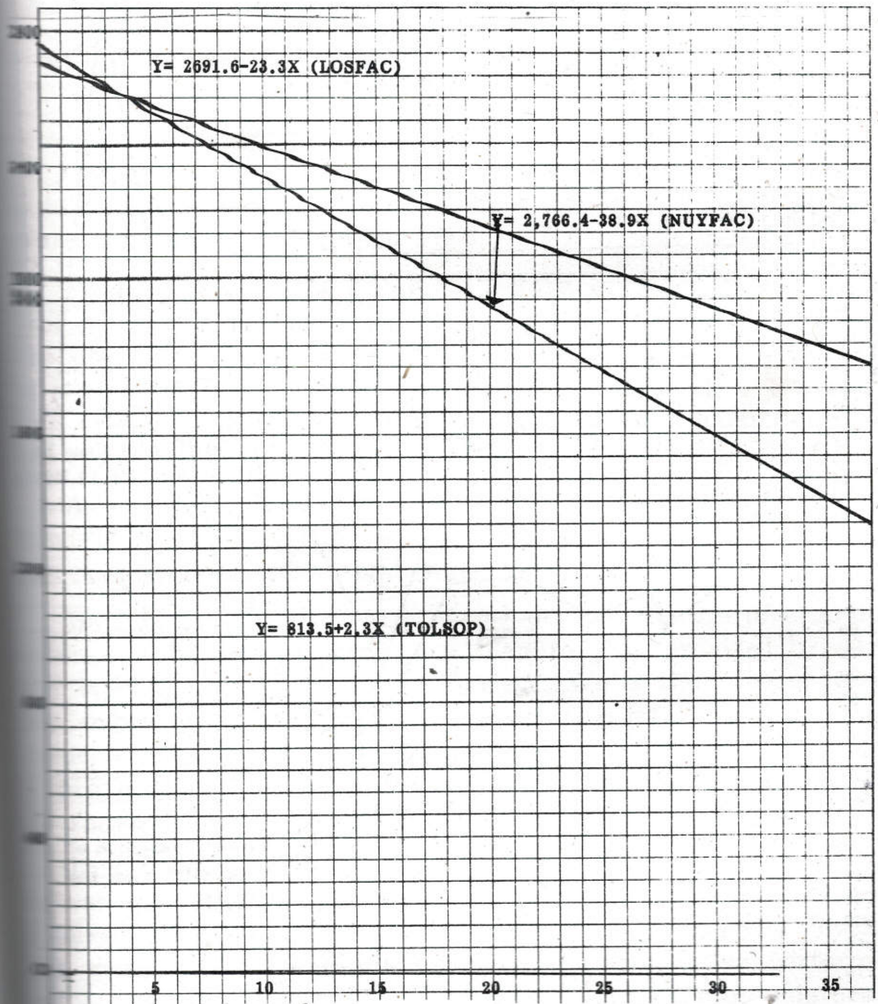


Figure 5

...ession Lines of Three Independent Variables (LOSFAC, TOLSOP, NUYFAC)againt Total Production

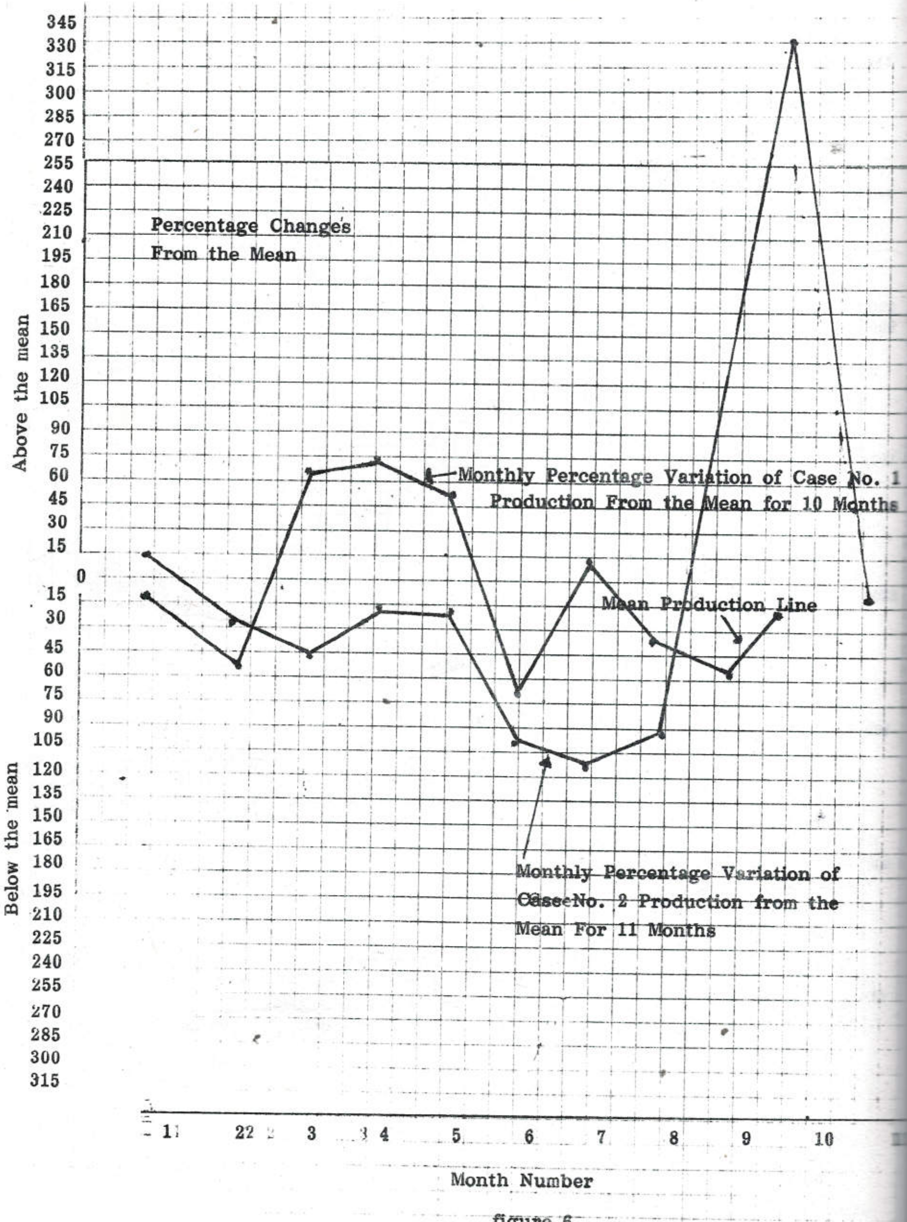


figure 6

Monthly Variation of Production From the Mean of Two Cases of Farmers

PRODUCTIVITY LEVEL OF TEST FARMS UNDER VARIOUS CROPPING SYSTEMS: THE CASE OF THE LAKE BALINSASAYAO PROJECT

Rowe V. Cadeliña and Elvisa Yrad

Introduction

One of the objectives of the Lake Balinsasayao project was to test various systems. The tests were intended to identify crop mixes that provide maximum yield.

To do this, around one-half hectare of land close to the Project Center was developed and planted with various crops. The site served as a test farm, a demonstration center and also as a seed bank for various crops. The farmers were provided with actual evidence concerning productive performance of various crops as well as a seed base for crops that they like to grow.

As a seed bank, the farm had already provided seeds to the farmers. These consist of various varieties of beans, squash, tomatoes, pepper, eggplant and other vegetables.

During the last two years of the project, the use of organic fertilizer, composed of dried goat manure, was provided by our goat breeder, an Anglo-Nubian variety. While the breeder can help improve the quality of few goats raised in the area, the breeder can also serve as a fertilizer generator to our test farm. A barn was constructed at the edge of the test farm to facilitate the transport of the manure.

This paper attempts to document the productivity level of the various crops planted and the collective productivity level of mixed crops on our test farms. Relative productivity levels were measured to determine the maximum productive performance of specific crop and the different types of crop mixture. For practical interest, types of crop mixture and specific crops that render higher productivity performance compared to others were selected for possible adoption by the farmers.

METHODOLOGY

Since harvesting was not done once, especially for vegetables, every harvest activity was monitored, information on the size of the farm planted, the quantity of product harvested, the type of cropping (specialized or mixed) and the crops planted were recorded. The quantity of product was measured using a commercial weighing scale.

Monitoring was not done on the basis of agricultural year. Instead, production was reckoned on the basis of completed production cycle, that is from planting to its complete final harvest. Hence, the reference point of production is land area during completed cropping cycle. In case of mixed cropping, the completed cropping cycle covers from the start of planting up to the complete harvesting of all crops planted.

DATA AND DISCUSSION

Productivity level of four test farms were monitored from December 1987 to August 1988. Each test farm was characterized by different mixes of crops. The intention of the experiment was to find the kind of crop mixes that would yield optimal result. The experiment was set up in this manner since it was assumed that mixed cropping is more efficient than monocropping both in soil fertility use and in pest management and control.

Test Farm No. 1 involved a plot with an area of 1414 sq. m. Starting in December 1987 to August 1988, various crops were planted and harvested from the site (see Table 1). The following crops were planted and harvested: gabi, yam, sweet potato, corn, *habitchuelas* (white beans), string beans, okra, squash. The total monitoring period for this plot was nine months.

Test farm No. 2 consisted of 1.349 sq. m. planted to nine different crops (see Table 2). They include banana, papaya, yam, squash, *alogbate,* baguio beans, camote tops, *gabi* and *ubi*. Production period lasted for eight months starting January 1988 and ended in August 1988.

Test Farm Number 3 only involved an area of 120 sq. m. Two varieties of vegetables were planted: string beans and tomatoes (see Table 3). Production period being monitored lasted for five months, from March to July 1988.

Table 1

Production Data: Test Farm No. 1

Crops Planted	Total Area Planted	Total Kilos Harvested	Months Involved
Gabi	1,414 sq. m.	270.45	December, 1987— August 1988
Yam			
Sweet potato			
Corn			
Habitchuelas			
String beans			
Okra			
Squash			

Table 2

Production Data: Test Farm No. 2

Crops Planted	Total Area Planted	Total Kilos Harvested	Months Involved
Banana	1,349 sq. m.	339.25	January, 198 August, 198
Papaya			
Yam			
Squash			
Alogbate			
Baguio beans			
Camote (tops)			
Gabi			
Ubi			

Table 3

Production Data: Test Farm Number 3

Crops Planted	Total Area Planted	Total Kilos Harvested	Months Involved
String beans Tomatoes	120 sq. m.	24.75	March 1988- July, 1988

Test Farm Number 4 covered an area of 1,132 sq. m. There were 12 different crops — yam, sweet potato, tomatoes, okra, papaya, corn, pepper, peanut, onion, Irish potato, ginger and carrots. Production period for this test farm went on for a period of eight months beginning January 1988 and lasting in August 1988 (see Table 4).

Table 4

Crops Planted	Total Area Planted	Total Kilos Harvested	Months Involved
Yam Sweet Potato Tomatoes Okra Papaya Corn Peanut Pepper Onion Irish potato Ginger Carrots	1,132 sq. m.	217.75	January 1988- August 1988

Production was measured by using a commercial weighing scale which was regularly calibrated to maintain its level of accuracy. Table 5 summarizes the productivity level of the four test farms. In absolute term, Test Farm No. 2 provided the highest yield. This is followed by Test Farm No. 1. Since Test Farm No. 3 had the smallest area, obviously we can expect also the lowest yield from it in absolute erms.

On the basis of production per unit area of cultivation, Test Farm No. 2 yielded the highest. Per square meter of land area cultivated this test farm produced .25 kilograms of products from various crops. Using the kind of crop mixes for Test Farm No. 2 it is estimated that a one hectare piece of land for a period of only eight months can produce around 2,500 kilograms of various agricultural products. In this test farm, as we saw earlier, only nine crops were planted such as the following: banana, papaya, yam, squash, *alogbate,* baguio beans, camote tops, *gabi,* and *ubi.* Given these varieties of crops, this would suggest that this test farm has a crop density of about 150 sq. m. to every crop. Since the crops were randomly mixed, we could say that the crops were exposed intensively to others as they grow on the test farm.

If we take the average monthly production of Test Farm No. 2 during the period its productivity had been monitored, Test Farm No. 2 also yielded the highest prouctivity level. It had a monthly yield of around 42 kilograms for an area of only 1,349 sq. m.

The lowest productivity level had been generated by Test Farms No. 1 and No. 4. Both farms recorded a production level of only 19 kilograms for every square meter of land. Test Farm No. 1 had only eight while Test Farm No. 4 had 12 different crops. Test Farm No. 1 had a crop density of around 177 sq. m. per crop while Test Farm No. 4 has 94 sq. m. per crop. It should be noted again that these crops were randomly mixed.

Test Farms Nos. 1 and 4 are estimated to produce around 1,900 kilograms per hectare during a production period of eight to nine months. With an area of 1,414 sq. m. Test Farm No. 4

was estimated to produce around 30 kilograms of agricultural products per month during the nine-month period. For Test Farm No. 4, with an area of only 1,132 sq. m., it was estimated to produce around 27 kilograms per month during a production period of eight months. Test Farm No. 1 is only slightly higher to that of Test Farm No. 4.

Table 3 suggests that the highest yielder among the test farms is the one that is intermediate in terms of the number of crops planted. The lowest yielder test farms, Test Farm No. 1 had eight crops planted while Test Farm No. 2 had 12. The highest yielder, Test Farm No. 2, had nine crops. This indicates that having only eight different crops in a farm means too little which do not optimize production, while having 12 means too dense causing more competition and reducing production. Hence, the optimal level of production can be achieved by having nine different crops planted in a farm. How strong is our conclusion?

Let us answer this question by looking at our Test Farm No. Although the size of the plot in this test was too small to warrant some general observations, perhaps some trends can be identified. This test farm had only two crops planted (string beans and tomatoes) on a very small area of 120 sq. m. yielding around 25 kilograms during a production period of five months. Its production level per square meter is slightly higher than those of our lowest yielder test farms (Test Farm Nos. 1 and 4), but lower than that of our highest yielder test farm (Test Farm No. 2). This indicates that the idea concerning optimal number of crop mix is not a very strong hypothesis to assert. However, it does still remain as a standing hypothesis for further testing in the future since our test case is not large enough to warrant a more definite claim.

Another angle that should be looked into is the quality of the crops mixed. Particular types of crops being mixed may have some chemical interaction which may contribute to low or high productivity. Let us look into this by comparing the crops planted in our highest and lowest yielder test farms.

Table 5

No. Test Farm	Total Area (Sq. Meters) Planted	No. of Months Involved	Total Kilos Harvested	Production per Sq. M. (Col. 4/Col. 2)	Production Per Month (Col. 4/Col. 3)	Estimated Production Per Hectare During the Months Involved (Col. 5 x 10,000)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1,414	9	270.45	.19 kg	30.05 kg	1,900 kg
2	1,349	8	339.25	.25 kg	42.41 kg	2,500 kg
3	120	5	24.75	.21 kg	4.95 kg	2,100 kg
4	1,132	8	217.75	.19 kg	27.22 kg	1,900 kg

Table 6

Crops Planted In Low and High Yielder Test Farms

[illegible] Planted In [illegible] Yielder ([illegible] Farm No. 2)	Crops Planted In Low Yielder (Test Farm No. 1)	Crops Planted In Low Yielder (Test Farm No. 4)
[illegible]	Yam	Yam
[illegible]e (Tops)	Sweet Potato	Sweet Potato
[illegible]	Corn	Corn
[illegible]	Ckra	Okra
[illegible]	Gabi	Tomatoes
[illegible]	Habitchuelas	Papaya
[illegible] beans	String beans	Pepper
[illegible]	Squash	Peanut
[illegible]		Onion
		Irish Potato
		Ginger
		Carrots

Table 6 shows crops like banana, *ubi,* Baguio beans and *alogbate* as peculiar to Test Farm No. 2. These peculiar crops must have significant contribution to high yield for this test farm. The other crops are common to all the low and high yielder test farms. For practical consideration, banana and *ubi* should be introduced in the farm since these crops tend to contribute higher yield to the farm.

SUMMARY

The study revealed that certain crop mix tend to produce higher compared to others. Although still not very conclusive, there appears to be a threshold on the number of crops mixed that will provide an optimal production. Beyond this threshold limit, it may contribute to over competition between various plant species causing a reduced production. Below the threshold, it may not allow optimum use of nutrients causing also low productivity. The right level of mixture has to be determined. This study has provided the lead and more study in the future along this line have to be conducted.

For practical interest, this study suggests that a farm can be optimally producing if the following crops are mixed — yam, camote tops, banana, *ubi, gabi,* papaya, baguio beans, *alogbate,* and squash. Production estimate using this recommended crop mix shows that a one hectare piece of land can produce 2,500 kilograms of various agricultural products during a production period of eight months. Assuming that this agricultural production will have an average market price of ₱2 per kilogram — a one hectare piece of land using the recommended crop mix will be capable of producing ₱5,000 within an 8-month agricultural production.

PRODUCTIVITY CHANGES OF THE ATA: EFFECT OF AGRICULTURAL INTERVENTION ON NATIVE TRIBAL POPULATION

Rowe V. Cadeliña and Rodrigo Puracan

Introduction

The ultimate test for effects of intervention activities on farming practices is farm productivity. Since productivity represents the results of the interaction between various biophysical and chemical qualities of the land, changes in the production level suggest an over all condition of the farm with regard to its capability to support plant life. Of course, other extraneous factors have to be considered such as rainfall and other climatological factors. Given a particular nature of the climatological forces, production level of the farm can therefore be attributed to the biophysical and chemical characteristics of the farm. Hence, productivity changes can serve as indicators for changes in the soil characteristics of the farm.

About three years ago, the Ata in Cangguhub, Mabinay, Negros Oriental started introducing in their farms soil conservation measures designed to conserve and improve the soil conditions. Obviously, such measures did not provide immediate effects on farm crops. If their effects in the farms were positive, over time, the farm productivity level can be expected to rise. Otherwise, the productivity level of the farm can be conversely expected to decline.

FARM PRODUCTIVITY OF THE ATA: RESEARCH ISSUE

Farm productivity is a composite measure of output of a farm. As a measure, it has both time and crop component. Time is essentially represented by one agricultural cycle which may involve the multiple planting and harvesting "episodes" of similar crops. The "episodes" of harvesting are usually done in a series or sequence since serial or sequential planting of similar crop may be introduced. Hence, sequential harvesting may take place during one agricultural cycle.

The crop component would include the variety of crops grown simultaneously during one agricultural year. Hence, multiple varieties of crops may be harvested simultaneously during one agricultural cycle from a particular piece of land.

Farm productivity, therefore, measures the total harvest of a particular crop as well as all the other crops harvested during one complete agricultural cycle.

One agricultural cycle among the Ata involves three croppings of corn. The most common is two croppings; the least common is three croppings. Corn, a staple crop, is a permanent crop. Cassava and sweet potato, which are annual crops, are planted as supplements — hence, considered as famine crops.

Unlike corn, root crops are planted only once a year and it is usually harvested toward the end of an agricultural cycle. The end of an agricultural cycle is marked by the coming of the dry season.

The beginning of an agricultural cycle, on the other hand, is evidenced by the coming of the rainy season after the dry season. This happens between the months of May to July.

An agricultural year among the Ata therefore, could have the following months composition—from May to April, from June to May, or from July to June. If the rain comes during the months of May or June and the rain continues until January the next year, the Ata generally plant and harvest corn three times in one agricultural year. Otherwise, they only plant and harvest twice a year.

The first cropping in one agricultural year is known as *panuig*, the second cropping as *ulilang*, and the third, *pangagp*... On the basis of production, the *panuig* tends to have the highest production level per unit area of land. This is expected, since the land has been given a brief fallow period after the last cropping of the previous agricultural year.

The second cropping produces lower than what is yielded by the first cropping. This is expected, since the farm has not been given enough time to rest unlike what had happened in the *panuig*. Since the *ulilang* cropping uses the same plot where the *panuig* production took place, the soil nutrients left for the *ulilang* will be more limited compared to that of the *panuig*.

Similar problem holds true for the *pangagpas* cropping. Production level of the *pangagpas* tends to be lower to that of the *ulilang*. The exhaustion of soil fertility for the tribal cropping will obviously bring down production level. Since the Ata no longer have the luxury of shifting cropping sites, farms are cultivated twice or thrice in one year. This repetitive use of similar piece of land will obviously hasten nutrient lose and reduce farm productivity.

The introduction of mixed and rotation cropping systems of leguminous crops (peanuts, mungbeans, soya bean, and others) with their staple crop (i. e. corn) are expected to help improve productivity level of the Ata farms.

ATA PRODUCTION LEVEL: BASELINE DATA

In 1983-84, farm production data of the Ata farmers were collected for one agricultural year. The activity went on from March 1983 to February 1984. This took place immediately before the intervention program on farm systems development was introduced in 1985.

On the average, the Ata households were cultivating barely a hectare. Two subsistence crops were planted: corn and root crops.

Eighteen Ata households were monitored from March 1983 to February 1984 and data showed that, on the average, 97 percent of the household production in its farm consisted of corn and root crops.

An Ata household, on the average, consisted of five individuals (Oracion 1984-; 99). For a period of 12 months, an average Ata household was producing around 106,071 calories of corn and root crop from a barely one hectare piece of land. This would suggest that from agriculture alone, the Ata were producing far below than what an average Ata needs for his caloric requirement (see FNRI 1980). Hence, his caloric deficit has been supplemented by food products derived from exchange (see Oracion 1984:81-105).

The following table shows the pattern of harvesting and the volume of the crops harvested or produced from farm by an average Ata household.

Using the "Food Consumption Tables" of the FNRI (1980), the caloric production level of the Ata farm was tremendously low during the 1983-84 agricultural year. A slightly less than one hectare farm during that time was only producing between three to four cavans of unmilled corn. Such level of productivity suggests the level of degradation of the farms of the Ata during that period.

Indeed, an intervention program on the development of their farms was necessary. In 1985, farming systems development was introduced. Rockwalls and other soil conservation measures were introduced along with appropriate cropping systems. Three years later, production of their farms was monitored.

1988 PRODUCTION LEVEL OF ATA FARMS: RESULT FROM FARMING SYSTEMS DEVELOPMENT

During the 1987-88 agricultural year, farm productoin was monitored. The data revealed similar types of products during the 1983-84 agricultural production count. Root crops constituted only less than five percent of the total farm production and the rest consisted of corn. Hence, root crops contribution to the total household production is very insignificant.

Table 1

Estimated Monthly Caloric Production of An Average Ata Household From Its Farms (Barely One Hectare In One Agricultural Year of 1983-84). Estimated from Oracion's (1984:77) per capita caloric production from farm per month.

Month (1)	Corn (2)	Root Crops (3)
	Household Caloric Production From Barely One Hectare Farm	
March 1983	8,667	270
April	128	511
May	none	364
June	none	99
July	none	128
August	2,379	none
September	49,448	none
October	17,365	none
November	2,747	357
December	5,967	991
January 1984	12,484	517
February	3,649	none
Total Average Annual Caloric Production	102,834	3,237

Twenty-three farm sites were monitored during the 1987-88 agricultural cycle. Sixty-one percent of these farms have been provided with soil development and protection devices, and the rest were not. The total area of the farms developed with soil protection devices is approximately 10 hectares while those without any soil conservation measures have a total area of 7.

The soil development inputs in the farms consisted of contoured rockwalls and contoured canal system. In addition to these, hedgerows of ipil-ipil (*Leucaena leucocephala*) and napier grasses are planted along the sides of the rockwalls and the canals.

Corn production was monitored on a daily basis during the maturity of the crop. The number of ears of corn harvested were recorded. The recording was made every six o'clock in the afternoon in order to include those harvested during the early and the later part of the day.

To provide a meaningful measurement of production in relation to food requirement of an average Ata, the total number of ears of corn harvested were converted into its caloric equivalent value.

The data on production from farms with and without soil development inputs provide an excellent synchronic indicator on the effects of these inputs of soils as reflected by the production differential between those farms with and without soil development inputs. Obviously, it can be initially claimed that those farms with soil development inputs will have higher productivity level than those without soil development inputs.

Table 2 shows the detailed production related information for every 23 cases of farm units. For each case, information on the size of the farm, the total number of ears of corn produced, the estimated level of production per hectare per *panuig* harvest, and the presence and the types of soil conservation measures introduced into every farms are provided. With these data, one can initially observe that those farms with soil development inputs tend to produce relatively higher than those without these inputs.

Table 3 shows that those farms with soil development inputs are estimated to produce during *panuig* harvest around 6,861 ears of corn per hectare. This is around seven cavans (6.9 to be exact or approximately equivalent to 350 kilograms).

On the other hand, those farms without soil development inputs produced only 4,689 ears of corn per hectare during the panuig harvest. This is around 4.7 cavans (approximately equivalent to 250 kilograms).

Those farms with soil development inputs produced higher by around 47 percent compared to without soil development inputs. Such difference can be attributed to the positive effects of the soil development activities on the farms of the Ata.

On a household level, production during the *panuig* harvest is approximately 4.8 cavans from those farms with soil development measures. On the other hand, those households that have not developed their farms toward soil improvement only produce around 3.9 cavans per *panuig* harvest. The former is higher by around 23 percent from that of the latter. Those domestic units owning farms that are developed with soil protection tend to have higher per capita production during *panuig*. The former will have a per capita production of around one cavan while the latter will have less than one cavan. The difference is around 44 percent.

Since production in this study is reckond with a complete agricultural cycle, the succeeding corn cropping have to be likewise measured in order to determine the total production level of the farms. As mentioned earlier, the Ata may have a second cropping (*Ulilang*) and a third cropping (*Pangagpas*) depending on the availability of rainfall.

Compared with the first cropping, the second cropping generally drops at around 50 percent in terms of area cultivated and level of production. The third cropping decreases by 75 percent in area of cultivation and level of production per unit of land. The decline is caused by the limited time between harvesting and cropping, the inadequate exposure of the cultivated land to sunlight

Table 2

Corn Production Profile of Major Cropping (Panuig) in 1988

Case (1)	Size of Farm(Ha.) (2)	Total # of ears produced (3)	Estimated Production Per Hectare For *Panuig* (Ears) Col. 3/col.2) (4)	Soil Development Inputs (5)
1	1.90	5,738	3,020	Contoured canal and hedgerows of napie
2	.10	1,372	13,720	Contoured rockwalls with ipil-ipil and napier grass
3	.33	2,196	6,655	None
4	.25	3,590	14,360	Contoured rockwalls with ipil-ipil hedgerows
5	.10	612	6,120	None
6	1.50	9,270	6,180	None
7	.25	2,600	10,400	Contoured rockwalls
8	1.50	5,830	3,887	None
9	.33	3,870	11,727	Contoured rockwalls and hedgerows of napier
10	.80	3,528	4,410	Countoured rockwalls, canal with nap grasses
11	1.80	6,814	3,786	Countoured rockwalls with ipil-ipil
12	.33	3,119	9,452	Countoured rockwalls with ipil-ipil
13	.33	1,964	5,952	Countoured rockwalls with napier gra
14	.75	4,949	6,599	None
15	.50	3,549	7,098	Countoured rockwalls with napier gra
16	.50	3,470	6,940	Countoured rockwalls and canals wit napier hedgerows
17	1.00	1,465	1,465	None
18	.33	3,810	11,545	None
19	1.00	3,942	3,942	None
20	1.00	12,345	12,345	Countoured rockwalls, canals
21	1.40	12,642	9,030	Countoured canals
22	.33	2,776	8,412	Countoured rockwalls with ipil-ipil
23	.9	2,670	2,967	None

Table 3

Comparative Corn Production Level of Major Cropping (Panuig) In 1988 Between Farms With and Without Soil Development

Types of Farm (1)	Total Area of Farm (2)	Total Number of Cases (3)	Total Number of Ears Produced (4)	Estimated Panuig Production Per Hectare (Ears) (Col. 4/Col. 2) (5)
With soil development inputs	9.82	14	67,377	6,861
Without soil development inputs	7.41	9	34,744	4,689

before planting for the second and third planting, and the depletion of soil nutrient during the second and more especially for the third cropping.

Two estimates of farm production during one agricultural cycle were developed: "Minimum Estimate" and "Maximum Estimate." In the "Mininmum Estimate," we assume that the Ata made only two croppings of corn in one agricultural cycle. For the "Maximum Estimate," three croppings were assumed to be practiced.

For the "Minimum Estimate," Table 4 shows that the 14 cases of farm lands with soil protection devices and having a total area of 9.82 hectares yielded a total of 84,221 ears of corn. This is approximately 84 cavans with a total weight of around 4,200 kilograms. Per hectare, the production level of these farms is around 8.6 cavans weighing approximately 430 kilograms. Per household, the production is approximately six cavans for one agricultural year. This is equivalent to 300 kilograms. Assuming that there are five individuals, on the average in an Ata household, this would suggest a per capita production of slightly one cavan per one completed agricultural cycle.

For the farms without soil development inputs, a "Minimum Estimate" of production for one agricultural cycle was also computed. These farms involved a total land area of 7.41 hectares occupied by nine families or households. These types of farms have a total production of 43,419 ears of corn for one agricultural cycle (see Table 4). This is equivalent to around 43 cavans or 2,150 kilograms. Per hectare, the yield is around 290 kilograms or around 5.8 cavans. Per household, the annual production is around 4.8 cavans or 240 kilograms. This would indicate a per capita production of less than a cavan or around 48 kilograms per annum.

The percentage difference of our minimum production estimate between those farms with soil development inputs and those without these inputs is around 95 percent, with the first type of farms leading. This further suggests a positive effect of our soil development activities in the Ata farms.

For our maximum production estimate, those farms with soil development inputs yielded an annual production of 88,509 ears of corn (see Table 5). The land as we saw earlier, involved an area of 9.82 hectares with 14 cases of farming families or households. The total annual production is equivalent to around 89 cavans weighing 4,450 kilograms. The annual yield level per hectare is around nine cavans or approximately 450 kilograms. Per household, this would suggest a productivity value of around six cavans or 300 kilograms. On a per capita level, an individual Ata must have produced annually around 60 kilograms or slightly over one cavan.

Among those farms without soil development inputs, our total maximum annual production estimate is 45,646 ears of corn. (see Table 5). This is approximately 47 cavans or 2,350 kilograms. At this level, our per hectare estimate is around six cavans or 300 kilograms. Per household, this would mean a production of around five cavans or 250 kilograms.

Comparing the annual productivity level of the farms using the maximum estimate, the farms with soil protection measures yielded higher than those otherwise farms. The difference is around 94 percent, an indication of positive effects that soil conservation brings into the Ata farms.

To make our data comparable to the 1983-84 data and meaningful in the context of the Ata food consumption, our production figures were all converted into calories, a measure of energy derived from food (see Table 6). Two estimates were also made for the total annual caloric production: minimum and maximum.

Using the minimum estimate, an average Ata household with a farm that is developed with various soil protection measures has a total annual caloric production of around 258,077. On a per capita basis, considering that an average Ata household has five members, the annual per capita production level is only [illegible] calories. For households whose farms are not yet provided with soil development measures, the total average annual household production is around 206,873 calories. Among these households, their individual members have an average annual share of only 41,375 calories.

Table 4

Cooperative Corn Production Level During One Agricultural Cycle (Panuig and Ulilang) In 1987-88 Between Farms With and Without Soil Development Inputs (Minimum Estimate)

	Panuig		Ulilang		
Types of Farms (1)	Total Area of Farm (2)	Total Number of Ears Produced (3)	Total Area of Farm[1] (4)	Total Number of Ears Produced[2] (5)	Total Production of Corn During One Agricultural Cycle (Col. 3 + Col. 5) (6)
With soil development inputs	9.82	67 377	4.91	16,844	84,221
Without soil development inputs	7.41	34,744	3.70	8,675	43,419

[1]Total area of farm during Ulilang generally declines by 50 percent from that of the Panuig.

[2]Average production per hectare during the Ulilang generally declines by around 50 percent from that of the Panuig.

Comparative Corn Production Level During One Agricultural Cycle (Panuig, Ulilang, and Pangagpas)

In 1987-88 Between Farms With and Without Soil Development Inputs (Maximum Estimate)

	Panuig		Ulilang		Pangagpas		
Types of Farms (1)	Total Area of Farm (2)	Total Number of Ears Produced (3)	Total Area of Farm (4)	Total Number of Ears Produced (5)	Total Area 1 of Farm (6)	Total Number of 2 Ears Produced (7)	Total Production of Corn During One Agricultural Cycle (Col. 3+Col. 5+Col. 7) (8)
With soil development inputs	9.82	67,377	4.91	16,844	2.5	4,288	88,509
Without soil development inputs	7.41	34,744	3.70	8,675	1.9	2,227	45,646

[1]Total area of fare during Pangagpas generally declines by 75 percent from that of the Panuig.

[2]Average production per hectare during Pangagpas generally declines by around 75 percent from that of the Panuig.

Under a maximum estimate, an Ata household draw an annual production of around 271,189 calories from farms that are already provided with soil development measures. From those farms without soil development measures, a household only derived an average annual production of 217,360 calories (see Table 6).

An increment factor of five percent should be added to the minimum production estimate for both farms with and without soil conservation measures introduced. This correction factor should also be added into our maximum production estimate.

A correction factor of five percent is to take into account the calories that were derived from root crops. Other data base from our production monitoring activities suggest that root crop only takes around five percent of the calories derived from corn. This correction factor has to be added into our minimum and maximum estimates for annual caloric production (see Table 7).

On the whole, however, the production level is still very much lower compared to what an average Ata needs to keep himself alive. Using the recommended caloric requirements for an average Filipino, an Ata would need approximately 1,957 calories per day (FNRI 1980). The annual per capita caloric production for persons whose farms are already provided with soil protection measures, under our minimum estimate, can only last for 28 days. For our maximum estimate, it can only last for 29 days. This would mean that the Ata would have to take the other required calories for the rest of the year from another source. Oracion's (1984) study revealed that wage labor would provide a significant contribution to the total caloric need of the population.

Among those farms without soil conservation measures, per capita caloric production is worst. For our minimum estimate, an individual caloric supply can only last for 22 days, while for the maximum, 23 days.

Individuals owning farms with established soil protection get more calories by around 27 percent than those who are working on farms without soil protection. This suggests that more be-

Comparative Household Caloric Production From Corn During One Agricultural Cycle in 1987-88 Between Farms With and Without Soil Development Inputs

Types of Farms (1)	Minimum Estimate: Households Number of (2)	Total Caloric Production[1] (3)	Per Household Caloric Production (4)	Maximum Estimate: Number of Households (5)	Total Caloric Production (6)	Per Household Caloric Production (7)
With soil development inputs	14	3,613,081	258,077	14	3,796,650	271,189
Without soil development inputs	9	1,861,860	206,873	9	1,956,240	217,360

[1]Caloric production was computed by converting total number of ears of corn harvested into cavan. One cavan is equal to approximately 1,000 ears. One cavan was then converted into kilograms which is equivalent to 50 units. To get the edible portion of corn, the total kilograms produced was multiplied by 6. The result was divided by 100 and then multiplied by 143 calories which is the caloric value of 100 grams of edible portion of white corn (see FNRI 1980:6). White corn was chosen since the Ata only produce white corn.

Table 7

Average Annual Caloric Production After Correction Factor Has Been Added Into Minimum and Maximum Production Estimate

Types of Farm (1)	Minimum Estimate: Average Household Caloric Production (2)	Minimum Estimate: Average Per Capita Caloric Production (3)	Maximum Estimate: Average Household Caloric Production (4)	Maximum Estimate: Average Per Capita Caloric Production (5)
With soil development inputs	270,981	54,196	284,748	56,950
Without soil development inputs	217,217	43,443	228,228	45,646

efits will be coming to the Ata household as the soil development easures continue to restore and improve the soil condition of e farms. At present, the soil development measures established the farms are barely three years old. Since the effects of these easures are long term, we can expect more increase in the ming years.

Table 1 shows that an Ata household during the 1983-84 crop r produced only 106,071 calories (corn and root crops) for whole agricultural cycle. This is approximately two to three ns. For 1987-88 agricultural production, an Ata household producing 270,981 calories for our minimum estimate and 748 for our maximum estimate. These yield levels were all n from our experimental farms where soil protection and de- pment measures have been introduced. Since there was no ing systems development program introduced yet in 1983-84, ncrease in yield during the 1987-88 agricultural year could ttributed to the soil development inputs established in 1985. gricultural year 1987-88, around three years after the estab- ent, the effects of the soil development measures began to w.

he 1987-88 household caloric production is higher by around ercent for our maximum estimate and 155 percent for our um estimate from that of the 1983-84 crop year production. crease, after the soil development activities have been intro- can be attributed to these farm inputs. However, other s like rainfall and weather condition may affect pro- ty level aside from soil development measures intro- into the farms. Hence, control farms were monitored for productivity during the 1987-88 agricultural year. There ine control farms with a total area of 7.41 hectares. These ot provided with any soil protection and development es. The assumption is that any increase in production in trol farm could be attributed to other factors like better condition and absence of pests, just to mention a few, the soil development inputs.

e control farms yielded an average household production 217 calories for our minimum estimate and 228,228 calories maximum estimate. The differences between our control

Table 8

Percentage Increase in Production in 1987-88 and 1983-84 Agricultural Year

Production Estimate	Percentage Increase In Production of Control Farms (1987-88) From that of the 1983-84 Agricultural Year % (1)	Percentage Increase In Production of Experimental Farms (1987-88) From that of the 1983-84 Agricultural Year % (2)	Percentage Increase In Production of Experimental Farms (1987-88) Caused by Soil Development Inputs From that of the 1983-84 Agricultural Year (Col. 2 - Col. 1) (3)
Minimum estimate	100	155	55
Maximum estimate	115	168	53

farm production in 1987-88 from that of our 1983-84 production level are around 100 percent for our minimum estimate and for maximum estimate, the difference is 115 percent.

Table 8 shows the estimated percentage increase in production as caused by the introduction of the soil conservation measures.

Table 8 shows the increase in production of our experimental farms (those with development inputs) that can be attributed to the changes in the soil condition caused by our soil development activities. For our minimum estimate of production, around 55 percent in the increase in yield of our experimental farm can be attributed to the soil development inputs; for our maximum estimate, around 53 percent.

SUMMARY AND RECOMMENDATIONS

Using a quasi experimental and diachronic monitoring of farm productivity, the study demonstrated the changes in production caused by an intervention project designed to improve the soil condition of the Ata. Longitudinal productivity data with an interval of around four years were compared. Another synchronic data sets were compared by taking into account the production level of experimental and control farms. The experimental farms were those provided with soil development inputs while the controls were those without soil development inputs.

The data showed a positive increase in the production level of experimental farms. Around 53 to 55 percent of the increase was caused by developmental inputs that were introduced into the farms.

... developmental implications, soil conservation and improvement should be given top priority in farming systems development. Especially in areas where soil erosion has already ... in advanced stage, soil conservation development should ... considered as the foundation for another development efforts ... be introduced later. Cropping systems development would be meaningless under a condition where the soils are not managed effectively. The study showed that by concentrating primarily first on soil conservation, the Ata farmers were able to increase their production within a period of four years after the measures have been introduced. Although their total annual household production is still very low, an increase in yield is in fact true. Continuing increase in yield can be expected over the years since the effects of these measures are long term.

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A SURVEY OF SAMPLE FARMERS ON MARKETING PRACTICES IN LAKE BALINSASAYAO

Norma Caluscusan and Cleonico Fontelo

Introduction

In an effort to bring about desired improvement in the quality of life of farmers in the uplands, Silliman University, through its Research Center, has initiated the Silliman University Research and Development Program in the Uplands (SURADPU). This undertaking has already gained positive results in such areas as soil conservation and farming techniques geared at increasing the production level of the Balinsasayao farmers. Since these farmers depend solely on their farm produce to meet the basic necessities in life, they would be given assistance not only on how to improve production, but more importantly, on how to increase the income derive from their products. This will fall under the realm of developing an effective marketing system to maximize the profits from selling their products.

Significance of the Study

Marketing is as important as production itself. It stimulates social change and raises standards of living. Marketing enables buyers and consumers to gain access to goods and services and satisfy these needs. On the other hand, profitable marketing increases the purchasing power of the producers and enables them to buy not only the basic necessities of life but also some amount of luxury, better education for the children and health care.

A farmer can be profitable if he produces the right products in the right quantity and at the right time and place with effective marketing system. The return from his investments — materials, labor and capital can only be maximized if he has successful marketing strategy.

An effective marketing system means disposing the products at the best terms possible for the seller. Marketing goes beyond just finding the market. What counts most is the ability of the farmer to develop a strategy which affords the maximum return on his investment. If the farmer cannot get optimum benefits from his investment, he stops farming and seeks other viable undertaking to the detriment of the other communities that are dependent on them. At these times, when migration to the towns and cities is fast increasing, it is important that others will be encouraged to cultivate the farms. In this way, agriculture may be able to support industry and vice versa. In the end, this two-way support system will contribute to the ultimate development of the economy.

Through a sample of ten farmers, the study aims to identify the kinds and quantity of agricultural crops produced by the members of SURADPU in Balinsasayao, their present marketing system, and the problems encountered in selling their products. Once an understanding of these aspects is gained, the study hopes to present possible effective marketing strategies for the farmers. It is felt that improvements in their present marketing system can only be proposed if one is familiar with what the farmers sell, where and how they market their produce.

Review of Related Study

The Silliman University Research Center (URC, for short) organized in 1983 the SU Research Action Development Program in the Uplands. The project aimed at helping the upland farmers in Lake Balinsasayao achieve a significant level of production through the application of appropriate farming techniques that that will conserve the soil and maintain and improve its fertility.

Through appropriate assistance by the SU Research Center, the farmers were able to increase considerably their produce. However, this increase in farm produce needs to be translated into real and actual income for the farmers. To accomplish this, the farmers must have an effective marketing system. "An analysis on energy wastage (Cadeliña 1986) by the Lake Balinsasayao farmers after the crops have been produced showed that poor marketing opportunities could lead to the loss of almost 50% of what has been produced." This is because the farmers are vulneble to extreme pressure by middlemen to sell their produce at low prices. The farmers have hardly any choice. Due to distance, the problem of how to bring the produce to the appropriate market is an acute one.

Inspired by an enthusiasm to maximize its assistance to the Lake Balinsasayao farmers, the SU Research Center conceived of an experimental marketing assisted project. The project utilized Silliman campus as the market place. The assistance extended to the farmers consisted mainly of a vehicle to transport the farmers' produce from Lake Balinsasayao to the Silliman campus. The farmers shouldered the fuel cost of a four-wheel drive vehicle and its driver. Another form of assistance given to the farmers was an updated price quotations for the farmers' produce based on the prices in Dumaguete's public market. The URC conducted price surveys for all the commodities sold by the farmers in the morning of the market day. The prices of the farmers were set between 10% and 20% lower than the retail price at the public market.

The assisted experimental marketing project covered the period November 1985 to July 1986. The URC concludes that "the assisted marketing program has improved, on the average, by 70% over the farmers' original cash proceeds from sale of farm products during their non-assisted marketing system." The regular marketing channels, up-to-date information on prices of their products and getting rid of middlemen contributed to the improved benefits to the farmers. It cannot be overemphasized that an effective marketing system is a necessary complement to production, if the farmers are to enjoy truly the fruits of their labor.

Theoretical Framework

Marketing is so basic that it cannot be considered a separate function. It is the whole business seen from the point of view of the final result, that is, from the customer's point of view.

At this stage of our economic development, even the farmers like the ones in Balinsasayao do not only produce goods for their own consumption but have managed to sell a portion of their products and sometimes devote the whole production of certain goods for marketing purpose only.

Modern and well-managed organizations, mainly because of their size, experience and competence are succeding in the effective performance of their marketing functions in contrast to those of the small producers — the farmers in particular. The limited production of the latter is already a disadvantage which is compounded by the inaccessible and poor roads, unavailability of transporting and distance from the source of marketing information.

Juan Antonio Carrion (1971) mentions eight marketing functions. These include research, product planning and development, procurement, transportation, warehousing, budgeting-forecasting, risk and distribution. These functions are not obviously materialized in the marketing activities among the small upland farmers.

It is necessary therefore, that any genuine effort made toward improving the quality of the farmer's life should not be directed only to increasing the production of his farm but should be coupled with measures for effective marketing of his produce.

Larry J. Rosenberg (1977) defines marketing as a matching process. This suggests that the values created by marketing will be enhanced further by regulating the level of the product's supply to match with demand. Philip Kotler (1984), considers this function as one of the eight marketing tasks and names it as synchro-marketing. For effective marketing, the need should be supplied, but without necessarily creating market saturation as commodities with elastic demand fetch a lower price when supply exceeds demand.

Analysis

Results of the survey covering ten farmers show a total sales of fifteen thousand seven hundred twentdy-one pesos (₱15,721.00) in a month's time. Of this amount, one respondent accounted for ₱10,280 or 65.4% of the total, while one had only ₱90.00 or .5%. The other eight had sales ranging from ₱410 to ₱870 (see Table 1).

Table 1

Sales Value of Farm Products of Balinsasayao Farmers For one Month

FARM PRODUCTS	FARMERS (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	TOTAL
Abaca hemp (Abaka)									P 185		P 185
Apara	P 120		P 600	P 240	P 75	P 20	P 90	P 180	135	P2,400	3,860
Avocado (Abokado)	50										50
Baguio beans		P 90									90
Bananas (Saging)		100	70	200	200			96		30	696
Breadfruit (Kulo)										150	150
Cassava (Kamoteng kahoy)	20										20
Chayote (Sayote)	400	20	45	200		40		50	40	90	885
Coffee (Kape)										1,750	1,750
Gabi							80	45	50	500	675
Ginger (Luy-a)								80			80
Jackfruit (Nangka)	40				300						340
Papaya (Kapayas	100				10					60	170
Pepper (Atsal)		90		50			100				240
Squash (Kalabasa)					100		100			700	900
String beans (Balatong)		200								1,000	1,200
Sweet Potatoes (Kamote)	30		15	180	40	30	135	180		1,600	2,210
Tomatoes (Kamatis)										600	600
Ubi					40			110		1,400	1,550
Vegetable ferns	70										70
TOTAL	P 830	P 500	P 730	P 870	P 765	P 90	P 505	P 741	P 410	P 10,280	P 15,721
	=====	=====	=====	=====	=====	=====	=====	=====	=====	========	========

LEGEND: Columns (1) to (10) represent the sales of each of the ten farmers.

Table 2

Types of Buyers, Their Location, and Size of Purchase
(Matang, Dapit ug Gidaghanon sa Pumapalit)

Respondent No.	Merchant Middlemen (Kumprador)			Ultimate Consumers (Konsumidor)			Location of Buyers (Dapit sa Pumapa
	a	b	c	a	b	c	
1		x					Tabuc, Cebu
							Hanay-hanay
						x	Dumaguete City
							San Jose
2		x					Tabuc, Cebu
						x	San Jose
							Tanjay
3		x					Hanay-hanay
4		x					San Jose
							Dumaguete City
							Tabuc, Cebu
						x	San Jose
5	x						Hanay-hanay
							Tabuc, Cebu
							San Jose
6		x					Tabuc, Cebu
						x	Dumaguete City
							San Jose
7		x					Tabuc, Cebu
							Hanay-hanay
8		x				x	San Jose
9	x						Hanay-hanay
							San Jose
10		x					Dumaguete City
							Tanjay
							San Jose
							Balinsasayao
						x	Balinsasayao

LEGEND: a—all (tanan)
b—most (kadaghanan) c—small portion (diyutay)

Twenty different farm produce were sold during the period covered and the most commonly sold crops are *apara* and *kamote*, with total sales value of ₱3,860 for *apara* and ₱2,210 for *kamote* (see Table 1).

Most of the farmers' products are purchased by middlemen from the nearby places of San Jose, Hanay-hanay, and even Bacnasayao. There are also buyers coming from Dumaguete City, Tanjay and as far as Tabuc, Cebu province. Very little of the farmers' products are sold to ultimate consumers (Table 2).

As to the prices of these commodities, 50% of the respondents disclosed that they determined the selling prices, while 30% said they end up selling their goods at the price agreed upon between the sellers and the buyers. It is interesting to note that in some cases, the buyer gets to decide on the prices, as what two of the respondents claimed. However, there are occasions when the farmers have to use the prevailing market price as basis for their sales transactions.

Table 3

Price Determinants

	No. of Respondents
Prevailing market price	3
Seller's price	5
Buyer's price	2
Price agreed upon by seller and buyers	2

(Note: There were two respondents who disclosed that selling price is determined by more than one factor.)

Factors like transportation, buyers visiting them, delivery and other selling expenses, weather conditions, presence of more buyers and volume of sales, were commonly cited by the farmers as some of the factors affecting prices of their produce. For instance, 90% said that when sales materialize in their places (i.e. buyers come to them), selling prices will drop. Or that, when they sell products in such places as the San Jose or the Dumaguete City public market, they have to increase their prices to cover such selling expenses as transportation and delivery. It is worth pointing out that the Lake Balinsasayao farmers seem to ignore the "suki system" prevalent in the Filipino sales transaction, since 70% of them disclosed no change in prices when they sell to their patrons. Others like peace and order conditon of the area was also considered a significant factor that can bring about a change in the selling prices. For instance the farmers said they usually sell at low prices when there is an NPA-military encounter prior to the selling day.

Table 4

Factors Affecting Price On Farmers' Products

Factors	Effect on Price (Number of Respondents): Increase	Decrease	No Effect
1. Plenty are sold		5	1
2. Few are sold	5	1	
3. Buyer is regular customer			7
4. Products bought wholesale		5	1
5. Plenty of sellers		7	1
6. Products are perishable		6	
7. Products bought at farm (Lake Balinsasayao)		8	1
8. Expenses incurred	9		
9. Bad weather	7		1
10. Peace and order (bad)	4		

Eighty percent extend credit to the middlemen in very minimal amount with maximum period of one week. This is because most of them sell once a week only. Most respondents sell most their produce but sometimes some do not get to dispose all products for sale during a market day for some reasons. Among them are, buyers have plenty of stock, or products are damaged during transport. Damaged products usually end up sold at a very low or "give away" prices (for highly perishable items), sold on credit or bartered with other items like salt, or given as gifts to the farmers' patrons.

Half of the respondents cited transportation as comprising the main marketing expenses, paying an average of ₱4.40 per sack. Other expenses include delivery, taxes, and snacks. All except one believe they get reasonable prices for their products. However, they still desire for higher prices for their products.

Since they consider transportation as the major marketing problem, they would like to get help along this area. Hence they strongly declared the need for SU to continue its project in Lake Balinsasayao.

Summary and Recommendation

The survey shows the deplorable marketing situation of the Balinsasayao farmers. This problem requires an immediate solution considering that the farmers depend solely on what they can sell for their basic needs. The farmers have products which are either left unharvested or are ineffectively marketed. There is a lot of economic potentials in the area and these must be maximized not only by socially-conscious private institutions but by the government as well. The government talks about enhancing economic recovery, hence it must harness to the fullest the potentials at Lake Balinsasayao by providing appropriate marketing assistance to the farmers. The farmers at Lake Balinsasayao can certainly contribute towards this concern of the government.

The researchers would like to make the following recommendations:

First, a vehicle large enough to transport the farmers' products has to be provided. The costs of transportation must be shouldered by the farmers. Practically all of the respondents cited transportation as their major marketing problem.

Second, better roads need to be constructed. While it is true that the present roads to Balinsasayao are passable, most often they render considerable damage to the farmers products when delivered.

Third, strengthen the present association and inculcate in the minds of every member the importance of helping one ano ther. For instance, they should at least observe uniform pricing for their products, consider the types of their crops to be produce and proper scheduling of harvests in order to regulate supply.

Fourth, the farmers have to develop better relationship wit their buyers. After all, the buyers can be good source of som marketing information.

Fifth, control supply to coincide with peak demand. Sellin prices will drop when there is excessive supply. As a result, pro fits will also drop as most of the marketing expenses are fixe However, this scheduling system may be most effective only wit products which are not perishable.

Finally, there is a need to improve the peace and order con dition in the area.

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APPENDIX I

Credit Terms to Merchant Middlemen

Farmers	Extended Credit	Amount Involved	Period
1	(no credit)	—	—
2	x	₱100	1 week
3	x	100	1 week
4	(no credit)	—	—
5	x	200	1 week
6	x	50	1 week
7	(no credit)	—	—
8	x	50	1 day
9	x	50	1 week
10	x	500	1 week

APPENDIX II

Frequency of Selling In One Month

Farmers	1	2	3	4
1			x	
2				x
3				x
4				x
5		x		
6				x
7		x		
8			x	
9				x
10			x	

APPENDIX III

REASONS FOR INABILITY TO SELL PRODUCTS

Farmer	With Unsold Products	Reasons	Remedy
1	*	—	—
2	x	Plenty of supply	Sell at give away price (if bananas, let them ripen and sell, barter)
3	x	Plenty of supply	Sell on credit
4	*	—	—
5	x	Plenty of supply	Barter with salt
6	x	Plenty of supply	Barter with salt, sell at low price
7	*	—	—
8	*	—	—
9	*	—	—
10	x	Damaged due to trip	Given to buyers

* Products are all sold.

APPENDIX IV

FARMERS' SUGGESTIONS/IDEAS ON HOW THEIR INCOME WILL INCREASE

Farmer	
1	Higher price for their products
2	If provided with transportation for his products
3	(no suggestion)
4	(no suggestion)
5	If provided with transportation for his products
6	If provided with transportation for his products
7	Higher price for his products
8	Increase personal efforts
9	Higher price for his products
10	Higher price for his products

APPENDIX V

MARKETING-RELATED PROBLEMS

Farmer	
1	Low price for products, transportation
2	Transportation
3	Transportation
4	(did not express)
5	Transportation
6	Transportation
7	Low price, transportation
8	Transportation
9	Transportation
10	Peace and order, limited set of buyers, transportation

APPENDIX VI

NEEDS/REQUESTS OF FARMERS

Farmer	
1	Transportation and continuance of the Lake Balinsasayao project
2	Transportation and continuance of the Lake Balinsasayao project
3	Transportation and continuance of the Lake Balinsasayao project
4	Transportation and continuance of the Lake Balinsasayao project
5	Transportation and continuance of the Lake Balinsasayao project
6	Transportation and continuance of the Balinsasayao project especially the school and farming assistance, more visitors
7	Transportation, more buyers to offer better prices
8	(did not express need or request)
9	Transportation
10	Transportation, continue project especially the school and farming assistance, more visitors

ASSISTED MARKETING PROGRAM: AN ANALYSIS OF RESOURCE EXCHANGE BETWEEN A LOWLAND ACADEMIC COMMUNITY AND AN UPLAND SWIDDENING POPULATION IN NEGROS ORIENTAL, PHILIPPINES

* Rowe V. Cadeliña

Introduction

Like any other subsistence groups, the upland farmers need cash, a very scarce resource. The fact that not all the things they need can be locally produced, a portion of their subsistence production should have to be converted to cash by selling their marketable goods. Marketing their products is a real problem, therefore. The claim that subsistence farmers do not have a serious problem on marketing since they do not have surplus products is a myth. For the subsistence farmers, selling some of their products is just a way of obtaining cash to purchase goods that they cannot produce. These are the basic necessities that are essential for their very survival. Marketing of products therefore remains to be a very important activity for the subsistence farmers.

The Silliman University Research Action Development Program in the Uplands (SURADPU) is a project which aims at helping the upland farmers in Lake Balinsasayao achieve a significant level of production through the application of appropriate farming techniques that will conserve the soil and maintain and improve its fertility. Considering that the soil is the base for all agricultural efforts, the primary target of this planned program is the soil. Through the integration of tree crops, the ecological support on the farm can be further strengthened since trees can render a number of hydrological functions especially on sites that are declared as watershed. The integration of tree crops will allow the farmers to restore certain amount of vegetational cover on the ground while their roots can serve as nutrient pump to the soil.

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Tree crops which have food and cash value will likewise contribute to the expansion of food and cash bases for the local population. Hence, there is an expected increase in the overall production to the farmers. With the intended design of increasing production and meeting the actual needs of the farmers, marketing the products of the Lake Balinsasayao farmers becomes a real issue.

This paper serves to document the activities of the assisted marketing program of the Lake Balinsasayao farmers. As such, it will discuss the processes, the resources involved in the process and the cash resources that are transferred from the lowland community to the upland. While the paper will look at the ecological implication of the process, it will also examine closely its developmental implications of assisted programs.

BRIEF BACKGROUND — THE LAKE BALINSASAYAO AREA

With the following coordination; 123° 10′ east longitude and [illegible] 21′ north latitude, the Lake Balinsasayao area is situated around 25 kilometers northwest of Dumaguete City. It is about [illegible] meters above sea level.

Due to its volcanic origin, the farm top soil is considered rich in humus necessary to support various crops. Compared to the coastal community, Lake Balinsasayao has a cooler ambience characterized by frequent rainfall. This type of environment enabled the farmers to produce high priced vegetables that require low temperature for their growth.

The pockets of primary forests where ambience is similar to the rainforest areas in the tropics are still in existence. The relatively higher altitude makes the area relatively cooler.

The community is also endowed with a resource that has greatly improved the nutritional condition of the local population. Its two lakes, Balinsasayao and Danao, provide a variety of fish products that local population utilize for their protein [illegible]

The community is occupied by a population migrating from the lowlands. They are mainly farmers who have been dislocated from the lowland due to increasing demographic pressure on land resources. Some of the farmers were born in the area but their parents were lowland migrants. In short, the farming population is not indigenous to the local community and their lifestyle can be aptly described as lowland oriented.

THEORETICAL FRAMEWORK

It should be noted that different places in a region have different capabilities and opportunities. Due to the peculiar combinations of their respective social and biophysical subsystems, no two geographical sites will have completely similar available resources necessary for human survival. Likewise, on the temporal level, resources and opportunities from different sites may not necessarily exist at the same time. Hence, another source of differentiating factor may be working. These differences in resources and opportunities have been conceptually defined as imbalances (Jochim 1981:164-204).

Imbalances of resources and opportunities could be brought about by a more complex process than what we can imagine. Conceptually, three forces come to mind when we analyze "imbalances" closely. These forces are interacting dynamically producing a particular profile of resource availability. First, which is very apparent, is the peculiar biophysical endowment of a given geographical space. Their respective climatological, terrestrial and biological characterestics determine the kinds of botanical and zoological life that can be grown in the area. Hence, their overall resource base may not necessarily be the same. Second, since the population sizes of various communities are not at all times similar, the respective demographic pressure (Boserup 1965; Spooner 1972) on reosurces will not necessarily be the same. The greater the pressure, the less access people will have to resources and vice versa. Since the biophysical endowment of various geographical spaces is dissimilar, the carrying capacity (Brush 1975; Zabrow 1971 & 1975) of the areas will likewise not be equal. And, since the demographic pressure on resources is dependent on the carrying capacity of the resource and the absolute number of people, one can therefore expect an extremely varied levels of demographic pressure between different geographical sites.

The third force, emanates from the social system. Studies (Adelman and Morris 1973; Beteille 1977; Cashdan 1980; Jenks 1972; Smith 1976; Lenski 1966; Lynch 1969) on the way the social system allocates and distributes the resources show that these can largely affect the accessibility of resources to the different sectors of the population. In fact, famine to certain sector of the population can take place while the overall resources available to the other sectors is adequate due to bottlenecks created by the more advantaged group of the population (Central Institute of Research and Training in Public Cooperation 1969; Woodham-Smith 1962; Shepard 1975; Dirks 1980). Theoretically, a kind of class famine is created.

When these imbalances take place, corrective measures may be implemented. Jochim (1981:185) calls these compensatory strategies. These include techniques such as redistribution of resources through exchange (Healey 1978; Sillitoe 1978; McCarthy 1939; Sahlins 1965; Whitten and Whitten 1972; Jochim 1981) and redistribution of people through various modes of spatial movement of the human population (Bedford 1973; 1980; Bowles 1970; Carino 1976; Committee on Urbanization and Population Redistribution of the International Union for the Scientific Study of Population 1979; Goldstein 1976). In fact, warfare has been considered as a way of correcting these imbalances (Jochim 1981: 194-201; Chagnon 1977; Driver 1969; Meggitt 1977; Vayda 1976).

Since one of the forces that can produce imbalances is not static but changing (i. e. population), it is possible that in a given locality such problem may not exist at a given moment but at future time. Its occurrence can be anticipated and predicted. Under such circumstances, the population may implement preventive measures or anticipatory strategies (Jochim 1981:165) to suppress the possible occurrence of the problem. Among the lower forms of animals, territorial control (Klopfer 1969) is common, and among the human population, conservation measures (Moore 1957), storage of resources through social credit (Schneider 1969; Schneider 1979; Piddocke 1965; Pryor 1977; Heider and Ruddle 1974), and population control (Ammerman 1975; Birdsell 1953; Casteel 1972; Hassan 1978; Carneiro 1960) have been commonly reported.

The lowland-upland dichotomy of communities in the Philippines provides a case where imbalances in resources can be discerned. Their distinct biophysical features provide both communities. The swiddening population in Lake Balinsasayao and the faculty and staff of Silliman University represent the upland and the lowland communities respectively. From the former community, fresh vegetables are produced which the latter needs very badly. Although the former is also consuming part of their produce, they have to sell the rest to obtain cash needed to buy the essentials. In short, the upland population needs cash just as bad as the others. The faculty and staff of Silliman University use their cash resources to buy the foodstuff. It is on the basis of this exchange of currency and energy (foodstuff) that their respective needs can be met.

ASSISTED INTER-COMMUNITY TRADING PROCESS

Since the demand for agricultural products usually originates from the lowland communities, goods from the upland will have to be transported down to the lowland for marketing. The farmers generally bring down their products in big bulk and walk back home. In this regard, the farmers do not have the time to sell their products direct to the buyers in the public market or in other places through peddling. The farmers have no choice but to sell their products to the middlemen in the public market. Studies show that these middlemen may involve two or more hands before the goods reach the consumers. The longer this chain of middlemen is, the lower the price the farmers get from their product. Our analysis on the energy wastage (see Cadeliña 1986) by the Lake Balinsasayao farmers after the crops have been produced showed that poor marketing opportunities could lead to the loss of almost 50 percent of what has been produced. This is caused by the tremendous underpricing of farm products since the farmers' customers are not directly the consumers.

In short, reaching the consumers directly will allow the farmers to improve returns from their products. In this process, our assistance toward conserving their soil and increasing their production can be effectively safeguarded. Moreover, the efforts will allow us to maximize the benefits accruing to the farmers through a programmed development effort.

An assisted marketing program for the farmers was finally esigned. The idea was to bring the produce down to Silliman niversity campus and sell directly to the faculty and staff. he farmers had still their doubts as to whether or not this heme will work, so they can buy the essential goods they need d return home on the same day. The planners, on the other and, thought that these conditons can be adequately met due to e following considerations:

1) given the volume of their farm products, the faculty and aff of Silliman University and some interested outsiders can ovide adequate market for their products;

2) since there will be no other vegetable sellers, the farmers monopolize the community's market, hence the selling e can be shortened giving them enough time to go back to their ms on the same day;

3) since the buyers will be largely direct consumers, the ners will get a higher return from their products.

The ultimate goal of the assisted marketing program is to en- e the Lake Balinsasayao farmers and the Silliman University lty and staff to help each other. While the Silliman Univer- faculty and staff provide this to the farmers, the farmers in will be providing fresh vegetables at a price cheaper than buyers usually pay at the public market of the city. A fast over of faculty and staff buyers can therefore be expected cing the selling time. This gives the farmers enough time to the goods needed before going home that same day.

Since the prices of vegetables are highly fluctuating, the Uni- ty Research Center (as part of the program's services) al- conducts a price survey (for all the commodities the farm- are selling) at the public market in the morning of the et day before their products are displayed for sale. These on prices will serve as guides for fixing the price of the during a particular sale day. Prices are always set between to 20% lower than the retail price at the public market.

The good points about the scheme can hardly be put across to the farmers. It had to be demonstrated that it will work. A test run had to be implemented. Hence, an experimental assisted marketing program was run from November 1985 to July 1986. The experimental assisted program had three purposes:

(1) to show that the proposed marketing scheme will work;

(2) to show that they will make a profit;

(3) to accustom the farmers to this new system of marketing so they will continue with it even after the assisted experimental marketing project ends.

To encourage the farmers to participate in the assisted experimental marketing project, the SURADPU provided a subsidized transport system to the farmers — a four-wheel vehicle with a trailer. They only have to shoulder the fuel cost and the driver's fee. These costs were shared among the farmers proportionate to the volume of products loaded. The result of the test run was encouraging. Table 1 shows the income of 10 selected farmers from his various farm products before and during the assisted marketing program.

It is very apparent that the assisted marketing program has improved, on the average, by 70% over their original cash proceeds from sale of farm products during their non-assisted marketing system. The change in cash returns reflected by the 10 cases of farmers ranges from 47% to 114%. This clearly suggests that if the upland farmers have regular adequate marketing channels, they can still largely improve their welfare out of their farm produce. This condition is not only applicable to the Lake Balinsasayao upland farmers but also to others who have to contend with marketing problems associated with distance, transport facilities and middlemen. The fewer middlemen involved, the better for the upland farmers. Since the middlemen are still essential marketing channels especially for the peasant farmers, the best that can be done in assisted marketing programs is to try to reduce their number to maintain a lower price of produce for the consumers but on a profitable level for the farmers.

From experience, one can see that the upland farmers are already losing a good amount of resources due to poor farm management. Added to this is the loss accrued from the less efficient marketing of their products. If upland development program is designed toward efficient use of resources, then one of its development components should be on marketing. On the average, an upland farmer is approximately losing 70% of the actual worth of his products without good marketing channel. With a good marketing channel, a farmer may need only one-half kilo of Baguio beans to sell in order for him to buy a kilo of rice. Without good marketing system, a farmer will need at least one kilo of beans to sell to be able to pay for a similar quantity of rice.

How this marketing channel should be organized, however, is a problem. One channel of organizing this, may be through cooperative. Remember that this cooperative organization should involve marketing activities not consumer activites. It appears that buying what they need is not much of a problem as long as they get the most out of their products. When they come down to the lowlands to sell, they can have easy access to trading centers where they can buy their household needs from their optimum proceeds.

One word of caution will have to be made concerning cooperative efforts among lowland migrant swiddening population in the uplands. Considering the diversity of social and spatial origins of this group, they tend to be highly household-centered not individually centered. Perhaps the diversity of their social and spatial origins does not provide them a common reference point for any collective effort. This suggests therefore that cooperativism is one hard thing to develop among individuals of upland swiddening population who come from various lowland communities. In fact pooling their products together and selling them on a purely cooperative basis does not seem to work. The farmer wants to maintain definite ownership of the products marketed. This is also caused by the rather highly diverse amount and quality of products produced by the individual farmers. Such differences will obviously bring diffentiated returns from the sale of their products. The farmers want to maintain this highly individualized activity which I think is only fair.

Hence, any cooperative activity toward these marketing efforts should not attempt, in any way, to organize common disposal of produce and equal or even proportionate sharing of such proceeds. Lessons from other Southeast Asian countries with parallel problems seem to point to a similar direction.

RESOURCE EXCHANGE BETWEEN TWO COMMUNITIES

The assisted marketing scheme went on for nine months. As mentioned earlier, a transportation system was provided during this period to start the system going. When the system shall have been established, as the program was originally conceived, the assistance can be terminated and the farmers will have to organize their own transport system. From August 1986 when the transport provision ceased, the marketing program has been going on regularly up to this writing.

Regularity of Weekend Vegetable Sale

Every Friday of the week, the upland farmers bring their products to the university campus. Of the total nine months involved during the experimental assisted marketing program, slightly over 50% of this period had a full 4-weekend sale per month. However, the trend shows an irregular pattern (see Table 2).

The irregularity during some months was not caused by social factors but by natural ones. Obviously, beyond control of the farmers. In February, a strong rain accompanied by gusty winds hit the area causing some farms to be innundated. Crops were blown away by the gusty winds and washed down by floods. The rain went on for more than a week causing the water level from the lakes to rise. In fact, the Project Center was submerged in water up to is rooftop.

The calamity took place during the second week of February so that during that month, there was only one weekend vegetable sale. Since the crops were wiped out to almost zero, nothing can be sold in the later weeks of February and during the whole month of March. Crops had to be regenerated which took the farmers around two months to do so. For two months, the farmers had to depend on anything that was left on their farms by the calamity.

Meanwhile, the crops began to regenerate and the products started to be available during the third week of April. By then, the vegetable sale resumed its original schedule but was disrupted by a weekend non-sale since it was a summer break. The farmers decided not to sell their products since most of the students and the faculty were not on campus They were on vacation. Finally, the sale went on regularly again starting the second week of June until the present.

Since the marketing system of their products seems to have been already internalized by the farmers, they now look forward to the weekends when they can get good cash from their products. Such anticipation has given them incentives to produce more, hence more efforts are now apparently put into their farms to improve production. This is one positive result of the experimental assisted marketing scheme.

Market Sectors Involved In The Assisted Marketing System

As originally planned, the faculty and staff of Silliman University will serve as buyers of the farm products. While it is true that they turned out to be the major buyers of the products especially during the initial period of the activity, other sectors from the community started coming in. Hence, slowly the market for the farmers was expanding.

The students found out that the produce are cheaper than those sold at the market so they joined in with the other consumers from the outside community. Hence, there is an increase in absolute terms, in the number of buyers or customers. As a consequence, the expanding market has now reduced the selling time (see Table 3). The reduction of their selling time is a positive characteristic of this marketing scheme since this was one of their concerns during the initial attempts towards this effort. As mentioned earlier, the shorter their trading activity in the city, the more adaptive the activity is for them, since the farmers will have enough time to buy for their own needs and time to travel back home in the same day.

Quantity of Resources Exchanged

Due to the peculiar way of measuring the volume of products during the sale, it is difficult to use a standardized unit. Three units of measurements were commonly used during the transaction (see Table 4). It is very apparent from Table 4 that the quantity of vegetable products that are sold on Silliman University campus has been increasing. This can be reflected from all indicators for a unified attempt on the part of the farmers to increase the volume of products to be marketed.

There are a number of factors that contributed to this attempt at increasing the volume of products sold. First, as we saw earlier, there is an increasing number of buyers. The buyers now are no longer limited to the population from Silliman University but include those that come from outside. Second, with the increasing demand, the selling time of the products is reduced by 50% giving them enough time to do their own purchases and go home right after. Third, the relatively higher prices than what the middlemen are paying for their commodities allowed them to derive bigger yield or return form their own products.

On the average, during the first three months of our assisted marketing program, slightly below one ton of vegetable products (mostly succulents) from the upland reached the campus of Silliman University. In addition, around 600 pieces of assorted crops and 100 bundles of leafy vegetables are likewise sold. This obviously must have helped the needs of the population on campus by providing them fresh and cheaper vegetable products.

In the succeeding months the quantity went up. Around one ton of succulents reached the campus while the volumes of leafy vegetables and other crops have increased by almost three times as much as that in the first three months of sale.

Obviously, this increased sale indicates that the quality of the produce must be high. The diversity of the crops sold suggests an improved nutritional content of the total vegetable repertoire made available by the farmers to the people in the lowland, i.e. campus of Silliman University.

While the people of Silliman enjoy the foodstuff, how much do the farmers earn from this venture? There were two things hat we monitored during the sale: the quantity and the kinds f products sold by the farmers during the sale day; and the mount of money that the farmers earn during the sale. Table 5 ells the story.

Again, on the basis of the total amount of money received, e table shows the increasing revenues accruing to the farmers om the sale of produce to Silliman. For the first three months f the assisted marketing program, more than ₱2,000 have een pumped into the upland community and this went up almost twice that amount during the last six months.

With the increasing participation of the farmers in the sale f the products on campus, there is an increasing spread of is cash to the farming households. It is very interesting to note at while there is an increasing distribution of cash resources the greater number of farmers, there is still a corresponding rease in the absolute amount each participating farming household in the sale gets. For instance, during the first three months, ere were arond 10 farmers on the average who are involved in e sale per month. Each seller gets only, on the average, slightly er ₱200. During the next six months, on the other hand, e number of farmers selling their products increased by %, while the income per seller increased by slightly over %. This suggests that while there is a growing interest ng farmers to participate in the sale, there is also an increasing desire by every participating farmer to increase the ntity of the products they are selling.

ons Learned

What we saw is a process where two population groups are ed by the activities of resource exchange. It is a situation re various forms of energy are transferred between two s because of their peculiar needs and capabilities. This situan is oftentimes visible in most communities all over the ppines. The lowland-upland gradient characterizing various es are common in the Philippines due to the archipelagic re of the country.

Considering that the upland communities are now increasingly becoming the target of extension and development efforts, the exchange of resources activities between these ecozones provides an excellent adaptive channels for development programs in the communities involved. In short, development efforts can hardly be considered, especially in the Philippines, as a mono-ecozone oriented assistance program. It is very apparent from our Lake Balinsasayao-Silliman University experience that development activities should be multi-sectoral to include the lowland communities to expand the network of beneficiaries who derive energy, materials, and information from exchange activities for their own survival. The assisted marketing program surely gives the chance to both the upland and lowland populations to exchange their energies and materials in a more socially responsible manner since both sides get an optimum return from their own respective resources.

Looking at the sale as a kind of social transaction, such socioeconomic process would surely lead to the accumulation of information by the upland population on the economic processes in the lowlands. This will of course sharpen the strategies of the upland population toward the disposal of their resources in a more productive manner. Information is one resource that can hardly be seen, as it is intangible; but is quickly made available to the farmers during the process of transaction.

Since the expected outcome of the assisted marketing program is mainly the optimization of returns from their products, the motivational consequence of the program to the farmers is two-pronged. First, it increases the number of participating farmers. If participation among the local population is accepted as a good gauge of a program's success, then marketing schemes of local products will surely improve the chances of success of other programs, it therefore, serves as an effective means of improving the distribution of benefits derived from the project to the local population.

Second, the population is enthusiastic to get more returns from their products. Our data show that while there is an increase in the number of participants, there is also a concomitant increase in the volume of products sold. If it were otherwise, the increasing number of sellers could have brought about a decrease in per capita income.

SUMMARY AND RECOMMENDATIONS

Finally, some major points will have to be stressed here.

First, development efforts in the upland can be made more effective if an adequate marketing system of products is provided.

Second, even subsistence farmers in the uplands will have to sell part of their products to buy the goods they need from the outside. Surplus production is therefore not a pre-requisite for providing marketing support to highly farming upland population.

Third, the marketing program allows the farmers to check potential loss of revenues due to unfair and poor marketing system. With efficient marketing program, the farmers can increase the welfare they can derive from their products by around 70% which can otherwise be quickly lost by poor marketing channels.

Fourth, poor marketing channels for the upland will therefore compound energy wastage. The loss of energy starts at cultivation time and continues on to marketing time if victimized by poor marketing channel.

Fifth, a good marketing support has a strong motivational effect on the farmers to participate in upland development efforts to improve production. This has tremendous implications for any upland development programs.

As a recommendation, it is very apparent that marketing cooperative, not consumer cooperative, has more salient role in strengthening upland assistance programs. The mechanisms of upland development should be geared toward this direction to attain multifaceted and more positive effects for the intended beneficiaries.

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Table 1

Comparison of Cash Yields From Various Products Sold Before and During the Assisted Experimental Marketing Project

Case No. of Farmers (1)	Products Sold (2)	Cash Income Derived From Sale: Before Assisted Experimental Marketing Project (3)	Cash Income Derived From Sale: During Assisted Experimental Marketing Project (4)	Percentage Change of Cash Income From Sale During Assisted Experimental Marketing Project (Col 4-Col 3/Col 3 x 100) (5)
1	10 kilos of Baguio beans; 100 pieces of sayote; 5 kilos of tomatoes	₱ 70	₱150	114
2	10 bundles of camote tops; 10 kilos of eggplant; 3 kilos of pepper	₱ 60	₱111	85
3	15 bundles of vegetable fern; 15 kilos of yam; 10 kilos of sweet potato	₱105	₱205	95
4	20 kilos of Baguio beans; 12 kilos of tomatoes	₱100	₱160	60
5	25 kilos of yam	₱100	₱150	50
6	300 pieces of sayote	₱ 90	₱180	100
7	15 kilos pepper; 7 kilos of eggplant	₱130	₱220	69
8	20 kilos of sweet potato; 50 pieces of sayote	₱ 95	₱145	53
9	25 kilos of Baguio beans; 5 kilos of pepper	₱160	₱235	47
10	250 pieces of sayote	₱ 63	₱125	98
Average From All Cases of Farmers		₱ 97.30	₱163.10	73

Table 2

Months and Products Monitored During the Assisted Marketing Scheme for the Lake Balinsasayao Farmers

Months	Number of Weekends When Products Sale Took Place	Number of Varieties* of Products Sold
November, 1985	4	21
December, 1985	4	18
January, 1986	4	15
February, 1986	1	9
March, 1986	0	0
April, 1986	2	15
May, 1986	4	18
June, 1986	3	16
July, 1986	4	18

*These include products such as squash; tomatoes; eggplant; Baguio beans; sweet potato; apara; ubi; tops of edible fern, sweet potato, gabi, and sayote; [illegible]; petchay; sayote; bitter melon; bell pepper; onion; bananas; string beans; avocado; coconuts; cassava; jackfruit; ginger; papaya, and white beans (abet-[illegible]as).

Table 3

Comparison of Market Sectors and Selling Time During the First Three Months and the Succeeding Months of the Assisted Marketing Systems

Periods of the Assisted Marketing Program	Length of Selling Time (Hours)	Average Monthly Number of Buyers	Proportion of SU Faculty & Staff Buyers	Proportion of SU Student Buyers	Proportion of Outside SU Buyers
During the first three months of assisted marketing scheme	6	67	85%	15%	0%
During the fourth and the later months	3	105	55%	35%	10%

Table 4

Various Measures of Quantity of Farm Products Sold During Two Periods of Assisted Marketing Program Compared

Periods During Assisted Marketing Program	Average Monthly Number of Pieces of Certain Products*	Average Monthly Number of Bundles of Certain Products**	Average Monthly Number of Kilos of Certain Products***
First three assisted marketing scheme	649	111	830
The second six months of the assisted marketing scheme	1,763	151	951

*This involves the products such as sayote; avocado; bananas; and coconuts.

**This includes products such as tops of edible fern, sweet potato, sayote, and gabi; string beans; and onion leaves.

***This includes all the products reported in Table 2 other than those noted in footnotes 1 and 2.

Table 5

Comparison of Cash Returns Farmers Received From Their Products During Two Periods of the Assisted Marketing Program

Two Periods of the Assisted Marketing Program Compared (1)	Monthly Average Amount Received by the Farmers (2)	Monthly Average No. of Farmers Selling Vegetable (3)	Monthly Average Cash Income Each Farmer Received From Sale of Products Col. 2/Col. 3 (4)
First three months of assisted marketing scheme	₱2,545.00	10	₱254.50
The second six months of the assisted marketing scheme	₱4,623.00	15	₱303.20

HEALTH CONDITION OF UPLAND FARMERS: A STUDY ON THE EFFECTS OF THE UPLAND DEVELOPMENT PROGRAM IN LAKE BALINSASAYAO

Rowe V. Cadeliña and Vilina V. Cadeliña

Introduction

One of the important concerns of economic development in a community is health improvement of its inhabitants. If one assumes that health is dependent on the availability of food and other basic resources, an increase in the quantity and quality of these goods is, therefore, imperative.

The Silliman University Research Action Development Program in the Uplands (SURADPU) particularly in Lake Balinsasayao, started around three years ago (1984). It is an integrated approach aimed at conserving the remaining forest by keeping the cleared farms stable. This aim is mainly carried out by introducing soil conservation techniques appropriate for the highlands. The embodying philosophy is this: Once the farms are stable, production will improve. Farmers will no longer find it necessary to expand forest clearings to augment production. In this way, forest clearings can be considered.

During the last three years of the program, the Lake Balinsasayao farmers have been exposed to intensive training on appropriate farming techniques which they implement on their farms. More than 20 farmers adopted the techniques. Their activities were monitored during the last two years to assess their farm production changes and their health condition. The assumption is that the farmers' present health condition is partly a reflection of the effects of their present food condition brought about by the adoption of new farm development techniques.

Baseline Health Condition of the Farmers

In May 1982, seven communities around Lake Balinsasayao area were surveyed. A major concern was the assessment of the communities' health condition. This took place around two years before the project started operating. The study collected data on

Table 1

Percentage of Various Age Groups Who Are 10 Years Old and Younger By Nutritional Levels Based On Body Weight

Age Groups	Normal (%)	First Degree Malnourished (%)	Second Degree Malnourished (%)	Third Degree Malnourished (%)	Total (%)
Below 2 years old	54	31	8	7	100.00 (13)
3-4 years old	20	47	33	0	100.00 (15)
5-6 years old	0	75	25	0	100.00 (8)
7-8 years old	*	*	*	*	*
9-10 years old	*	*	*	*	*

* No data

Source: Fontelo 1985:87

anthropomorphic measurements as indicators of health conditions of preschool children (aged 0-6 years old). These measurements include weight, height and arm circumference (Fontelo 1985).

On the basis of weight, the study (see Table 1) showed that the worst health condition was found among children aging 3-6 years old. While it is true that third degree malnutrition was found among children whose ages are two years old and below, its preparation (only 7% for third degree) was negligible. More than 50% were on the normal range. A very low percentage was registered as normal for those aging 3-6 years old.

In terms of height, those children aging two years old and below consistently demonstrated better condition compared to the older ones. More than 60% of those children aging two years and below were under normal condition of height (91-100% of ideal height). Nobody was considered as belonging to the third degree level (61-70% of ideal height). Among children aging 3-4 years old, 13% were considered third degree malnourished (see Table 2).

For ideal area circumference, however, children aging two years and below no longer performed as well as in the other indicators (ideal height and weight). The older age groups were slightly better off than the younger age category (see Table 3). This difference could be due to error in measurement especially for arm circumference, which is highly sensitive to inaccuracy (measurement slippage) compared to bodily weight and height.

In 1983, another study was conducted (Cadeliña 1984). This time the study did not do any anthropomorphic measurement, but concentrated on collecting information about incidence of illness. Fifteen percent of all the respondents contacted were sick at the time of the interview. They reported to be afflicted with viral infection (such as flu) and respiratory trouble.

Another question was asked on the incidence of illness during the last 12 months before the interview contact was made. On the basis of recall, 31% of the respondents claimed to have been sick, on the average, six times during the last 12 months.

Table 2

Percentage of Various Age Groups Who Are 10 Years Old And Younger By Nutritional Levels Based On Desirable Height (1982)

Age	91-100% of Ideal Height (%)	81-90% of Ideal Height (%)	71-80% of Ideal Height (%)	61-70% of Ideal Height (%)	Total (%)
Below 2 years old	62	23	15	0	100.00 (13)
3-4 years old	40	40	7	13	100.00 (15)
5-6 years old	38	62	0	0	100.00 (8)
7-8 years old	*	*	*	*	*
9-10 years old	*	*	*	*	*

* No data

Source: Fontelo 1985:88

Table 3

Percentage of Various Age Groups Who Are 10 Years Old And Younger By Nutritional Levels Based On Ideal Arm Circumference (1982)

	91-100% of Ideal Arm Circumference (%)	81-90% of Ideal Arm Circumference (%)	71-80% of Ideal Arm Circumference (%)	61-70% of Ideal Arm Circumference (%)	Total (%)
Below 2 years old	54	38	0	8	100.00 (13)
3-4 years old	60	40	0	0	100.00 (15)
5-6 years old	50	50	0	0	100.00 (8)
7-8 years old	*	*	*	*	*
9-10 years old	*	*	*	*	*

* No data

Source: Fontelo 1985:89

Each length of illness or sickness usually lasted for three days. This suggests that on the average, the morbidity rate in the area forced the ill farmers to stop from working around 18 days per year.

When the project started, another study which still included health condition was conducted (Harvey n. d.). This time, the data did not show marked improvement on the condition of the preschoolers. On the basis of weight, only 7% was reported normal; 51% was reported to be first degree malnourished; 35% second degree and 7% third degree. The information was, however, not disaggregated for the younger age groups.

Unlike the first study, the third study did not show consistency of health condition of the preschoolers when other indicators were used. For instance, when ideal height was used, 39% was reported to be normal and the rest were first degree malnourished. When arm circumstance was used, 15% was reported normal First degree malnourished was on the magnitude of 66%, 15%, second degree and 4% for the third degree. On the whole, the same study also reported that around 12% among the the preschoolers showed physical manifestations of anemia.

Assuming that health education can improve health condition of the population, the second study also attempted to determine the proportion of households in the community having received basic health education. The data revealed that around 17% only received basic information and the rest did not.

Present Health Condition

From March 1986 to the present, a monthly monitoring of the health condition of our farmer cooperators of SURADPU in Lake Balinsasayao has been done. This includes documenting the incidence of illness among children and adults and the changes of the anthropomorphic measurements of children up to age 10. These measurements include weight, height and arm circumference.

For this paper, the data analyzed include only those collected from March 1986 to February 1987.

Morbidiy Pattern

The study in 1983, which was supposed to show the morbidity pattern of the community was refined by our ongoing one-year old health monitoring in the area. In the 1983 study, the respondents were not disaggregated according to age and sex. They were lumped into one category only. Most of the information sought were on the number and types of illness experienced during the 12 month period. At the time of the interview contact, 15% of the respondent population were reported to be sick. For the period of 12 months before the interview contact, 31% reported to have been sick.

The data on our present study allow us to see trends of morbidity pattern of various age and sex groups during a period of 12 months. Figure 1 shows that for the age group, 10 years old and below, the peak of incidence of illness could be seen both sex groups, although the peak tends to be higher for the females than for the males.

For the older age groups, two age levels were compared, i.e. the 11-29 years old and 30 years old and above. Figure 2 shows the morbidity pattern of four groups of population (female aging 30+, aging 11-29, male aging 30+ and male aging 11-29) on a monthly basis for 12 months. Similar to our first observation, two peak periods of illness (see Figure 2) occur during the months of March and November. This suggests that illness is seasonal and probably coincides with weather and temperature changes. It should be noted that the onset of the southwest moonsoon in the area occurs during the month of March and the northeast monsoon, November.

In almost all age groups (see Figure 1 and 2), the females are more prone to illness. A higher incidence of illness in almost all months have been registered by the females for age groups 10 and younger and aged 30 and older.

Between age groups, the youngest and oldest categories tend to be more susceptible to illness compared to the middle age groups. This suggests the general condition that the youngest and

Figure 1

Frequency Trend of Male and Female Population Aged 10 Years Old and Younger Who Got 111 During a 12-Month Period of Monitoring

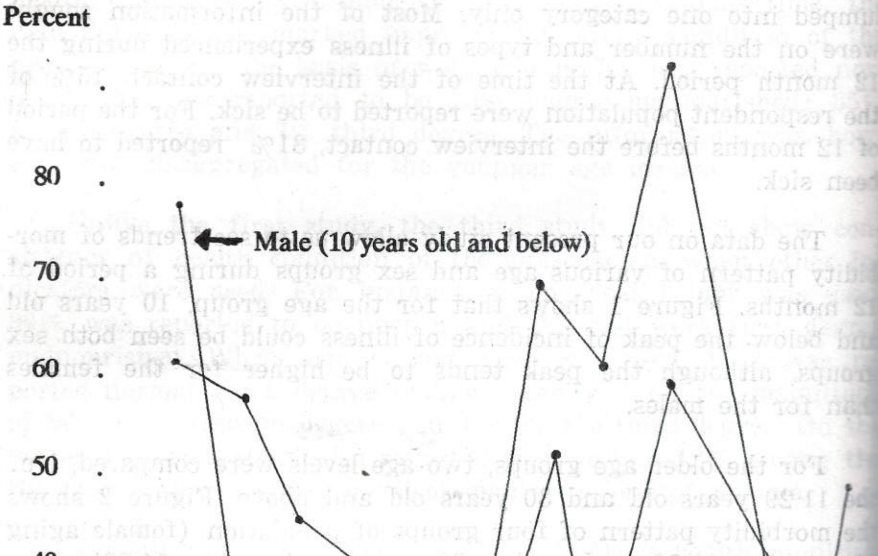

Figure 2

Frequency Trend of Male and Female Population Aged 10 Years Old and Younger Who Got 111 During a 12-Month Period of Monitoring

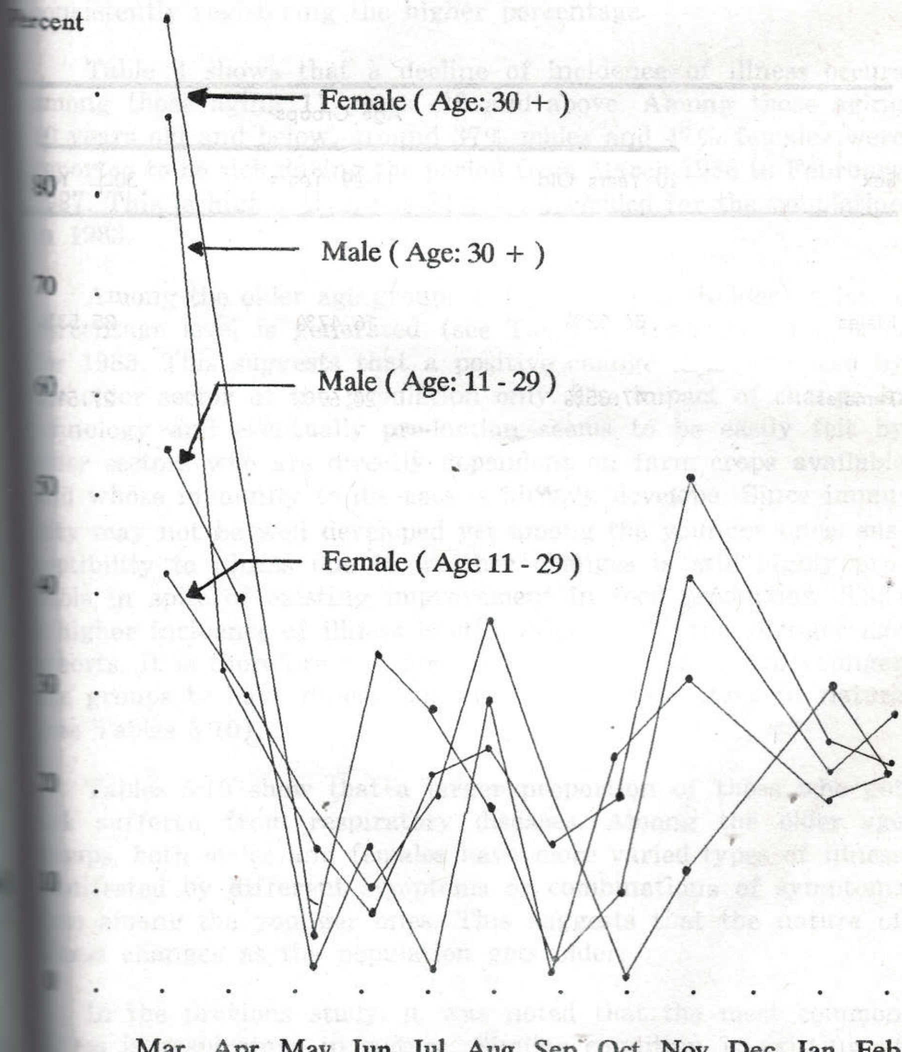

Table 4

Average Percentage of Individuals Under Various Age and Sex Groups Sick During 12-Month Period (March, 1986-February, 1987) Monitored In Lake Balinsasayao

Sex	Age Groups		
	10 Years Old	11-29 Years	30+ Years
Males	36.62%	16.47%	25.53%
Females	47.35%	20.67%	27.51%

Table 5

Kinds of Illness of 10 Years Old and Younger For a Period of 12 Months (Male)

Illness	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986	JAN 1987	FEB 1987
Abdominal problem	6%	10%	20%	0	0	0	0	0	0	-	0	0
Respiratory disease (cough with fever, etc.)	44%	50%	80%	60%	0	100%	57%	75%	71%	-	33%	100%
Others (tonsilitis, sore eyes, swelling of knees, etc.)	6%	30%	0	40%	100%	0	43%	0	0	-	0	0
Combination of the above	44%	10%	0	0	0	0	0	25%	29%	-	67%	0

\- No data

Table 6

Kinds of Illness of 10 Years Old and Younger For a Period

Table 6

Kinds of Illness of 10 Years Old and Younger For a Period of 12 Months (Female)

Illness	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986	JAN 1987	FEB 1987
Abdominal problem	0	0	17%	0	0	20%	0	17%	0	–	0	0
Respiratory disease (cough with fever,etc.)	40%	65%	67%	100%	100%	80%	100%	83%	57%	–	100%	75%
Others (tonsilitis, sore eyes, swelling of knees,etc.)	20%	0	8%	0	0	0	0	0	29%	–	0	25%

– No data

Table 9

Kinds of Illness of Male Individuals Aged 30+ For a Period of 12 Months

Illness	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986	JAN 1987	FEB 1987
Abdominal Problem	10%	0	0	0	0	0	0	0	0	-	0	0
Respiratory diseases (cough with fever, etc.)	10%	57%	100%	100%	0	33%	0	100%	50%	-	100%	100%
Others(tonsilitis, sore eyes, swelling of knees,etc.)	30%	29%	0	0	100%	77%	100%	0	50%	-	0	0
Combination of the above	50%	14%	0	0	0	0	0	0	0	-	0	0

- No data

Table 10

Kinds of Illness of Female Individuals Aged 11-29 For a Period of 12 Months

Illness	MAR 1986	APR 1986	MAY 1986	JUN 1986	JUL 1986	AUG 1986	SEP 1986	OCT 1986	NOV 1986	DEC 1986	JAN 1987	FEB 1987
Abdominal problem	11%	13%	0	0	0	0	33%	0	33%	-	0	0
Respiratory diseases (cough with fever,etc)	22%	62%	75%	100%	0	80%	0	0	33%	-	50%	100%
Others (tonsilitis, sore eyes, swelling of knees,etc)	11%	13%	0	0	100%	20%	33%	0	0	-	50%	0
Combination of the above	56%	13%	25%	0	0	0	33%	0	33%	-	0	0

- No data

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of illness is occuring only for the older age category. Such difference is difficult to determine as "change" simply because the data from the two studies were not organized in a similar manner.

Table 11 reveals the number of days a person gets sick during the past 12 months. For all categories of respondents the average number is longer than that at the start of the project. The difference is almost twice as much. A longer length of illness is consistently demonstrated by the females from all age groups.

Table 11 suggests that while it is true that there is a decline in the proportion of those who got ill at present compared to that at the initial period of the project, the length of illness has not changed. In fact, the data reflect an increase in the number of days for the present. Such condition is difficult to explain.

Anthropometric Measurements

For the individuals aging 10 years old and below, three measures were taken. These were body weight, height and arm circumference.

Body Weight: On the whole, the males are found to be heavier than the females. However, the males do not consistently demonstrate weight superiority over the females for all age groups. For instance, the males aging 5-6 years old and 2 years old and below are relatively lighter than their female counterparts for these age categories. Nevertheless, the difference is slight (see Table 12). Assuming that body weight, among others, suggests certain amount of resistance to diseases, this might explain why we tend to find higher incidence of illness among the females than among the males.

Comparing the mean actual weight to the average minimum ideal weight of the various age groups. Table 13 shows that only the females belonging to the two-year-old and younger group have normal weights. Those who belong to the 3-4, 5-6 and 7-8 years old groups are below the average minimum ideal weikghts. These underweights fall under the first degree malnutrition.

Table 11

Average Number of Days A Person Got Sick During The Past 12 Months

Age and Sex Groups (1)	Average Monthly (Days) (2)	Annualizing Factor (3)	Estimated (Days) Average Annually (Col. 2 x Col. 3) (4)
Male (11 years old and older)	2.6	12	31
Female (11 Years old and older)	2.7	12	32
Male (0-10 years old)	2.9	12	35
Female (0-10 years old)	3.3	12	40

Table 12

Average Weight (Kilograms) of Male and Female Individuals By Age Groups (10 Years Old and Younger) During the Last 12 Months (March 1986-February 1987)

	Male		Female	
Age Groups	Mean Weight	C.V.*	Mean Weight	C.V.*
2 years old and below	9.03	.47	9.31	.42
3-4 years old	14.45	.38	11.84	.45
5-6 years old	15.67	.45	15.78	.43
7-8 years old	17.48	.43	17.36	.38
9-10 years old	20.57	.44	20.38	.43
N	—		—	

*Coefficient of Variation

Among the males, the 2 years old and below and the 3-4 years old have normal weights. Only the age groups 5-6 and 7-8 are underweight. Like their female counterpart, they are first degree malnourished.

This health condition is obviously better than what we found in the community around five years ago, i.e. before the establishment of the project. Table 1 showed 7% third degree malnourished and 8% second degree malnourished from children aging two years old and below. Among children belonging to 3-4 and 5-6 age groups, 33% and 25%, respectively were reported to be second degree malnourished. On the basis of weight, therefore, there is an improvement of the present health condition of the children compared to that found in the community before the program started.

Height: The height of the male and female individuals does not significantly differ. Tabe 14 shows that both males and females from the five different age groups have almost similar heights.

Let us now assess the health condition of the subject on the basis of height. This can be done by comparing the ideal height of the person given their actual weight and height. Since there is an ideal height associated with a particular weight, then we can assess health on the basis of actual height and weight.

Among the males, only the 7-8 and 9-10 age groups have normal heights. They slightly exceed the standard. All the other age groups (see Table 15) have height slightly shorter than the ideal. The difference suggests a first degree malnutrition.

Among the females, all age groups except one have normal heights. Females aging 2 years old and below have heights below the ideal, a condition suggesting only a first degree malnutrition.

On the basis of height, the present health condition of these age groups is better than that we found five years ago. Table 2 shows 15% belonging to the second degree malnutrition for ages two and below in 1982. Among children aging the 3-4 years old, [illegible]% fall under the third degree malnourished level, while 7% fall under second degree malnourished level during that year.

Table 13

Health Condition of Male and Female Individuals Aged 10 Years Old and Below on the Basis of Body Weight During the Last 12 Months (March 1986-February 1987)

Age Groups	Mean Actual Weight: Male	Mean Actual Weight: Female	Average Minimum Ideal Weight*
2 years old and below	9.03	9.31	8.29
3-4 years old	14.45	11.84	13.29
5-6 years old	15.67	15.78	16.14
7-8 years old	17.48	17.36	17.65
9-10 years old	20.57	20.38	—
N=	—	—	

* Source: National Nutrition Council 1974:45-46.

\- No data

Table 14

Average Height (Inches) of Individuals Aged 10 Years Old and Below During the Last 12 Months (March 1986- February 1987)

	Male		Female	
Age Groups	Height (Inches)	C.V.*	Height (Inches)	C.V.*
2 years old and below	28.00	.45	28.08	.58
3-4 years old	37.07	.43	37.44	.63
5-6 years old	39.60	.43	39.00	.72
7-8 years old	41.56	.39	41.34	.45
9-10 years old	45.00	.59	44.46	.42

* Coefficient of variation

Table 15

Health Condition of Male Individuals During the Last 12 Months

(March 1986-February 1987) On the Basis of Height

Age Groups	Actual Weight (Kilogram)	Actual Height (Inches)	Ideal* Height (Inches)
2 years old and below	9.03	28.00	28.08
3-4 years old	14.45	37.07	37.44
5-6 years old	15.67	39.60	39.00
7-8 years old	17.48	41.56	41.34
9-10 years old	20.57	45.00	44.46

*Source: National Nutrition Council 1974:44

Table 16

Health Condition of Female Individuals During the Last 12 Months

(March 1986-February 1987) On the Basis of Height

Age Groups	Weight (Kilogram)	Actual Height (Inches)	Ideal* Height (Inches)
[illegible] years old and below	9.31	28.32	28.47
[illegible] years old	11.84	35.74	32.76
[illegible] years old	15.78	40.16	39.00
[illegible] years old	17.36	41.53	41.34
[illegible] years old	20.38	44.79	44.46

*Source: National Nutrition Council 1974:44

Arm Circumference: The males, generally tend to register a bigger arm circumference. However, the pattern seems to change at the later age. The females, 7-8 and 9-10 years old, register a slightly larger arm circumference than their male counterparts in those age groups.

On the basis of arm circumference, the National Nutrition Council (1974:47) sets a standard for determining health condition of children. Three categories were set — "satisfactory," "at risks" and "undernourished." Individuals with arm circumference of 13.5 centimeters and above are considered satisfactory and those "at risk" have 12.6 to 13.5 centimeters. Below 12.5 centimeters is considered "undernourished."

Table 17 shows that all sex and age groups fall above the "satisfactory" marker. This suggests that on the basis of the arm circumference, the present population is under satisfactory health condition. If we compare this with our data in 1982 (see Table 3), the present condition must have improved from that of the past. Table 3 shows around 8% of those children aging two years old and below are third degree malnourished and 38% first degree. Among the other age groups, the proportion of first degree malnourished ranges from 40% to 50%. In fact, in another study conducted in 1984 (Harvey, n. d.), on the basis of arm circumference, only 15% were reported as under normal health condition.

Health and Nutrition Education

Toward the end of 1985, a full time nutritionist was hired for the project. Her responsibility was to provide educational training for the mothers on household nutrition and sanitation. Weekly seminars were held for the mothers. On the basis of our record on participation, 100 percent of the mothers within our area of operation have participated in this training. During the later period, family planning officers from the government(Population Commission) were invited to give seminars on family planning in the community.

Table 17

Average Arm Circumference (Centimeters) of Individuals Aged 10 and Younger

During the Last 12 Months (March 1986-February 1987)

	Male		Female	
Age Groups	Arm Circumference (Centimeters)	C.V.	Arm Circumference (Centimeters)	C.V.
[illegible] years old and below	14.17	.78	13.96	.71
[illegible] years old	15.51	.82	14.69	.70
[illegible] years old	15.90	.51	15.59	.83
[illegible] years old	16.40	.49	16.69	.59
[illegible] years old	17.14	.67	17.57	.67

This component of the program has therefore provided local training for mothers on proper food preparation, illness prevention, sanitation and family planning. It is asumed that this training program must have equipped with the basic information on those areas.

From the study of Harvey in 1984, it was noted that only 17% of the households in the community received basic health education. Therefore, the population at present, must have enjoyed better access to health education compared to that period in 1984. The availability of better informed mothers on health at present must also have contributed to the improvement of the actual health condition of the population today.

Summary and Conclusion

The study started with the asumption that the present health condition of the farmers and their household members in Lake Balinsasayao is the result, among others, of the present upland development program implemented in the area. Since the program has been in operation on field for three years, it was assumed that change in production must have already been felt by the population.

The program started collecting baseline information on the community five years ago. One set of information collected was on health condition. In March 1986, a continuing monthly monitoring of information on health was implemented. On a monthly basis, information on incidence of illness and anthropometric measurements (weight, height and arm circumference) were monitored. This is a continuing activity up to the present.

Three indicators of change on health conditions were measured. These were morbidity patterns, anthropometric measurement and prevalence of basic knowledge on health education. Although some of the data from the two periods (past five years and the present) are not directly comparable, some conclusions can still be discerned through inferences.

On the basis of the three indicators measured, the present health condition of the Lake Balinsasayao population is better than that of five years ago. Although the length of illness at present tends to be longer than that of five years ago, the overall percentage of illness incidence is lower. It should be noted, however, that the females are more prone to illness than their male counterpart.

There is a consistent pattern revealed using the anthropometric measurements. If ever malnutrition exists, the three measurements consistently show only first degree malnutrition. This tends to occur more frequently among the females. This perhaps explains why a relatively higher morbidity rate is found among the females. Nonetheless, the overall health situation is found to be a lot better than that prevailing in 1982.

The establishment of the program has improved the level of awareness on the part of the local mothers concerning proper nutrition, prevention of illness, sanitation and family planning. One hundred percent of the project's clientele population has already been exposed to these issues through seminars. Obviously, this shows a superior advantage to that one five years ago where only 17% had been reported to have learned basic health information.

It seems that the synergistic effect of the two components of the SURADPU program must have worked for the health improvement of the farmers. The introduction of the appropriate farming and cropping system for the uplands must have improved farm production and consequently food intake. The training on proper nutrition, illness prevention and sanitation must have reduced the risks of illness among the farmers.

For practical considerations, it appears that the impact of development program on health condition is dependent on two things. First, it hinges on the proper utilization of resources so that the quantitative and qualitative aspects of production can be improved. It should be noted that the nutritional quality of the food products can be improved by diversification, one of the goals of the program's cropping systems component. In fact in another study (Cadeliña 1985), it was found out that diversification of crops can improve the quantitative dimension of production.

Second, it is also anchored on adequate health and nutrition educational drive. Improvement of the cropping system is not adequate if we want to feel a stronger impact on health. A suitable training program on nutrition and illness prevention should be incorporated, a step further to reduce the risk of illness.

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MORBIDITY PATTERNS OF UPLAND FARMERS: A COMPARATIVE STUDY BETWEEN THE LAKE BALINSASAYAO AND THE ATA POPULATION GROUPS

Rowe V. Cadeliña and Vilina V. Cadeliña

Introduction

One of the services that upland population groups badly need is health. Since all the health services provided by both government and private sectors are located in the lowland centers, the upland population groups are alienated from these services both by physical distance and cost.

One of the concerns of the Silliman University Research Action Development Program in the Uplands (SURADPU) is the improvement of health condition of upland farmers. These upland farmers include the Ata farmers in Cangguhub, Mabinay and the farmers around Lake Balinsasayao in Enrique Villanueva, Sibulan. Cangguhub and Lake Balinsasayao are 87 km and 25 km northwest of Dumaguete City, respectively.

The improvement of health condition of upland farmers was expected to be achieved by two processes. First—is the introduction of appropriate farming system in the uplands which included soil conservation and cropping systems development (to improve the productivity level of the farms as well as the quality of the agricultural products; such improvement would bring better diet and nutritional conditions to the farmers as well as better health conditions). Second — is the coordinating function of SURADPU personnel in tapping the services of the Department of Health (general health check-ups and medicines were provided to the farmers to prevent high occurrence of illness in the uplands).

This study, therefore, is an attempt to document the pattern of incidence of illness between two population groups who are beneficiaries of SURADPU. These beneficiaries are the Ata and the farmers of Lake Balinsasayao.

RESEARCH ISSUES AND PROBLEMS

Development programs in the uplands tend to employ an integrated approach. Such approach is generally multi-disciplinary since upland problems are perceived to be multi-faceted. The ultimate goal of the program is to improve the over-all welfare of the population

Welfare is a complete concept that carries multi-dimensional implications. It is largely a quality of life expressing certain amount of freedom from want and hunger. Health condition of the population, considering the variety of factors affecting it provides a summative index of welfare. It represents the result of interaction of factors such as working condition, food availability in household, access to health services, farm productivity level, labor use and condition of farms.

Health condition, therefore, can serve as a single index of welfare. It can be used as a measure of effectivity of upland development program.

Health condition, as an abstraction, can be empirically measured by a number of indicators. One of these is the incidence of illness or getting sick during a given particular time point. The local population can be asked to report the number of times they have been ill during a particular time frame. For instance, the time frame could be during the past month, past two months, past six months, or past 12 months whichever is most convenient. However, for reliability purposes, the shorter the time frame, the better for the respondent to recall easily.

For long term study, such measure is easily collected on a regular shorter time frame. For a period of one year, the information may be collected on a weekly or monthly basis.

The measure of incidence of illness, as an indicator of health condition, can also provide other relevant information aside from just information on incidence, *per se*. It can generate information on the diseases that commonly hit the population as well as on the number of days that an individual stays home to rest because he is sick.

The information on the kind of illness will allow program management to identify weak areas of the program. It will enable the program to determine what preventive and curative measures have to be strengthened and made available to the local population.

The number of days the farmers are unable to work because of illness is a very important information in determining labor use and labor availability in the household. Since farming systems development require intensive human labor, information on household labor supply is essential for developing strategies in farming systems improvement efforts. The health factor on household labor availability will provide depth in the understanding of labor supply in the community.

METHODOLOGY

During the month of July 1988, the incidence of illness among the two population groups was monitored. The referent time was the last 30 days immediately prior to the contact.

At the same time of the contact, each household member was asked to report whether they were ill during the last 30 days. Information on symptoms of illness were noted together with the length or number of days of temporary incapacitation among working age household members. Symptoms of illness were later categorized into kind of illness.

Various age groups of morbid individuals were noted and were cross-categorized by kind of illness and by the numbr of days of temporary incapacitation. This cross categorization was very important since incidences have varying length of occurrences. Counting only the incidence per se will miss a lot of contextualizing information since one who got ill for one day compared to one who got ill for 10 days are completely different especially in the light of providing labor toward farming systems development.

DATA AND DISCUSSION

Among the Ata farmers, 93 were surveyed. Forty-seven per cent are males and the rest females. Combining male and female population, 41% are below 10 years old (18% for male and 23%

Table 1

Age Distribution of Surveyed Population on Morbidity

Individual Categories	Ata Farmers (%)	Lake Balinsasayao Farmers (%)
Male		
Below 10 years old	17 (16.8)	25 (22.7)
10-19	11 (10.9)	10 (9.1)
20-29	5 (5.0)	5 (4.5)
30-39	6 (5.8)	5 (4.5)
40-49	3 (3.0)	4 (3.7)
50-59	2 (2.0)	2 (1.8)
60+	0 (0.0)	3 (2.7)
Female		
Below 10 years old	21 (20.8)	22 (20.0)
10-19	8 (7.9)	11 (10.9)
20-29	11 (10.9)	7 (6.4)
30-39	11 (10.9)	7 (6.4)
40-49	4 (4.0)	6 (5.5)
50-59	0 (0.0)	0 (0.0)
60+	2 (2.0)	3 (2.7)
TOTAL	101 (100.0)	110 (100.0)

for females). Those who are 40 years old and older constitute 12% both men and women added together. The rest are from 10 to 39 years old (see Table 1).

For the Lake Balinsasayao farmers, on the other hand, 110 individuals were studied. Of these individuals, 49% are males and the rest females. Compared to the Ata subjects, the Lake Balinsasayao farmers have slightly higher proportion (43%) of individuals belonging to age below 10, combining male and female population. Those who are in their 40s and older constitute 16% which is higher than that of their Ata counterpart. The rest belong to 10-29 years old bracket.

Of the 44 male population among the Ata, 16% were reported ill during the last 30 days prior to the contact in contrast to 37% of its 49 female counterpart (see Table 2). This suggests that the female population is more prone to illness than the male Ata population.

By age level, 18% of the male Ata below 10 years old claimed ill during the last 30 days before contact compared to 33% among the female Ata with similar age level. Among the 10 to 19 years old group, the females consistently demonstrated higher rate than the males. Nobody among the 10-19 years old male was reported ill, while around 25% did get sick during the time referent period among the female Ata. The same is true for age bracket 20-29. Only 25% were reported for the males in contrast to 67% among the females. For the age group between 30-49 again the females have a higher rate compared to that of the males; 33% females and 20% males were reported sick. The females among the 50 and the older age group still yielded higher percentage compared to that of the males; 33% for women; 22% for men. In all age groups, the females show higher morbidity rates compared to that of the males.

While it is true that the female Ata are more prone to illness than their male counterpart, the men, however, tend to stay ill longer than that of the females. The men, once they get sick, stay ill for around 14 days on the average, in contrast to only nine days for that of the females. During this period of illness, the Ata es-

Table 2

Incidence of Morbidity Among the Ata

Individual Categories	Ill During The Last 30 Days	Not Ill During The Last 30 Days	Average Number of Days Ill During the Last 30 Days
Male			
Below 10 years old	3	14	10.33
10-19	0	11	—
20-29	2	3	13.00
30-39	1	5	7.00
40-49	1	2	24.00
50-59	0	2	—
60+	0	0	—
Female			
Below 10 years old	7	14	5.57
10-19	2	6	4.00
20-29	3	8	5.50
30-39	3	8	15.33
40-49	2	2	9.00
50-59	0	0	—
60+	2	0	17.00

lly the males are tempering "incapacitated" from their farm k. If we assume that the illness period on a monthly basis is ays, then an ill male Ata can be thrown out of work by around of the year at most. This may happen to 18% of the male lation.

On the whole, the incidence of morbidity among the Ata is . If we take the average time under which an Ata individual ck, for males and females, it will take 12 days. This would that those 26% of the total Ata population who will get sick e year are generally thrown out of job by more than 100

On the other hand, for the 54 male individuals surveyed g the Lake Balinsasayao farmers, 19% were reported ill g the last 30 days before contact. Among the 56 females sur- , 11% were found sick during the study. A higher morbidity was registered by the male individuals among the Lake Balin- ao farmers. This is exactly opposite to what we found among ta farmers where higher morbidity rate has been recorded e females.

y age groups, males below 10 years old showed the highest tage of sick individuals; 28% of this group were reported uring 30 days before contact. For the females belonging to me age category, only 14% were reported sick during the eriod. Again, the males consistently show higher morbidity nce compared to that of the females. From age 40 and above the males, 33% of the population in this age group were d ill during the 30-day period prior to contact. Among the nobody was reported ill during the period (see Table 3).

ring the 30-day period of monitoring, on the average, a le ind'vidual usually stays ill for around 10 days. For the it is only around three days. This means that while the alinsasayao females have lower morbidity rate compared counterparts, the females also showed shorter period of g 'incapacitation" caused by illness compared to that of es.

Combining the male and the female population together, the incidence of morbidity among the Lake Balinsasayao farmers is around 17%. If we assume the average number of days a person is ill during 30 days prior to contact as a running monthly average for a period of 12months, an individual in Lake Balinsasayao will be tempering "incapacitated" firm work by around 75 days. This will happen to approximately 70% of the total population of Lake Balinsasayao.

If we compare the incidence of illness between the Ata and the Lake Balinsasayao farmers, the Ata has higher incidence — 53% higher compared to that of the Lake Balinsasayao farmers. This higher incidence of illness among the Ata is partly explained by the lower food supply in the Ata household compared to those from Lake Balinsasayao. For instance, in two case studies of household productivity during one annual cropping in Lake Balinsasayao, a household can produce, on the average, 2,276 kilograms of various farm products. Among the Ata, it is only slightly over 1,000 kilograms. The Lake Balinsasayao farmer doubles the production of an Ata. Hence, more food is available to an inidividual coming from Lake Balinsasayao. Better nutrient can be expected from the Lake Balinsasayao population improving the over all health condition of its people.

Another factor that may help explain the higher incidence of illness among the Ata compared to that of the Lake Balinsasayao farmers is the absence of regular health team visitation among the farmer. In Lake Balinsasayao, through the health unit from the municipality of Sibulan, a monthly medical consultation has been provided. This service provided both curative and preventive measures against diseases. Hence, the low incidence of illness and the short average number of days sick among the Lake Balinsasayao populace are also partly explained by the availability of curative and preventive medical services.

The disease prevalent among the Ata and the Lake Balinsasayao farmers are similar in both groups. Upper respiratory diseases like coughs and colds are common in both population groups. Around 50% to 60% of the male and female population

Table 3

Incidence of Morbidity Among the Lake Balinsasayao Farmers

Individual Categories	Ill During The Last 30 Days	Not Ill During The Last 30 Days	Average Number of Days Ill During the Last 30 Days
Male			
Below 10 years old	7	18	4.43
10-19	0	10	—
20-29	0	5	—
30-39	0	5	—
40-49	1	3	30.00
50-59	1	1	1.00
60+	1	2	5.00
Female			
Below 10 years old	3	19	3.00
10-19	0	11	—
20-29	0	7	—
30-39	3	4	2.67
40-49	0	6	—
50-59	0	0	—
60+	0	3	—
TOTAL=110			

Table 4

Illness of Individuals During the Last 30 Days Before Contact Compared Between The Ata and the Lake Balinsasayao Farmers

Illness	Ata		Lake Balinsasayao Farmers	
	Male (%)	Female (%)	Male	Female
Colds only	—	6.0	30.0	33.0
Cough only	—	—	20.0	—
Colds and fever	—	—	—	—
Cough and fever	—	11.0	—	—
Cough and colds	58.0	33.0	10.0	17.0
Cough and colds and fever	14.0	—	—	—
Fever only	14.0	22.0	10.0	33.0
Hip and knee bone pain	14.0	11.0	20.0	—
Muscular pain	—	—	—	17.0
Dysentery	—	17.0	—	—
Back pain	—	—	—	—
TB (early stage)	—	—	10.0	—
	100.0	100.0	100.0	100.0
	(7)	(19)	(10)	(6)

from various age groups were reported sick. They suffer from coughs and colds during the last 30 days prior to contact (see Table 4).

Other illness like hip and knee bone pain were reported from both groups. Only in Lake Balinsasayao where we observed a confirmed TB case in its early stage. The confirmation was made by the TB Pavillion of Negros Oriental. No such case has been reported among the Ata.

Intestinal ailment like dysentery was reported only among the Ata. No case has been reported among the Lake Balinsasayao farmers.

Table 5 summarizes the salient difference on morbidity issues between the Ata and the Lake Balinsasayao farmers.

It should be noted that both the Ata and the Lake Balinsasayao farmers have been subjected to intervention program on farming systems development. Projects on soil rehabilitation and cropping systems development have been introduced which must have already provided its initial benefits to the farmers. In another study on the effects of SURADPU on the health condition of the Lake Balinsasayao farmers showed that, on the whole, the health condition has improved. Various indicators such as incidence of illness, arms circumference of children, height and weight revealed a better condition two years after the implementation of the project compared to the time before SURADPU was implemented. Proportion on the incidence of illness at present (1988) is also lower than what we found in the study conducted two years after (1986) the implementation of SURADPU. This therefore suggests that the Lake Balinsasayao farmers are progressively increasing the health benefits they derived from the project.

For the Ata, however, in the absence of health studies before, the effects of SURADPU can still hardly be discerned. The slight increase in their production of 20% at present from that level before the project started may not have yet an impact on their health, since their actual production at present is still very low. The slight increase at present is still not enough to meet their minimum food requirement. The present morbidity pattern of the Ata is still quite similar to the health condition of the pre-project implementation period.

Table 5

Comparison of Morbidity and Length of Incapacitation Caused by Illness Between the Ata and the Lake Balinsasayao Farmers

Individual Categories	Lake Balinsasayao Farmers: Percentage of Population Ill During the Last 30 Days	Lake Balinsasayao Farmers: Average Number of Days Ill During the Last 30 Days	Ata Farmers: Percentage of Population Ill During the Last 30 Days	Ata Farmers: Average Number of Days Ill During the Last 30 Days
Male				
Below 10 years old	28%	4.43	18%	10.33
10-19	0	—	—	—
20-29	0	—	40%	13.00
30-39	0	—	17%	7.00
40-49	25%	30.00	33%	24.00
50-59	50%	1.00	0	—
60+	33%	5.00	0	—
Female				
Below 10 years old	14%	3.00	33%	5.57
10-19	0	—	25%	4.00
20-29	0	—	67%	5.50
[illegible]	43%	2.67	27%	15.33
[illegible]	[illegible]	—	50%	9.00
[illegible]	[illegible]	—	0	—
[illegible]	[illegible]	—	100%	17.00

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SUMMARY AND RECOMMENDATIONS

The health condition of the farmers can stand as a major indicator of welfare which the clientele population derived from a project. Comparing the Ata and the Lake Balinsasayao farmers' health condition, the Lake Balinsasayao farmers have a better welfare compared to that of the Ata. The incidence of illness among the Ata is higher by 53% compared to that of the Lake Balinsasayao farmers.

On the basis of the average number of days a person usually gets sick, the Lake Balinsasayao farmers consistently revealed a more favorable one compared to that of the Ata. Those who got sick among the Ata during a 12-month period would be ill of around 140 days. Among the Lake Balinsasayao farmers, the average number of days would be 78%. The Ata farmers' incidence of illness is higher by around 80% compared to that of the Lake Balinsasayao group.

This suggests that the Lake Balinsasayao farmers have better control on the supply of labor on their farms since illness no longer draw many workers out of job. Among the Ata, this is not yet so. Illness still takes substantial number of days when workers are incapacitated. The natives will surely have difficulty in the control of labor supply for farming systems development.

For practical consideration, it is apparent that the provision of health services in the upland will help improve the welfare of the population. While it is true that the major concern of upland development is the improvement of the local farming systems, such major concern should be supplemented with medical services to bring higher welfare to the local upland population. Further more, the provision of a regular medical services will provide the farmers with better control on their household labor supply.

On the basis of the prevalent illness among the Ata and the Lake Balinsasayao farmers, it is recommended that health services should concentrate on intestinal and upper respiratory diseases including tuberculosis. Their regular availability of medicine for these types of illness will help improve the overall morbidity pattern of the upland population.

NUTRITIONAL ASSESSMENT AMONG THE NEGRITO FAMILIES IN CANGGUHUB, MABINAY AND CEBUANO FAMILIES AROUND LAKE BALINSASAYAO

C. B. Fontelo and L. V. Lim

Introduction

If health improvement of the inhabitants is an important aspect of economic development in a community, then food, which is a determinant of health, must be given attention. To a very significant extent, nutrition determines what ultimately becomes of man. Nutrition is perhaps the single most important factor which influence the development of people. Studies show the important role that nutrition plays in shaping our physique, molding our mind, and even influencing our feelings and behavior (Florencio, 1986).

While the need for food is instinctive, man is not equipped with the same natural instinct to know and to determine what and how much food is necessary for him to eat in order to attain optimum health. This is something that is acquired or learned. People in many societies have their own way of determining what is food and what is not food and what kind of food should be eaten and on what occasion. This gives rise to food habits and practices which distinctly differentiate one group of people from another.

This particular study aims to establish and understand the nutritional status of two groups of people living in two separate areas where development project is in progress.

The two groups of people in this study belong to different cultural background and live in different natural ecosystems. These variables influence to a great extent the kind and amount of available food resources, their food consumption practices, and consequently, their state of nutrition.

Cangguhub is approximately 300 meters above sea level and is situated in the municipality of Mabinay around 87 kilometers northwest of Dumaguete City. Farmers depend on rain water to grow their plants. During the dry months, very few plants could grow hence harvest is marginal or none at all. This place is inhabited by the Ata, many of whom married Cebuano lowlanders. They have begun to produce their own food, a development from their being natural gatherers and hunters. Farming is characterized by promoting food crops primarily for household consumption. Many of them work as paid laborers of landowners nearby. Wage labor has become a major source of cash income for the Ata.

Lake Balinsasayao area is a typical rainforest situated between 800 to 1,000 meters above sea level approximately 25 kilometers northwest of Dumaguete City. It is occupied by lowland Cebuano migrants. Its climate and soil condition are condusive to the growth of a variety of trees and food crops. Farmers in this area plant food and cash crops. While the place has produced marketable products, transporting its produce to nearby towns for marketing has been a perennial problem.

The main objectives of this study are:

1. To determine the dietary adequacy of the families in Lake Balinsasayao and in Cangguhub and identify any deficiency in specific nutrient intake;
2. To find out existing food preparation and consumption practices of the families and utilize the information to serve as a starting point for nutrition education and food precessing lessons.
3. To assess the food situation in the two areas;
4. To assess the nutritional status of pre-school children by anthropometric measurements.

Methodology

Four families from the Lake Balinsasayao area and twelve families from the Ata settlement area in Cangguhub, were the subjects of this study. Information regarding usual food intake, food preparation and consumption practices, and food availability were obtained by interviewing either the father or the mother of each household.

Intake of calories, protein and seven other essential nutrients based on the typical food intake was calculated by the use of the Food Composition Table (1980) published by the Food and

Nutrition Research Institute (FNRI). The average per person nutrient intake of the family was compared with the per person recommended allowance by the FNRI.

Twenty-one preschoolers in Cangguhub and 35 preschoolers in Balinsasayao were weighed using a bathroom scale. The actual weights of the children were compared with the recommended weight standard for Filipino children using the following formula:

$$\frac{\text{Actual weight}}{\text{Standard weight}} \times 100 = \text{Percent of standard weight}$$

The children were then classified according to the degree of malnutrition using the Gomez standard:

91% and above	—	Normal
76-90%	—	First Degree Malnourished
61-75%	—	Second Degree Malnourished
60% and below	—	Third Degree Malnourished

The height of the preschoolers was measured in centimeters by means of a tape measure fixed to a wall. The children were classified according to height using the standard height for given age set by Jayme et. al.

Hemoglobin test was done among the women or child-bearing age using the Sahli method. The result was again compared with a standard blood hemoglobin level.

General Nutritional Condition

The results of the dietary surveys in Cangguhub and Lake Balinsasayao are presented separately.

Cangguhub

Meal Pattern. The usual meal pattern of the Ata families in Cangguhub, Mabinay is as follows:

Breakfast

Boiled root crops (Cassava, *Bisol*, *Gabi* or *Camote*)

Lunch and Supper

Boiled green leafy vegetables (usually, *Bago leaves*)

Boiled corn or root crops (Cassava, *Bisol, Gabi* or *Camote*)

Breakfast of the Ata consisted of boiled root crops, mainly, cassava. Others mentioned taking *bisol, gabi* and *camote*.

Lunch and supper consisted of corn or root crops and boiled green, leafy vegetable, usually *bago* leaves. None of the families used fat in cooking. *Tabios* was the most commonly consumed legume; however, during the survey none of the families reported taking *tabios* or any legume since it was out of season. Six of the twelve families interviewed did not mention using vegetable for lunch or supper. Only three families had *bulad* (dried fish) in their diet.

"Tuba," an alcoholic drink made from fermented coconut sap was heavily consumed by the Negrito menfolk. It was usually taken in the afternoons and evenings.

Nutrient Intake. Table 1 shows the average nutrient intake of the Ata.

Table 1

Average Per Person Nutrient Intake In Cangguhub, Mabinay

Nutrient	Intake	Percent RDA
Calories	1,346	64
Protein (gm)	32	74
Calcium (gm)	0.313	63
Iron (mg)	6.0	59
Vitamin A (I. U.)	2,894	93
Thiamine (mg)	0.4	37
Riboflavin (m)m	0.5	46
Niacin (mg equivalent)	3.0	25
Vitamin C (mg)	103	163

Despite their high carbohydrate diet, their caloric intake was only 64% of the recommended daily allowance (RDA). The low caloric intake which is characterized by relatively high carbohydrate, low protein and low fat content is typical of a poor diet usually consumed by economically depressed households. In this area, cassava and corn constituted the great proportion of the carbohydrate.

Protein intake was 74% of RDA, 63% of which was contributed by corn. Green leafy vegetables contributed a considerable amount of protein, about 31% of the total protein intake. From the diet history taken from 12 families, only three reported taking animal protein mainly from dried fish.

In Cangguhub, where supplies of animal protein are very inadequate, increasing the production of high-protein plants such as legumes, dark green leafy vegetables and cereals is necessary. Among all plant sources, legume is the most valuable, usually containing from 20% to 25% of protein together with appreciable quantities of thiamine, riboflavin, calcium and iron. In addition they are of great importance agriculturally owing to their nitrogen-fixing powers (Jeliffe, 1968).

Tabios (black pigeon pea) is the most commonly produced and consumed legume in Cangguhub. It contains 24.62% of protein which is comparable with other legumes planted in this area like mung beans, green and yellow varieties, which contain 22.94% and 23.31% protein, respectively. Mung bean, however, has an added advantage of containing more methionine, the limiting amino acid in legume. In addition to this, it also has more tryptophan, an essential amino acid which is a precursor of niacin. Niacin is a vitamin which is very inadequate in the diet of the Ata.

Dark green leafy vegetables are potentially extremely valuable food in Cangguhub. Like legumes, they are not only good sources of protein, but also supply other nutrients such as beta-carotene, thiamine, riboflavin, iron and Vitamin C. *Bago* leaves which are the most commonly consumed leafy vegetables contain approximately 3 gm protein per ½ cup serving portion. *Malunggay* which is known to be the most nutritious of the green leafy vegetables was also consumed but was not widely grown in the locality. The consumption of *bago* leaves as well as the growing and consumption of *malunggay* leaves should be encouraged among the Negritos.

Cereals, like corn, have incomplete protein because they are deficient in essential amino acid lysine and tryptophan. Dark green leafy vegetable and legumes like *tabios* and mung beans which are grown in the Ata area in Cangguhub, are deficient in the essential amino acid methionine and cystine. This plant proteins when taken together could complement the essential amino acids lacking in each food. Biologic value of these plant protein is, thus, improved. This capacity of proteins to make good one another's deficiencies is known as their supplementary value (Davidson 1975).

All nutrients, except Vitamins A and C, were inadequate in the diet of the Ata. Almost all of the Vitamin A and 72.5% of the Vitamin C were contributed by the *bago* leaves.

In plants, Vitamin A comes from vegetables and fruits in the form of carotene. Carotenes like beta-carotene have yet to be converted in the intestinal wall before these can be used in the body (VADAG, 1983). Performed Vitamin A (retinol) is four to six times as deficient as beta-carotene because much of the beta-carotene is lost in the process of converting it to usable form. In addition, since carotene and Vitamin A are fat-soluble, it needs fat and oil for absorption. Thus if fat is low in the diet or oil is not used for cooking, the carotene and Vitamin A will be poorly absorbed. In spite of the reported adequate Vitamin A intake among the Ata, the form in which it is present and the absence of fat in their diet could possibly result to a poor Vitamin A nutrient.

Vitamin C in the diets of the Ata came from green leafy vegetables, mainly *bago* leaves and starchy roots such as cassava and *camote*. Starchy roots and tubers can contribute a significant amount of Vitamin C in the diet, especially when consumed in large amount. This was noted among the Igorots in which as much as 87% of the ascorbic acid in their diet was derived from *camote* (FNRI, 1968).

Calcium has been found to be inadequately supplied by the diet amounting to 310 mg or 62% of the RDA. However, there has no convincing evidence that an intake of calcium even below 300 mg is harmful (WHO 1962). The body is capable of possibe adjustment within limits. However, these limits are not well defined, and may vary from subject to subject. The level of intake of calcium at which an individual attains calcium balance may be gradually lowered to a minimum for the individual at the given time. Cases of human subjects including children on diets containing .2 to .4 gm of calcium have been reported without detectable injury (Darby, 1962).

Other than diet, there may be other sources of calcium which are not accounted for in a dietary evaluation (FNRI, 1965). The chewing of beetle leaves with lime, among the Ata may add considerably to the calcium intake.

Iron intake was inadequate amounting to 59% only of the RDA. The greatest proportion was contributed by plant sources like cassava and corn. The form of iron in plant food is less readily absorted than iron from animal sources. Hence, with respect to iron, not only is their diet deficient in quantity but in quality as well.

Individual hemoglobin determination using Sahli's method of ten childbearing age Ata women was made to further assess the iron nutriture in this area. The following table shows the hemoglobin level of the Ata women:

Table 2

Hemoglobin Level of Ten Child-bearing Age Ata Women

Indicated Level of Nutrition	Number
Deficient (below 11.o gm %)	9
Low (11.0 to 12.9 gm %)	1
Acceptable (13.0 to 13.9 gm %)	0
High (14 gm % and above)	0

The result showed a range of 9 to 12 gm % of hemoglobin with an average of 10.5 gm %. None of these women were rated "deficient," only one as "low" and none as "acceptable" or "high."

The high preparation of "deficient" hemoglobin values could be ascribed to the poor iron intake which, as mentioned above, was only 59% of the RDA. In addition, source of iron in their diet being plant food is not readily absorbed.

Hemoglobin level usually is still normal even when iron stores are low. Thus, hemoglobin level falling below normal is a reflection of iron deficiency in the advanced stage (VADAG, 1983).

The B-vitamins including thiamine, riboflavin and niacin were all inadequately met which were 37%, 45% and 25% of the RDA, respectively. Corn, aside from being a major contributor of iron, also provided thiamine, riboflavin and niacin in the diets of the Ata.

Riboflavin and niacin are vitamins which are involved in tissue metabolism. Thus, deficiencies in these two vitamins are prevalent in areas where there is inadequate intake of animal food and legumes are not widely used. It is most likely to occur also in areas where there is dependence on staple, such as corn and cassava, which are poor in these nutrients. Thiamine inadequacy in the diet is common if highly milled cereals are used as staple without sources of B vitamins such as legumes and animal food (Solon, 1976).

Results of this study show that the diet of the Ata was inadequate in almost all the nutrients, except for Vitamins A and C. The least adequate in the diet were iron and the B-vitamins, thiamine, riboflavin and niacin. Fortification of the staple with these nutrients found to be very low in their diet may be desirable, economically feasible and practicable way of correcting these nutritional deficiencies (Jeliffe, 1968).

LAKE BALINSASAYAO

Meal Patterns: The usual meal pattern of the families in Lake Balinsasayao is as follows:

Breakfast

Bulad/Fish *inon-onan*
Corn
Roasted Corn Beverage

Lunch and Supper .

Green, Leafy vegetables with
Squash or Kayote cooked in coconut milk
Bulad/Fried Fish/Fish *inon-onan*
Corn

Snacks (Morning and Afternoon)

Boiled root crops

In Lake Balinsasayao, breakfast consisted of corn, a protein dish (usually dried fish or fish *inon-onan*) and roasted corn beverage. For their lunch and supper, they had green leafy vegetables such as *kangkong, gabi, alugbati* and *kamote* with squash or *kayote* cooked in coconut milk; protein dish, usually *bulad*, fried fish or fish *inon-onan*, and corn. Morning and afternoon snacks consisting of boiled root crops like *kamote*, *gabi* or *bisol* were taken.

Nutrient Intake: Table 3 shows a comparison of the average per person nutrient intake of residents in Lake Balinsasayao in 1982 and 1988.

There was a slight increase in the caloric intake of the families from 83% of the RDA in 1982 to 88% in 1988. However, it was still below the recommended amount. Protein intake increased from 87% to 114% RDA. When caloric intakes are not sufficient to meet energy needs, the body tends to use protein for energy, rather than for their most important building and repair functions.

The proportion of plant protein remained at 75% total protein taken in. The main bulk of protein and calories came from corn. Part of the protein intake was contributed by the dark green leafy vegetable. *Bulad* (dried fish) was reported as the basic source of animal protein and to a lesser extent, fresh fish caught from the lake.

The increase in caloric intake could partly be ascribed to the common use of coconut milk in cooking vegetable and of oil in frying food. The importance of fats as vehicle of fat-soluble vi-

Table 3

A Comparison of the Average Per Person Nutrient Intake of Resident in Lake Balinsasayao in 1982 and 1988

Nutrient	1982 (Before Project)		1988 (After Project)	
	Intake	Percent RDA	Intake	Percent RDA
Calories	1816	83	1610	88
Protein (gm)	51	87	46.5	114
Calcium (gm)	.48	98	.54	106
Iron (gm)	13.5	87	8.75	85
Vitamin A (IU)	5560	110	4530	133
Thiamine (mg)	.81	70	.76	78
Riboflavin (mg)	.71	62	.67	68
Niacin (mg equivalent)	13.4	89	11.8	92
Vitamin C (mg)	72	96	97	164

tamins cannot be overstressed. Being a concentrated source of energy, greater intake of fat could supplement the caloric contribution of carbohydrate to make a more nutritionally desirable caloric distribution.

Besides providing calories and protein, corn was also the major source of iron, thiamine, riboflavin and niacin in the diet.

Iron intake which was 85% of the RDA was slightly less than the recommended amount. Eighty-six percent of the iron was derived from plant sources such as corn, camote and green leafy vegetable. As mentioned earlier in this report, plant food sources are less readily absorbed. In this case the dietary intake of iron is not a good indicator of iron nutrient since much of the iron found in the diet was from plant sources.

As shown in Table 3, there was an increase in the intake of the B-vitamins namely thiamine, riboflavin and niacin in the 1988 survey. However, thiamine and riboflavin still remained below the recommended level, 78% and 68% of the RDA, respectively. Niacin which was 92% of the RDA was adequately met. Aside from corn, niacin in the diet was derived from animal food like *bulad* and fish caught in the lake. Thiamine in this area was contributed mainy by corn and camote.

Riboflavin which was 68% of RDA was the least adequately met of all nutrients evaluated. This vitamin is largely derived from animal food and plant food (dark green leafy vegetable and legumes). Animal food which is expensive may not readily be available in the diet; green leafy vegetables which are widely accepted and consumed become more important sources of this vitamin.

The intake of both Vitamins A and C was above the recommended amount; they were 133% and 164% of RDA, respectively. These levels were an improvement of the 1982 intake of 110% and 96% RDA in Vitamin A and C, respectively. The highest sources of ascorbic acid and Vitamin A were root crops (mainly camote) and green leafy vegetable. Camote supplied 60% of Vitamin C content of the diet. Similar findings were noted among the Ata in Cangguhub in which 62% of the Vitamin

C was supplied by root crops. In addition to camote, the inclusion of more and wider variety of vegetables in the diet improved the Vitamin C nutrient of the residents in Lake Balinsasayao.

With respect to Vitamin A, more than one-half (55%) was contributed by green leafy vegetables and 90% of the Vitamin A in the diet was in the form of beta-carotene which still needs to be converted to perform Vitamin A (retinol). In the process of conversion, much of the beta-carotene is lost. Because of this. the dietary intake of Vitamin A may not be an accurate indicator of their Vitamin A nutriture.

Fats needed for the absorption of the fat-soluble vitamin is well-provided in the diet of the residents in Lake Balinsasayao. In this study, fat in the form of coconut milk and cooking oil was found to be commonly used by families in this area. The survey made in 1982 showed the lack of fat in the diet.

Calcium, one of the nutrients which was commonly found to be inadequate in the Filipino diet, was more than adequately met, representing 106% of the RDA. A large proportion of calcium in the diet was derived from green leafy vegetables and camote root crop. *Bulad* and corn also contributed a considerable amount of calcium in the diet.

Health Condition of Children

Of all population groups affected by malnutrition, young children need most attention. Protein-energy malnutrition among young children is still a severe problem in many developing nations such as the Philippines. The underlying cause is basically lack of food. These children become more susceptible to infectious diseases which can aggravate their poor health condition. The weaning period, when the child is gradually or abruptly taken off the breast and given other food, has been identified with the overwhelming problem of protein-calorie malnutrition and other deficiency diseases. The culturally prescribed weaning food is usually soft carbohydrate food rice, corn camote or cassava. In most cases, hygienic condition is far from desirable and is compounded by a lack of safe drinking water.

A healthy child is expected to grow normally, hence, growth has been used as an index of health. Anthropometric measurements are practical indicators of the rate of growth of children. with the assumption that growth is made possible through adequate intake of the essential nutrients. Anthropometric measures therefore reflect nutritional status. There is actually no single indicator of an individual's nutritional status. There are several parameters used such as dietary intake, biochemical test, anthropometric measurement and clinical assessment. However, body measure or anthropometric measurement is considered to be more practical because of their objectivity and simplicity. The actual measurements are compared with an accepted standard.

Among the Ata, 18 out of 21 children (0-6 years) weighed were found to be suffering from varying degrees of malnutrition (Table 4). Among the children below two years of age, 87.5% were below the desirable level. All of the children in the 3-4 year category were found to be malnourished. In the 5-6-year age group, 72% were found to have weights below the standard.

The height measurement showed that one-half of the Ata children in the two-year-old category were below 90% of the standard height. The same was true with two-thirds of those in the 3-4-year age group, and three-fourths of those in the 5-6-year age group (Table 5).

In Balinsasayao, 29 out 32 children had weights below the desirable level (Table 6). Among the children below two years old, 83% were found to be suffering from first and second degree malnutrition, as well as 92.5% of the 3-4-year age group. Seventy percent of those in the 5-6-year age level were suffering from first degree malnutrition. There was no incidence however of severe malnutrition (third degree) in any of the age groups. The height measurement revealed that all of the children below two years old had heights below 90% of the standard; this was true also for 62% of those in the 3-4-year age group and 70% of those in the 5-6-year age group (Table 7).

Considering that in Cangguhub, only 38% (8 out of 21) were found to be suffering from second and third degree malnutrition and only 11% (4 out of 35) in Balinsasayao were found to belong to the same category, the children in general were able to maintain physical growth rates at reasonable levels in spite of inadequate intake of most nutrients. It was also noted that other clinical manifestations of malnutrition were found among the children. Nutritional studies have indicated that in spite of chronic energy deficit, most children are able to maintain physical growth rates at reasonable levels and this is attributed to what nutritionists call as "adaptation." This means that malnourished children undergo metabolic and behavioral adaptations in order to reduce the impact of nutrient scarcity, with the overall strategy of conserving whatever tissue is left by reducing both anabolic and catabolic processess. In addition, there is a decrease in physical activity, further conserving energy. In short, "adaptation" enables the body to adjust to nutrient scarcity.

The Negrito families depend mainly on their food crops for subsistence. Because of the fact that the area is isolated and not readily accessible to modern transport system, procurement of food supply from the nearest market is a problem. To a little extent cash cropping is being practiced. This generates some money to purchase essential goods such as soap, matches, salt, sugar, kerosene, aside from fresh and dried fish which are occasionally bought when they got a chance to go marketing in a nearby barrio. In short, subsistence farming, lack of adequate cash income, their remoteness from the source of food and essential goods all contribute to the marginal food supply of the people in Cangguhub

Miscellaneous Activities

The following activities had been done by the Health and Nutrition Team aside from the dietary survey and anthropometric measurements:

1. Nutrition Education

   Lecture on:

   a. the importance of food to health

   b. basic food groups

   c. breast-feeding

   d. diet of pregnant and lactating women

Table 4

Number and Percentage of Preschoolers by Nutritional Levels Based on Body Weight (Cangguhub)

	Normal		Overweight		First Degree Malnourished		Second Degree Malnourished		Third Degree Malnourished		
Age Group	No.	%	No.	%	No.	%	No.	%	No.	%	Total
2 years and below	-	-	1	12.5	3	37.5	3	37.5	1	12.5	8
3-4 years	-	-	-	-	5	83.0	1	17.0	-	-	6
5-6 years	1	14.0	1	14.0	2	29.0	1	14.0	2	19.0	7

Table 5

Number and Percentage of Preschoolers by percent Desirable Height (Cangguhub)

	19-100%		81-90%		71-80%		61-70%		Below 60%		Over 100%		
Age Group	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Total
2 years and Below	2	25.0	1	12.5	1	12.5	1	12.5	1	12.5	2	25.0	8
3-4 years	1	16.5	4	67.5	-	-	-	-	-	-	1	16.5	6
5-6 years	1	14.0	3	44.0	1	14.0	1	14.0	-	-	1	14.0	7

Table 6

Number and Percentage of Preschoolers By Nutritional Levels Based on Body Weight (Balinsasayao)

	Normal		Overweight		First Degree Malnouorished		Second Degree Malnourished		Third Degree Malnourished		
Age Group	Number	%	Number	%	Number	%	Number	%	Number	%	Total
2 year old and below	2	17.0	-	-	7	58.0	3	25.0	-	-	12
3-4 year old	1	7.5	-	-	11	85.0	1	7.5	-	-	13
5-6 year old	2	20.0	1	10.0	7	70.0	-	-	-	-	10

Table 7

Number and Percentage of Preschoolers by Precent Desirable Height (Balinsasayäo)

	91-100%		81-90%		71-80%		61-70%		Below 60%		Over 100%		
Age group	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Total
2 year old and below	-	-	10	84.0	1	8.0	1	8.0	-	-	-	-	12
3-4 years	5	38.0	7	54.0	1	8.0	-	-	-	-	-	-	13
5-6 years	3	30.0	6	60.0	1	10.0	-	-	-	-	-	-	10

Demonstration on the preparation of:

a. supplementary foods for infants

b. a low-cost complete meal:

Fried bulad

Mongo with malunggay

Corn

Banana

2. Initiated health examination of children and women of child-bearing age by inviting an intern from the Silliman University Medical Center (SUMC) and health workers from Mabinay.

Summary and Recommendations

Health and nutritional concerns have always been considered as an integral part of any development program. A preliminary survey was conducted in Cangguhub which tried to establish the present food and nutrition situation in the area. The survey collected data on food availability, purchasing power, food preparation practices, food intake, nutritional needs of household members, water supply and environmental sanitation.

Another study was conducted in Lake Balinsasayao. This was a follow-up of the investigation conducted in 1982 to find out if there was any improvement in the dietary intake of the residents considering that a development program was formally implemented in the area since 1984.

Results of the survey showed that the diet of the families in Cangguhub was grossly inadequate caused by lack of food especially during the dry season. They subsisted mainly on staples which are high in starch such as corn, cassava and *camote* roots. Body building food such as animal protein were seldom eaten. The same was true even for the protective food such as fruits and vegetables. All nutrients, except vitamins A and C were below the RDA. Since vitamin A was derived mainly from vegeta bles, it is in a form (carotene) that is not directly utilized by the body. Much of this is lost in the process of converting it to the active form of the vitamin. Since fat is low in the diet, it could mean that this vitamin will be poorly absorbed. Protein intake was low and at the same time it was derived mainly from plants. Plant proteins are in general partially complete. In addition, the calorie intake was inadequate, only 64% of the RDA, which could mean that most of the protein will be utilized by the body for the much needed energy instead of using it for tissue-building.

The weight and height measurements among the preschool children revealed the existence of varying degrees of malnutrition. Using weight as an indicator of nutritional status, 48% were found to be suffering from first degree malnutrition, 24% from second degree, and 14% from third degree malnutrition in Cangguhub.

The result of the 1988 dietary survey in Lake Balinsasayao showed an improvement in the nutrient intake compared with that of the 1982 result. Although there was an increased intake of the B-vitamins, it was still below the recommended level. It was also noted that coconut milk and cooking oil were widely utilized in the farmers' daily diet, a practice which considerably improved the intake of fat. They still depended on plant sources for their protein, iron and vitamin. The low intake of animal food was reflected on the low level of thiamine and riboflavin intake. The improvement in the dietary intake of the families in Lake Balinsasayao could be attributed to the new farm techniques introduced by SURADPU and the nutrition education provided by the personnel assigned in the area.

Anthropometric measurements indicated that most of the preschool children were suffering from mild and moderate malnutrition. Although there were only 6 out of 35 who had weights comparable with the standard, there was no incidence of severe malnutrition among the children in Lake Balinsasayao.

The main thrust of the nutrition component in this development program is to improve the food intake of the families in Cangguhub and Balinsasayao, both in quantity and in quality.

Appendix A

Weight of Preschoolers In Cangguhub

NAME	AGE (MONTHS)	WEIGHT (KILO)	NUTRITIONAL LEVEL
1. Baldado, Amado	60	9.5	9
2. Baldado, Bingbing	4	3.6	9
3. Baldado, Danilo	72	13.6	6
4. Bornea, Fedi	48	13.2	3
5. Bornea, Jo Ann	4	5.0	4
6. Briones, Danilo	2	3.2	7
7. Dan Lebiste, Cherry	72	15.0	4
8. Dan Lebiste, Liza	5	14.0	OW
9. Dan Lebiste, Mayvi	36	11.8	3
10. Dumdum, Eden	72	23.6	OW
11. Dumdum, Lani	60	17.3	N
12. Dumdum, Rowe	48	13.2	3
13. Mambaye, Bebeth	24	9.5	5
14. Mambaye, Rico	48	13.0	3
15. Pabillan, Irene	24	10.5	3
16. Pabillan, Jimmy	72	10.9	8
17. Pabillan, Myrna	48	14.0	2
18. Paladar, Saturnina	6	5.9	4
19. Requel, Brenda	72	16.4	2
20. Requel, Edwin	12	7.5	5
21. Requel, Mike	36	10.0	5

Level 1—Normal

Levels 2-4—First Degree Malnourished

Levels 5-7—Second Degree Malnourished

Levels 8-10—Third Degree Malnourished

Appendix B

Weight of Preschoolers in Lake Balinsasayao

NAME	AGE (MONTHS)	WEIGHT (KILO)	NUTRITIONAL LEVEL
1. Abing, Edna	7	8	N
2. Abing, Theresa	72	17.5	2
3. Abing, Veronica	43	14.0	2
4. Batal, Geraldine	62	14.0	4
5. Batal, Mabini	9	7.5	3
6. Bulagao, Agucilda	42	15.5	N
7. Bulagao, Alberto	24	10.0	4
8. Bulagao, Andrelo	3	5.5	N
9. Orcia, Ivy	9	8.5	2
10. Orcia, Juvy	72	19.0	N
11. Orcia, Maricel	37	13.0	2
12. Orcia, Melanie	62	16.0	2
13. Orcia, Richard	39	13.0	2
14. Orcia, Ritchel	15	8.0	7
15. Quilpio, Cirilo	72	18.5	2
16. Quilpio, Melou Jane	10	8.0	3
17. Quilpio, Reynald	50	13.5	3
18. Rosiana, Charito	46	14.0	2
19. Rosiana, Darcyl	9	7.0	4
20. Rosiana, Imelda	66	16.0	2
21. Sotillo, Antonio	45	11.5	5
22. Sotillo, Marcia	40	14.0	2
23. Sotillo, Marissa	66	13.5	

Appendix C

Height Measurements of Preschoolers in Cangguhub

NAME	AGE (MONTHS)	HEIGHT (CM)	PERCENT STANDARD
1. Baldado, Amado	60	76.2	70
2. Baldado, Bingbing	4	60.9	94
3. Baldado, Danilo	72	94.0	82
4. Bornea, Fedi	48	95.2	92
5. Bornea, Jo Ann	4	62.2	96
6. Briones, Danilo	2	72.4	118
7. Dan Lebiste, Cherry	72	99.0	86
8. Dan Lebiste, Liza	5	29.2	44
9. Dan Lebiste, Mayvi	36	86.4	90
10. Dumdum, Eden	72	118.0	103
11. Dumdum, Lani	60	104.0	95
12. Dumdum, Rowe	48	83.8	81
13. Mambaye, Bebeth	24	73.7	83
14. Mambaye, Rico	48	83.8	81
15. Pabillan, Irene	24	82.5	93
16. Pabillan, Jimmy	72	88.9	77
17. Pabillan, Myrna	48	104.0	101
18. Paladar, Saturnina	6	88.9	132
19. Requel, Brenda	72	99.0	86
20. Requel, Edwin	12	66.0	80
21. Requel, Mike	36	78.7	81

Appendix D

Height Measurements of Preschoolers in Lake Balinsasayao

NAME	AGE (MONTHS)	HEIGHT (CM)	PERCENT STANDARD
1. Abing, Edna	7	60.9	88
2. Abing, Theresa	72	91.4	80
3. Abing, Veronica	43	86.4	84
4. Batal, Geraldine	62	94.0	86
5. Batal, Mabini	9	66.0	89
6. Bulagao, Agucilda	42	90.2	94
7. Bulagao, Alberto	24	73.6	82
8. Bulagao, Andrelo	3	36.8	58
9. Orcia, Ivy	9	60.9	85
10. Orcia, Juvy	72	104.0	91
11. Orcia, Maricel	37	82.5	86
12. Orcia, Melanie	62	95.2	87
13. Orcia, Richard	39	80.0	82
14. Orcia, Ritchel	15	60.9	74
15. Quilpio, Cirilo	72	104.1	91
16. Quilpio, Melou Jane	10	60.9	84
17. Quilpio, Reynald	50	96.5	93
18. Rosiana, Charito	46	91.0	89
19. Rosiana, Darcyl	9	60.9	82
20. Rosiana, Imelda	66	94.0	86
21. Sotillo, Antonio	45	82.5	80
22. Sotillo, Marcia	40	91.4	95
23. Sotillo, Marissa	66	95.2	83

The following are recommended:

1. Selective Food Production—planting nutritional fruits and vegetables such as green leafy vegetables and yellow vegetables: mung beans and other legumes such as *tabios* and *tahores;* coconut and peanuts to increase fat increase fat intake; raising of animals such as chicken, pigs to improve animal food intake.

2. Nutrition Education Program — proper meal planning and food preparation; preparation of supplementary food for infants; encourage mothers to continue breast-feeding and teach them proper techniques.

3. Increase Cash Crop Production — to improve cash income.

4. Safe Water Supply System — to improve health and sanitation.

5. Periodic Health Examination — to be performed by a physician in order to control infections and to check any deficiency disease.

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A BARANGAY HEALTH WORKER'S TRAINING COURSE FOR THE UPLAND DEVELOPMENT PROGRAM IN LAKE BALINSASAYAO

Felicidad B. Lozano

Introduction

Health is a basic human right. In a rapidly growing population in the uplands, the delivery of health services is not improving as much as desired. The people have limited or no access at all to health service. The need to develop indigenous health workers to service the underprivileged in the upland areas needs attention and action. There is therefore a need to conduct and establish a barangay health worker's training program for the cooperators of the Silliman University Research Action Development Program for the Uplands.

Needs and Determinant For the Program

A health survey in 1987 by Cadeliña, R. and Cadeliña, V. revealed that around 58% of the respondents were sick at the time the interview was conducted. Morbidity was primarily due to respiratory diseases, followed by a combination of other ailments such as gastrointestinal, circulator and musculoskeletal disturbances. The average annual sick days for males had been 33, and 36 for females (Table 2). A follow up survey by my team in August 1988 showed that around 87% of the respondents had consulted local healers; the rest utilized the services of the rural health midwife. Self medication was found to be commonly practiced, with the use of "over the counter drugs" in the treatment of their ailments. Treatment information was provided by friends and relatives who had experienced using a particular drug for a particular disease condition. The basic reason for resorting to self-medication and consulting local healers when sick was the absence of health facility in the locality.

A local barangay health worker can play a vital role in the provision and implementation of primary health care since she has a continuous contact with the local families. Training local health workers will prepare local leaders in the prevention of illness and the promotion and maintenance of health for the grass-roots.

Table 1

Average Percentage of Individuals Under Various Age and Sex Groups
Sick During 12-Month Period (March, 1986-February, 1987)
Monitored In Lake Balinsasayao

Age Groups	Males	Females
10 years old	36.62% (13)	47.35% (17)
11-29 years old	16.4% (33)	20.60% (42)
30 years old	25.53% (9)	27.51% (11)

Table 2

Average Number of Days A Person Got Sick During
The Past 12 Months

Age and Sex Groups (1)	Average Monthly (Days) (2)	"Annualizing" Factor (3)	Estimated (Days) Average Annually (Col. 2 x Col. 3) (4)
Male (11 years old and older; 82)	2.6	12	31
Female (11 years old and older; 106)	2.7	12	32
Male (0-10 years old; 29)	2.9	12	35
Female (0-10 years old; 35)	3.3	12	40

Table 3

Persons Consulted in Illness
Lake Balinsasayao, Sibulan, Negros Oriental
August 1988

Persons Consulted		Percent
Local Healers		81.25%
Rural Health Midwife		12.50
Physician		6.25
	Total	100.00%
		(36)

Table 4

Type of Waste Disposal, Lake Balinsasayao,
Sibulan, Negros Oriental

Type of Waste Disposal		Percent
"Cat system"		87.5
Ant'polo toilet		12.5
	Total	100.0
		(36)

Rural Health Worker Program

The general goals of the program are twofold

1. To improve the community health facility by providing trained health worker (paramedic) in the delivery of basic health services;
2. To promote self-reliance and self-sufficiency among families and the community that involve health issues.

After 130 hours of training, the barangay health workers are expected to render the following specific services:

1. Provide first aid for accidents and emergencies, medication for simple and common ailment, follow-up treatment prescribed by more skilled health workers;
2. Promote good sanitation and hygiene;
3. Refer cases that are unmanageable to Rural Health Unit (RHU);
4. Report cases to the RHU;
5. Identify malnourished children;
6. Act as liason between community and allied health agencies;
7. Conduct health education classes.

There are two phases in the training — classroom activities and field practicum. Didactics last for 20 hours consisting of lectures, demonstration and return demonstration using modules as teaching tools. A field practicum lasts for 10 hours at the Rural Health Unit. The trainees participate in the delivery of essential serviecs.

Contents of the training program.

Unit 1 Orientation
- — Rationale for training
- — Objectives of the training
- — Roles/responsibilities of the Barangay Health Worker
- — Primary health care concepts

Unit II Personal Health
- — Personal hygiene
- — Promotion and maintenance of personal health

Unit III Community Health

— Disease Transmission

— Common communicable diseases

— Prevention and control of common communicable diseases

Unit IV Material and Child Health

— Nutrition and nutrition education

— Family Planning

— Immunization

Unit V First Aid Emergencies

— Concepts of First Aid

— Care for shock

— Artificial respiration

— Care for Wounds and Bites

— Dislocation, Fractures and Sprains

Unit VI Environmental Sanitation

— Concepts on Environmental Sanitation

— Common Intestinal Parasites

— Food and Water Sanitation

— Sanitary Waste Disposal

Unit VII Appropriate Technology

— Accupressure

— Ventusa (dry cupping)

— Herbal Medications

Field Exposure (practicum)

Guides for selecting the trainees:

1. Participant must be a permanent resident of the barangay.
2. Participant must know how to read and write in English and Cebuano.
3. Participant must signify voluntary participation in the training.

In a Rural Health Worker's Program conducted in the area, 10 Lake Balinsasayao residents had participated in the training. Population size was used as the basis for determining the number of participants from each of the *sitios*: Kabalin-an, Mahilom and Hanay-hanay (Table 5). The group consisted of 90% females, and 10% males; mostly married; whose ages range from 25-56 years old (Table 6); and with an educational level ranging from Grade I-VI (Table 7).

Classes were held in an unoccupied house and the activity started at 9 a. m. to 12 noon; and again at 1 p. m. to 3 p. m. School supplies were provided by the project. A modular approach to teaching was used. After the didactics portion of the course was completed, practicum immediately followed.

Table 5

Distribution of Participants by Barangay
Lake Balinsasayao, Sibulan, Negros Oriental
August 1988

Barangay	No. of Participants
Kabalin-an	3
Mahilom	5
Hanay-hanay	2
Total	10

Table 6

Distribution of Participants According to Age, Sex, and Civil Status, Lake Balinsasayao, Sibulan, Negros Oriental, August 1988

Age Group	Sex		Civil Status	
	Male	Female	Married	Single
20-25		1	1	
26-30		2	2	
31-35		1	1	
36-40		1	1	
41-45		4	3	1
46 up	1		1	
	—	—	—	—
Total	1	9	9	1

Table 7

Educational Attainment of Participants To the BHW Training, Lake Balinsasayao, Sibulan, Negros Oriental August 1988

Educational Attainment	No. of Participants
Grade 1	1
Grade 2	1
Grade 3	1
Grade 4	3
Grade 5	1
Grade 6	3
	—
Total	10

Summary

The inaccessibility of health workers in the uplands requires the development of local health leaders who can provide initial health services when need arises. This paper has provided the alternative by providing training on health delivery services to local members. This local health leaders are known as Barangay Health Workers (BHW).

The efficiency of the BHW, however, would depend on the effective follow-up by professionally trained health workers from the Rural Health Unit on referrals made by the BHW.

Reference Cited

Cadeliña, R. V. and V. Cadeliña (in this volume, "Health Condition of Upland Farmers: A Study on the Effects of the Upland Development Program in Lake Balinsasayao").

AFTER SURADPU: LIFESTYLE OF THE LAKE BALINSASAYAO FARMERS

Cornelia P. Cadeliña

Introduction

The population in the upland is an important segment of the country's population. The problem of poverty in the upland is a problems of national importance which must be shared by all. Such problem as illiteracy and ignorance may affect people's lifestyles in the upland communities. This condition holds true among the upland farmers of Lake Balinsasayao.

Silliman University as a Christian Institution of higher learning has responded to the call of the less fortunate communities, specifically in the areas along Lake Balinsasayao. The university introduced forest conservation and farming systems development through its program known as Silliman University Research Action Development Program in the Uplands (SURADPU). Like other development projects, its effects are being monitored. This paper intends to present the changes in the lifestyle clientele population after four years of implementation of the development program.

FIELD METHOD

BANAGBANAG*, an association of the Lake Balinsasayao farmers has 63 household members. Of these, 31 are within the project site and 32 are outside the project site.

Originally, the plan was to interview the total population using a survey method, but the peace and order situation in the area did not allow a population census. Instead, a twenty-five

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* BANAGBANAG is an acronym for Balinsasayao Naghiusang Balangay nga Nag-baul. Banagbanag is a Cebuano term for "dawn," the coming of a new day.

percent sample was utilized. Sixteen household heads were randomly selected. In the absence of some of the household heads (generally husbands), wives were taken as substitutes. Aside from the survey method, in depth study was employed to supplement survey data.

The data gathering phase started in March 1988 and ended in July of the same year. It was done mostly during week-ends. To compare the living condition of the Balinsasayao farmers before and after SURADPU, simple recall and reporting systems on the following information were made: farm production, savings, consumption (on their products), material acquisition, expenses for services, utilization and distribution of goods and services, and social and cultural involvement.

DATA AND DISCUSSION

In this portion, the following data will be presented: (1) farm production; (2) consumption; (3) savings; (4) expenditures; (5) material acquisition (the quantity of furniture acquired before and after, e. g. cabinet, aparador, dresser, etc; bedroom paraphernalia, e. g. bed, blanket, mosquito net, etc.; kitchen utensils, e. g. kettles, chinaware, silverware, etc.; personal effects, e. g. towel, jewelry, bags, etc.; wardrobes, e.g. dresses, pants, shirts, etc.; farm implements, e. g. spray can, plow, etc.;) (6) utilization and distribution of goods and services; (7) social and cultural involvement.

Farm Production

Farm productivity in marginal upland areas generally fluctuates seasonally in one agricultural year (see Colson 1979). On the whole, farmers claimed that agricultural production had improved after the implementation of the program. Nevertheless, they claimed that the increase is not yet sufficient to allow them to meet their needs until the next harvest.

The increase in production has been reported for crops, such as corn, vegetables and root crops (see Tables 1-3). Tree crops like coffee, cacao, jackfruit, bananas, avocado, star apple, guavas, pomelo, mango, *camansi* and *sereguelas* were usually found in home gardens. Most of these are planted recently, one of the activities introduced by SURADPU. Hence, the data on fruit production level between the two periods do not show any difference yet (see Table 4). The data (see Table 5) show that not all of the 16 respondents raised livestock and poultry. Of the 16 respondents, only 69% raised hogs after the implementation of SURADPU, a decrease of 13%. The same table shows that for other livestock excepting hogs, production level is approximately equal. A respondent revealed that he had more than ten heads of cows before but most of them were stolen. Another one reported that recently he had two heads of horses. Unfortunately, one was borrowed by an armed group and the group never returned it. Table 6 shows that more respondents raised chicken before the intervention, rather than after.

Consumption of Farm Crops

With regard to consumption of corn, there is no difference between before and after implementation of SURADPU. Corn is largely for domestic consumption. Vegetables, on the other hand are their cash crops. Although they derive their cash income mainly from vegetable sale, a portion of their vegetable production is consumed domestically. This is also true before and after the presence of the program.

Although root crops are also consumed in the household as sources of carbohydrate, the amount sold for cash purposes is greater than what is consumed in the household. This is true even if we include those that are used to feed the hogs with household consumption. Such pattern of consumption has been found to be similar before and after the implementation of SURADPU.

A 50-50 split has been reported on fruit between household consumption and their sale for cash. This pattern is known to be true before and after the implementation of SURADPU.

Savings

Savings are necessary for emergency needs of the households. When the 16 respondents were asked if they acquired savings before the implementation of SURADPU, only 13% answered positively. To determine change in saving habits after the implementation of SURADPU, this question was asked, "Did you make any savings after SURADPU was implemented?" Twenty-five percent answered "Yes" an increase of around 100% to that of the "before period" of SURADPU. However, savings have been reported to be very limited. These are easily exsausted when one agency needs, (like hospitilization of household members).

Pattern of Expenses

In general, household expenses for protein food have relatively increased after SURADPU has been implemented compared to the time before SURADPU. This is evident by purchases of fish, 56%; meat, 37.5%; and sardines, 25%. The increase in the protein purchase indicates an increase in income. Another study by Fontelo and Lim in this volume also revealed similar increase in protein consumption by the Lake Balinsasayao farmers.

Similar trend of increase has been noted in other items such as clothing of household members after the implementation of SURADPU. This pattern is also expected for other items.

Material Acquisition

Before the introduction of SURADPU, only four mention that they have eating tables. After the introduction of SURADPU, seven mention an increase of 75 percent. However, there was a decrease on the possession of wooden trunk after the inintroduction of SURADPU in contrast to the possession of mosquito nets. The possession of mosquito nets has tremendously increased after the introductoin of SURADPU.

Plastic sack has been reported to have been used for mats before and after the introduction of SURADPU. It has not changed. The same thing is true with the use of plastic plates.

A few have purchased porcelain plates after the introduction of SURADPU, but these are kept for use during special occasions, not for daily use. Porcelain cups have been reported to be recently bought but these are likewise kept for special household events.

Concerning personal effects (clothing, bags, handbags, jewelry, etc.), the data disclosed a favorable change (see Table 10). For carpentry tools (see Table 12) the data suggest a progressive change in frequency. Their acquisition of farm implements like plow, trowel, bolo, etc. remains the same (see Table 13), but three respondents claimed to have acquired spray can, while one respondent disclosed to have purchased a weighing scale. These information still imply change considering that nobody owned these materials before the program.

Utilization and Distribution

Intra-Household Distribution: It is assumed that when food is scarce, food consumption among household members is controlled. This is usually done by sharing food equally among members. When food is abundant, no restriction can be theoretically expected on the consumption of food by the household members is imposed. Before and after the introduction of SURADPU, consumption of root crops by household members has not been restricted (see Table 14). This is not true for corn. Before the introduction of SURADPU, 63% control corn consumption by equally dividing corn among household members. After SURADPU, this percentage has gone down to 41%. A relaxation on consumption control has been observed. This is probably because of the increase in corn production after the SURADPU program.

Similar pattern is observed for protein food. Eighty-eight percent of the households have controlled the distribution of protein food among household members before the implementation of SURADPU, while 69% have conrolled the distribution of protein food among household members after the implementation of SURADPU. The decline in the incidence of households controlling the distribution among household members of protein food suggests an increase in household protein production.

Inter-Household Utilization Distribution of Goods: Do the respondents give part of their products, and to whom? Table 16 shows equally similar pattern of behavior of respondents before and after the implementation of SURADPU. Relatives are the most common recipients of farm goods given by the respondents. This may be explained by the saying which goes "blood is thicker than water"

Social and Cultural Involvement

All of the respondents are members of the organization BANAGBANAG. After the intervention, a number of groups were established, like Mohter's Club and labor groups, just to mention two. Respondents said that the presence of SURADPU has contributed much to the community socially. The place becomes lively especially that formal and nonformal education have been introduced. Children do not have to walk for kilometers to earn Grade I and Grade II trainings. Informal education/functional literacy has also added life and interest to learning especially English language. Both young and old, male and female, married or single participated in the functional literacy program. For practical consideration, key adult respondents want to learn arithmetic. They claim that they need the skill very badly during the marketing of their products.

The usual form of recreation among men is volleyball, cockfighting and other forms of gambling. Women do not play volleyball; they just witness the game. Some respondents (both men and women) go to fiesta. Another respondent says he goes to the movie once a month. The pattern of recreation before and after is practically the same.

Respondents' participation in organizational meetings/activities gave a hundred percent positive response. Four respondents (25%) are officers of BANAGBANAG.

SUMMARY/CONCLUSION

In general, the program SURADPU has brought a number of improvements in the life of the Balinsasayao community. It did not only increase most of their farm yields (as shown by their farm production) but also their social and cultural involvement.

Briefly, the following factors were responsible for the acceptance of the project by the Lake Balinsasayao farmers: a) appropriateness of the innovation itself including the strategy; b) the people's favorable image of the change agents (Silliman University and the project staff; and c) the people's high benefit expectation from the project.

The intervention has contributed much to the improvements of the farm production especialy during the first three years. However, the active operation of the armed groups had affected much on their farm activities, thereby adversely affecting their productivity. Several times, the farmers were forced to abandon their farm lots. Consequently, crops were poorly maintained bringing low production.

The peace and order situation in the area has even affected the relationship between and among the farmer cooperators, an issue discussed in one of the papers in this volume. Seemingly, the group has been divided. One group (from Kabalin-an, Danao and Kabatu-an) appears to be under the control of the rebels (a kind of a "forced" loyalty) while the Mahilum group is under the control of the military.

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Table 1. Rice and Corn Production (In Percentage)

		Before Intervention			After Intervention	
Product	N	Less	More	Same	Less	More
Corn	16	87.50		12.5	12.5	68.75
Rice	2	100				100

Table 2. Vegetable Production (%)

		Before Intervention			After Intervention	
Products	N	Less	More	Same	Less	More
Squash	15	26.66	33.33	40	13.33	46.66
Sayote	16	6.25	6.25	87.50	6.25	6.25
Eggplant	3	100	50			100
Pechay	2	50	50		50	50
Baguio beans	10	50	10	40	10	50
Pepper	6	66.66	33.33		33.33	66.66
Tomatoes	4	75	25		25	75
Kadios	1		100		100	
Ampalaya	3	66.66		33.33		66.66
Tahore	2			50		50
String beans	2					100
Lima beans	2			100		
Upo	1			100		

Not planted before: Cucumber and Singkamas

Table 3. Root Crop Production (%)

		Before Intervention			After Intervention	
Products	N	Less	More	Same	Less	More
Camote	16		6.25	50		43.75
Gabi	16		12.50	37.5		50
Ubi	10		10	30		60
Bisul	16		6.25	62.5		31.25
Balanghoy	6		16.66	16.66		66.66

Table 4. Fruit Production (%)

		Before Intervention			After Intervention	
Products	N	Less	More	Same	Less	More
Bananas	13		23.46	38.46		38.46
Jackfruit	14		14.28	50		35.71
Avocado	5		20	60		20
Buongon	1					100
Kape	1					100
Sereguylas	1					
Bayabas	1		100			

Table 5. Livestock Production (%)

		Before Intervention		After Intervention		
Products	N	Less	More	Same	Less	More
Hogs	9	27.27	72.72		72.72	27.27
Goats	4	50	25	25	25	50
Cow	4	25	25	50	25	25
Carabao	5	40	60			
Horse	3	33	33	33	33	33

Table 6. Poultry Raising (%)

		Before Intervention		After Intervention		
Game	N		More	Same	Less	More
Chicken	10	10	90	50	40	10
Gamecock	Of the 16 R's only one raised gamecock					

Table 7. Material Acquisition

A. Furniture and Other Household Paraphernalia

	Before Intervention	After Intervention
Aparador	1	0
Table	4	7
Bench	5	8
Sala set	1	1
Chair	0	1
Suit case	1	3
Kaban (wooden trunk)	5	2
Sewing machine	1	2
Transistor radio: with record player	4	7
radio amplifier	0	1
Wall clock	0	1
Flat iron	3	5
Flashlight	4	4
Pressure lamp	1	2
Scissors	1	7

B. Bedroom Paraphernalia

	Before Intervention	After Intervention
Beds	2	2
Chamber pan	0	4
Mosquito nets	3	10

C. Other Bedroom Paraphernalia (%)

		Before Intervention			After Intervention	
Products	N	Less	More	Same	Less	More
Blankets	16	62.5	18.75	18.75	18.75	62.5
Pillows	16	37.5	18.75	43.75	18.75	37.5
Pillow cases	16	31.25	25	43.75	25	31.25
Mats	16	18.75	12.5	68.75	12.5	18.75

Table 8. Kitchen Utensils

Items (In Dozen)	1/4	1/2	1	1 1/2	2	More than 2	1/4	1/2	1	1 1/2	2	More than 2
<u>Chinaware:</u>												
Plastic	1	4	7	3			1	1	5	3	3	1
Enamel	1	4	7	3					2	2		
Procelain		2	2		3	1						
Coco Shell (paya)									7 pieces			
Platter								3				
<u>Big bowl:</u>												
Plastic	1				1		4	1	2			
Enamel	1		1									
<u>Small bowl:</u>												
Plastic	2						1	1	1			
Enamel												
Porcelain												
<u>Saucers:</u>												
Plastic									1			
Porcelain					1							
<u>Silverware:</u>												
Spoon		4	2			1		3	6	1	3	
Fork		1	2					1	5		3	
<u>Cups:</u>												
Plastic							2					
Porcelain					1	1			3		1	
<u>Glassware:</u>												
Plastic	1		3	2			2	3	2			
Porcelain			1	3		1	1	1		2	3	
Empty mobil oil container						2 pieces						

Table 9. Other Kitchen Paraphernalia

Items	Before Intervention							After Intervention						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Earthen jar	2	1						4	2					
Pail	1		1					3	1					
Water Container:														
Plastic	2							3	3	3	1			
Can(taro)	1							3	3					
Basin	3							5	4	1				
Thermos bottle	1								1					
Earthen pot	4							3	4					
Pot (kaldero)	2	3	2	3	1		1	1	4	1	1	2	2	1
Frying pan	1	2						2	1					
Vat								1						
Bolo	4	8	3	1				3	7	5			1	
Knife	1	2						3		2				
Ax	4							5	1	2				
Laddle	6	10						2	7	6				

Table 10. Personal Effects (%)

		Before Intervention			After Intervention	
Items	N	Less	More	Same	Less	More
Dresses, Shirts, pants, undershirts, Underwear	16	68.75		31.25		68.75
Footwear: Shoes Slippers	16			18.75		81.25
Bags: Handbag, Shoulder bag, Children's bag, Travel bag	16			12. 5		87.50
Purse: Men/Women	15			66.66		33.33

Table 11. Other Personal Effects

	Before Intervention					After Intervention				
	1	2	3	4	5	1	2	3	4	5
Jewelry:										
a) Ring										
Fancy					1	2				
Real						1	1			
Bronze						1				
PBMA	2									
b) Necklace										
Real						2				
c) Earring										
Real						1				
Fancy						1				
d) Wrist watch						5				
Travel bag						4				
Belt						1				
Hat	3									
Mirror						1				
Umbrella	3					4	2			
Guitar	2	R's have guitars but were given								

Table 12. Carpentry Tools

Items	Before Intervention					After Intervention				
	1	2	3	4	5	1	2	3	4	5
Tigib	1					2	1	1		
Martilyo	2					4				
Gabas	2					4				
Serotso	2					3				
Wasay						2				
Eskwala						2				
Marik						1				
Pulgadera	1					1				
Sepilya						1				
Kigi blade						3				
Galingan (rock)						2				

Table 13. Farm Implements

Items	Before Intervention 1	2	3	4	5	6	After Intervention 1	2	3	4	5	6	7
Bugas	2	1					3						
Bunlay	2	10	4				1	4	2	2	2	4	1
Sundang	5	10	1				1	8	5	2			
Sanggot	3	2	1				3	5	2				
Alat/bukag	2	7	5	2			2	5	7	2			
Nigo	5	2					10	3		1			
Spray Can							3						
Weighing scale								1					

Table 14. Intra-household Utilization/Distribution of Food (%)

Food	Before Intervention: Equal	Before Intervention: Depends on Individual's Desire to Eat	After Intervention: Equal	After Intervention: Depends on Individual's Desire to Eat
Corn/Rice	62.5	37.5	43.75	56.25
Viand/ Protein source	87.5	12.5	68.75	31.25
Root crops		100	6.25	93.75
Vegetables		100		100
Fruits	56.25	43.75	37.5	62.5

N = 16

Table 15. Intra-household Clothing Distribution (%)

Household Members	Before Intervention	After Intervention
Parents	6.25	12.5
Father	6.25	6.5
Mother	12.50	12.5
Older Children	25	37.5
Middle Children	6.25	
Younger (est)	12.5	6.25
Equal among children	31.25	25

N = 16

Table 16. Inter-household Distribution/Utilization of Goods

A. To whom do R's give/share their products

Products	Before Intervention	After Intervention
Root crops & vegetables	1. friends, relatives 2. parents 3. brothers/sisters	1. friends 2. parents, brothers/ sisters 3. relatives
Protein source (when R butchers a pig)	1. parents, brothers & sisters 2. neighbors 3. relatives 4. friends	1. parents, brothers/ sisters 2. relatives 3. neighbors 4. in-laws 5. friends
Corn	1. parents, brothers & sisters 2. neighbors, relatives 3. friends 4. in-laws	1. parents, brothers & sisters 2. neighbors, relatives 3. friends 4. in-laws

B. From Whom Do R's Ask When Need Arises

1. Brothers/sisters	1. Brothers/sisters/parents
2. Parents	2. Relatives
3. Neighbors	3. Neighbors
4. Friends, relatives	4. In-laws
5. In-laws	5. Friends

/mfd

THINGS OF IMPORTANCE: WHAT MARGINALIZED FARMERS IN SELECTED SITES IN NEGROS ORIENTAL ARE CONCERNED ABOUT

Betty C. Abregana *

Introduction

There are possible conflicts between what people consider important and what change agents introduce as innovations in a given community. If we have to respect the wisdom of the local farmers, values locked within the traditional societies of mountain barangays must be seriously explored. This is important if an innovation has to take place in harmony with the value priorities of the people whom it is intended to serve.

An invention when applied for the first time is called an innovation (Mansfield, 1971). An innovation is an idea, practice or object perceived as new by an individual. It is the subjective newness of the idea for the individual — more than whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery — that really matters (Rogers, 1962; Rogers and Shoemakers, 1971). The dominant values of a person influence the adoption of innovation.

In all these long years of attempts at community development, planners, implementors and project evaluators have dismally failed to look deep into the beneficiaries' value systems, their indigenous learning styles and their resources, on which to base what and how to embark on change efforts. An assessment of the agri-technology transfer in the ethnic barangays of the northern Luzon highlands reveals that, among many interested variables, factors such as value orientation, perception, attitudes aspiration, and belief system have been found to have direct effect on a farmer's decision to adopt or reject a given agritechnology (Consolacion, et. al., 1983). The same study underscores the fact that in the decision to adopt a given agritechnology, the

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farmer involves his wife and children. Necessarily, what a farmer and his family consider as important things in life figure significantly in the process of decision making — whether or not to adopt any introduced innovation in the farm.

ALTERNATIVE VALUES

Persons are free to choose ideas, beliefs and behavior which best represent the nature of their existence and the direction they would choose for their lives. Jung and Piaget view values as the dynamic stance the self takes to the total environment. As the person evolves and the environment changes, values are constantly being rechosen from a host of alternatives (Hurlock, 1974).

In understanding values, one may consider two of the categories presented by Linton (1936) in describing the content of a culture — the universals and alternatives. Linton defines universals as "those ideas, habits, and conditioned emotional responses which are common to all sane, adult members of the society." His universals would include those core values held in common by all members of the culture. Core values remain central to a society for a long period of time. They are the foundation beliefs, the bedrock of society's existence and maintenance. His alternative consists of "a considerable number of traits which are shared by certain individuals but which are not common to all the members of the society." Alternative values would represent the socially acceptable beliefs and behaviors available for individual choice.

The availability of alternative values is often cyclical. The social acceptability of an alternative influences individual choice and the frequency of its display determine in large measure, its availability for choice (Munson, 1971). Let us consider, for example, the practice of some farmers to play volleyball as a form of recreation. When players are encouraged by fellow farmers and the game is punctuated with cheers by onlookers, the farmers-players find social acceptance and are likely to participate in the same game in future occasions. Moreover, if this form of recreational activity is regularly done during predictable times of the cropping season, say, after land preparation or after planting of the main cash crop or perhaps during *pangulilang* (secondary cropping season), then farmers at such times will likely play the game as a group's favorite pastime.

A shift in the agricultural cycle is associated with a shift in the type of recreational activity. During harvest season, for instance, farmers are observed to engage more in a game of *hantak* (a game of chance played by tossing of coins) than in the local volleyball game. This is due in part to the fact that during harvest season, farmers have some cash on hand. Also, gathering *sayote* (*Sechium edule*), let us say, and carrying them to a lowland market center are physically exhausting tasks. Thus, a nonphysical game of *hantak* appears to be a more appropriate recreation for a work-heavy season and a physically demanding game of volleyball is an appropriate game for a slack season.

THE PRESENT STUDY

In this study, values refer to what farmers consider as "important things in life." The underlying assumption is that the extent to which community programs correspond to what farmers value in life indicate relevance of such programs to beneficiaries' lives.

Nonformal, nondirective interviews employing the methods of *pagtatanong-tanong* (unstructured, unobtrusive question-and-answer method) and *pakikipagsalamuha* (meaning, literally, "to mix with") were conducted with selected men, women and children in the upland communities.

The first group of upland farmers who served as respondents of the study are dwellers in the rainforest of Balinsasayao, a mountain range due northeast of Cuernos de los Negros, the highest mountain peak in the province, west of Dumaguete City. The rainforest is part of a critical watershed in the region. A survey conducted in 1981-82 revealed that these farmers used to come from lowland communities and were driven to encroach on forest lands due to population pressure. The greatest number of these farmers moved up within the past 30 years (Abregana. 1984). The earliest recorded in-migration was in 1920s. At present, forest guards of the Philippine National Oil Corporation are said to protect the areas from new occupants aside from their expected task of prohibiting illegal cutting down of trees. Two major programs have been introduced to the farmers in this region. A government-sponsored program under the then Ministry of Agriculture was launched in the late '70s. Some farmers, especially those in the lower part of the mountain range, engaged in backyard goat or cattle-raising. In 1981, Silliman University initiated an agroforestry program to settlers within and adjacent to the remaining forest buffer zone. Several soil erosion control techniques and contouring mesaures were introduced to farming households. Some farmers volunteered to be cooperators in the management and maintenance of demonstration plots to show the effectiveness of terracing and various crop combinations on erosion control. Other households adopted proper tree-crop mix in their forest farms. By tending cash crops, several families went above subsistence levels. Some farmers, however, continued to play the role of bystanders and observers. Some continued to engage in age-old farm practices and manifested less enthusiasm in initiating or effecting change.

Negritos in the mountains of Mabinay toward south of Negros island comprise the second group of respondents. A historically-known cultural minority group of hunters and gatherers, Negritos at present have no resource but to engage in permanent cultivation. The changes in Negritos' lifestyle are attributed to the disappearance of the forest and the increasing upland migration of lowlanders who compete with the Negritos for economic survival (Cadeliña, 1974; E. Oracion, 1983). In 1950, the total number of Negrito households in the area was placed at 30 (T. Oracion, 1960) and in 1983, the population has increased to 73 households (E. Oracion, 1983). Over the years, the Negritos have assimilated into the larger Cebuano population and culture through social interactions and intermarriages. The danger of biological extinction of the pure Negrito population looms (E. Oracion, 1983).

In the face of these biological changes, Negritos (locally known as Ata) in the Cangguhub resettlement area eke out a living as farm cultivators. A group of 18 Ata households occupy 21 hectares of denuded forestal lands on government lease to

Silliman University. This year, an action-oriented research project under the auspices of the University Research Center maximized its community assistance by providing Negritos a full-time community worker who helps them in their agricultural activities.

The Cangguhub project sponsors a nonformal, once-a-week education classes for children and adults, usually on a Saturday or a Sunday. In Balinsasayao, Silliman University has extension classes in Grades 1 and 2. On the whole, Balinsasayao farmers are better off than their Ata counterparts in terms of cropping system, level of farm development, diversity of food resources, and marketing relations with lowland buyers of farm produce. The impending threat, however, to the sustainability of farms in Balinsasayao is the presence of military and nonmilitary elements whose activities undermine peace and order in the area.

At the time of fieldwork in May to July 1988, the active members of BANAGBANAG, the farmers' association in Balinsasayao, was estimated at 25 households. Several families resettled in the lowland communities because of fear that they will be entangled in the skirmish between the military (or paramilitary) and the alleged underground political reformists.

Fourteen households were represented in the study. In this sample group, six were male respondents and eight were female respondents (see Table 1). Seven children from the 14 households represented were available to participate in the study. The age range of the female respondents was between 24 to 44 while that of the male respondents was between 18 to 70. The age levels of children ranged from 8 to 12. The total number of household members ranged from 3 to 1. Alll the households except three were nuclear families.

In Mabinay, about 18 households reside in the Negrito settlement in Bo. Cangguhub. Fifteen households were represented in the study. In all, there were 19 adult respondents. Of this number, 11 were males and eight females (see Table 1). Eighteen children were available for the study. Female adults were between 15 to 47 years of age while male respondents were between the ages of 13 to 30. Children respondents were between 6 to 12 years old. It is worthwhile to note that five adults (3 males and 2 females) and three children could not tell their age. This denotes that there are still members of this ethnic community that have not adopted the use of Gregorian calendar in marking the passage of time. Household size was anywhere between 2 to 11 members in a dwelling unit. Except for one household, all Negrito households in this study were nuclear families.

RESULTS AND DISCUSSION

A value is operationaly defined in this study as any object, belief or idea considered to be essential in one's life. This was elicited by asking the stimulus question, "What to you are the three most important things in life?" In a conversational manner, respondents were asked to elucidate their responses. Afterwards, they were led to identify which among the "important in life" mentioned is the value which they would least likely to give up and which value they would more likely give up.

Among the Balinsasayao participants, all females identified at least three things in life that are important while only three out of the six male respondents did the same. Two males could identify only two most important things in life while one insisted that there is only one important thing in life. Among the children, two could give only two important things in life.

In the Cangguhub sample, five out of the eight women respondents mentioned only two important things in life while six out of the eleven males did the same. Only three among the women and five among the men identified three important things in life. Among the children, only two could not give three things of importance — one identified only one and another identified just two.

Not one among the respondents in both sites offered more than three things of considerable importance. In fact, their responses appear closely interrelated and hooked on basic subsistence needs. This finding indicates that both groups of farmers are concerned about matters of day-to-day existence far different from the variety of aspirations hoped for by formally educated lowland populace.

Table 4

Most Important Things In Life That Are Least Likely To Be Given Up by the Respondents

A. Balinsasayao Sample	Males (n=8)	Females (n=6)	Children* (n=7)
1. Farm work	5	1	—
2. Food	1	4	3
3. Prayers to God	—	2	—
4. Good harvest	—	1	—
5. Education	—	—	2
6. Clothes	—	—	2
7. Playing games	—	—	1

B. Cangguhub Sample	Males (n=8)	Females (n=11)	Children (n=18)
1. Farm work	8	2	2
2. Food	3	4	2
3. Faith in God	—	—	5
4. Education	—	—	5
5. Clothes	—	1	2
6. Household utensil	—	1	—
7. Help at home	—	—	2

*Total does not add up to 7. One child insisted that food and playing games are the most important things that she cannot give up.

Differences Between Sites

Clearly, in both sample groups, farm work is considered important in life. A cursory examination of Table 2 reveals that for both male and female groups, Balinsasayao has relatively more factors identified as important things compared to the Cangguhub sample. This suggests that, comparatively speaking, Cangguhub group has more focused and simpler wants than its Balinsasayao counterpart. This may be seen as a function of the level of group growth or farm development stage occurring in each site In Cangguhub, farmers are just beginning to engage in permanent cultivation, plant trees in their deforested area, and they have not established a consistent marketing relations with the lowland consumers. Balinsasayao farmers for their part have cash crops in their forest farms, they enjoy richer ecological niche (patches of primary forest still exist, upland lakes are sources of fish, and the down base of the forest is near the sea) and they have established relations with lowland market centers. As such, Balinsasayao respondents now begin to consider higher order needs like education, better health, prayers to God, and more cash in addition to basic needs for food and the utmost importance given to farm work. In the case of Cangguhub farmers, they put premium on the acquisition of household utensils, farm animals, and clothes next to farm work and food. Child care is considered important while having a good health was not mentioned at all. A visit to the Ata resettlement area will show that children below 10 years old proliferate which may explain why child care is deemed important by the group.

The matter on health is an interesting point to examine. Subsistence Ata farmers did not identify good health as an important aspect in life. Perhaps, being able to live is enough for them at this stage. Balinsasayao sample, being a relatively advanced group now aspires for good health. The fact that this is mentioned mostly by women in the latter group serves as a clue for health entry approaches in the upland communities. In a study conducted earlier, Balinsasayao farmers recognized health as a causal attribution for success in farm work (Abregana, 1988). Poor health was noted to be a cause for failure but good health was not mentioned as a factor for success in farming.

Table 2

Total Number of Occurrences Each Important Thing In Life Is Identified By Respondents, Regardless of Ranked Order

Things of importance	Males	Females	Total
Balinsasayao			
	(n=6)	(n=8)	(n=14)
1. Farm work	6(%)	5(%)	11(100%)
2. Food	1	3	4
3. Prayers to God	1	4	5
4. Money	1	2	3
5. Good harvest	1	1	2
6. Education	2	3	5
7. Clothes	-	2	2
8. Recreation/game	2	-	2
9. Farm tools/household utensils	-	-	-
10. Off-farm work	1	1	2
11. Good health	1	4	5
12. House/or shelter	1	-	1
13. Child care	-	-	-
14. Peace	-	1	1
15. Farm animals	-	-	-
Cangguhub			
	(n=11)	(n=8)	(n=19)
1. Farm work	10	5	15
2. Food	4	5	9
3. Prayers to God	-	-	-
4. Money	1	-	1
5. Good harvest	-	-	-
6. Education	1	-	1
7. Clothes	-	3	3
8. Recreation/game	-	-	-
9. farm tools/household utensils	6	2	8
10. Off-farm work	-	-	-
11. Good health	-	-	-
12. House/shelter	-	-	-
13. Child care	2	2	4
14. Peace	-	-	-
15. Farm animals	3	2	5

This implies that the concept of health among the farmers is still prescriptive rather than preventive in nature.

There is a need to underscore the fact that only the Cangguhub sample talked of proper child care, having farm animals and owning household tools or utensils as important. Any community program to be introduced or now being introduced must consider these distinct needs of the community if the program has to be responsive to people's felt concerns. Also, only the Balinsasayao sample openly valued good health, good harvest, availability of farm work, recreation, improved housing condition and peace in the community. As earlier mentioned, this list demonstrates higher-order needs among the Balinsasayao farmers. Again any project undertaken or to be undertaken in this forest community must take into account these identified necessities.

Gender Differences

Thus far, we have examined location-specific differences. Let us explore some gender differences in our sample groups. More men than women identified farm work as important while more women than men identified having food as important. It would look like in these farming households, males attach high value on the process of production (that is, farm work) while women assign considerable importance to the result of produc-
and other terminal results of production are important items
tion (such as having food and acquiring clothes). Clothes, food identified more by women than men probably because, among the household members, women take the role of consciously attending to the day-to-day needs of the family. This nurturance role among women is also manifested in the importance placed on good health by Balinsasayao females. Value placed on the means of production like farm tools is also noticed among Mabinay males.

Three females and just one male in the Balinsasayao sample mentioned prayers to God as one of the important things in life. While the respondents talked of prayer as a necessary ingredient of a good harvest, they were more emphatic in associating this act to the importance of attaining lasting peace in their forest environment.

Table 3

Important Things In Life As Identified By Children In Two Sites

Things Of Importance	Frequency of Responses in Balinsasayao	Cangguhub	Total
1. Education	6	12	18
2. Assistance/help in farming	4	8	12
3. Playing games	3	5	8
4. Clothes	2	6	8
5. Faith in God	-	8	8
6. Food	3	4	7
7. Household chores	-	4	4
8. Good health	-	3	3
9. Parents	1	-	1
10. Earn money	-	1	1

The Children

In many community studies, concerns of children are often overlooked. Yet, children constitute a significant number in any given rural population in our country. What do children view as important things in life? Table 3 reveals children's ideas about things of importance.

Things of Importance That Are Least Likely To Be Given Up

The respondents were pressed to choose which from among the important things identified they would least likely give up. This allowed them to choose freely from a set of self-identified alternatives these they value most in life. Table 4 outlines the result.

Balinsasayao men were almost one in saying that the most important things in life is *pamaul* or farm work. To them, their life depends on farming. As they say, farming is life and life is farming. This is echoed in the words of a 53-year old forest farmer who said *"Ang pamaul ang pinakabililhon sa kinabuhi tungod kay kini mao lamang ang tinubdan sa tanan nga among gikinahanglan parang mabuhi"* (Farming is the most important thing in life because this is the only source that provides for all our needs in life).

Most Balinsasayao women considered food important and emphasized the forest farm as a source of food products such as *sayote* and *camote* as cash crops, and corn and *camote* as staple crops. Some women also mentioned that they have baguio beans, squash and *gabi* in their farms that they can cook for the family meals. These women, in stressing that food cannot possibly be given up, assert that they regularly help their husbands in the farm by weeding and planting crops. *"Pagkaon ang pinakabililhon. Tungod kay ania man kami sa bukid ug halayo sa lungsod, gikinahanglan nga anaay mga salag-on sa baul para makasuportar sa inadlaw-adlaw nga panginahanglan"* (Food is most important. Since we are here in the mountain far from the town, it is imperative that we have farm crops to support us in our daily needs). Thus, said a 40-year old female with four children. Prayer is another thing of importance that is least likely to be given up by two

Balinsasayao women. "*Pinaagi sa pag-ampo ang atong mga pangamuyo makab-ot*" (Through prayers, our petitions will be granted). These petitions or *pangamuyo* include a plea for peace and good harvest.

Children in the Balinsasayao sample could not imagine giving up food, clothes, and the opportunity to attend school. One child insisted that food and playing games are two inseparable important elements in her life.

The pattern for Cangguhub males is similar to the rainforest men. Farm is also viewed to be of great importance. Among the female respondents in Cangguhub, food is likewise of paramount concern. Their difference with the Balinsasayao female participants is the utmost importance placed on such basic necessities as clothes and household utensils.

Children in the Negrito resettlement site view life's priorities differently from their elders. More of them value education and faith in God — things of importance that do not figure significantly among adults in the Negrito community.

AGENDA FOR CHANGE

To what extent have ongoing programs in the two sites responded to what farmers describe as important things in life? Given the data, one can examine whether or not ongoing community programs serve to answer what people value most in life. At the outset, it can be said that existing Silliman University-initiated projects in Balinsasayao and Cangguhub sites have components that are geared toward the satisfaction of basic sustenance needs of the farmers. All the respondents confirmed this assertion. Farm cultivators are given assistance in soil erosion control techniques, farm management strategies, choice of proper tree-crop combinations, and in the case of Balinsasayao marketing of farm produce. All these activities are related to farm work — the most important thing in life of the farmers.

Closely associated with farming is the value placed on food. Built into the innovations introduced to the communities is the goal to make farmers engage in forest preservation as well as to

Table 1

Respondents' Characteristics Classified By Groups Of Respondents and Location of Study

Categories by Sites	Adults: Males	Adults: Females	Children	Total
1. Sample size				
Balinsasayao	6	8	7	21
Mabinay	11	8	18	37
Total 8	17	16	25	58
2. Age range (in years)				
Balinsasayao	18-70	24-44	8-12	8-70
Mabinay*	15-47	13-30	6-12	6-47
3. Household size (range)				
Balinsasayao	3-8	4-8	5-11	3-11
Mabinay	2-11	4-11	4-10	2-11

*Eight respondents (3 males, 2 females, 3 children) could not tell their age.

adopt farm practices that are consistent with the principles of ecological balance. These built-in agenda will remain alien to the client system unless the basic needs and immediate personal wants are satisfied. To borrow and modify a cliche, "The way to a farmers's heart is through the stomach." However, concern for food should not just be associated with quantity, but also, more importantly, with quality.

Importance placed on food can be tied in with the importance placed on health mostly by women and children. An earlier report (Abregana, 1984) made the following claims:

"Our assessments of the household members' nutritional status reveal low intake of calories and protein. The respondents and their families have also been found to be susceptible to common respiratory ailments. Protein and calorie deficiencies, and respiratory problems may be caused by low food output per household, inadequate nutritional knowledge and poor health services delivered to the area.

The Silliman University Medical Center and the Silliman College of Nursing will be tapped to send a team of health workers to the area on a regular bases, focusing primarily on the health care of children. Preventive measures should be the main emphasis. Local residents, especially housewives, will be given training in the preparation and medicinal use of local herbs and other plants for treating ailments.

The Department of Home Economics of Silliman University will be asked to initiate a nutrition drive, concentrating on the selection and preparation of food from local sources. Residents will be made aware of the dietary needs of members of the family, taking into consideration, the age levels and nature of work these household members may be engaged in. Special dietary requirements of children, the weak and the elderly will also be presented.

Building on these initial contacts, parents may be called to discussions of common health and nutrition problems. It is hoped that such discussions will lead parents to possible solutions to health problems, as well as emphasize to them the importance of improving the quality, variety and productivity of their farms." (Abregana, 1984:18).

Latest reports on incidence of illness (Cadeliña and Cadeliña in this volume) and nutritional intake (Fontelo and Lim in this volume) showed some improvements among the Lake Balinsasayao subjects.

Education is another thing of value identified in both areas although mostly by children in Cangguhub. While an extension class has been set up in Balinsasayao and nonformal classes for children and adults are held in Cangguhub, there is a need to devise a module that will contain topics of direct relevance to a forest community — such special topics as location-specific ecological concepts and proper forest-farm management. Another module that may prove useful, especially for the Negritos is one that will facilitate critical analysis of the restraining and driving forces in one's social psychological make-up. Predilections to *sugal* (game of chance), lack of a sense of cooperativeness, disproportionate spending of time for fun and recreation are some observed ways that may pose as barriers to personal and sociocultural development. Preservation of the Ata's cultural identity, even as they continue to interact with lowland cultural majority, can be a worthwhile educational goal.

One way of applying the knowledge about what farmers deem important in life is not simply to consider the number of important things identified or to count the number of people who mentioned a particular thing of value but to assess how a given value can have an effect on impact on people's lives. While we say that Balinsasayao farmers have gone beyond basic needs for food. clothing and shelter, and that they have now moved on to higher-order needs, recent developments in the area can have an overriding, crippling effect on the initial gains achieved by the Silliman University project. This recent development refers to threats to peace and order in the community brought about by the confirmed visits of military, paramilitary and alledged insurgents to the area. Except for one, forest dwellers are hesitant to talk openly about the situation. The perceived precarious situation is usually referred to in a stilted fashion like in the farmers' expression of valuing prayers to God which is actually explained as their way of coping with the threats to peace. Unless, as perceived by the farmers, the peace situation improves, no amount of agritechnology and new farm innovations will motivate farmers to stay on in the community. In the event that forest dwellers will vacate their farm lots, one wonders if the move will prove beneficial to the forest preservation program. One thing can be sure. In the absence of viable alternatives, displaced farmers' things of importance in life will revert back to a rock-bottom need to survive.

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SOIL NUTRIENTS FROM DIFFERENT SUCCESSIONAL STAGES IN LAKE BALINSASAYAO

Renee B. Pa-alan and Angelita M. Cadeliña

Introduction

Soil maintenance is very important for the life of most green plants. The need for fertile soil increases as the demand for human livestock food increases. The capacity of the soil to hold water and nutrients, in addition to air circulation capacity, is crucial for this need. Such capacities are critical to the growth and development of green plants. The maintenance of the nutrients in the soil is also dependent on the vegetation factor as demonstrated by the fact that when tropical forests are cleared and planted with annual crops, soil fertility declines rapidly unless fertilizers are applied (Jurion and Henry, 1969). The study by Cadeliña, (1987) on soil nutrient changes from various cropping systems in Lake Balinsasayao indicated an accumulation of acidity as cropping activities continue. The study also showed the nutrient levels in the soil in various cropping systems. However, it did not indicate the degree of diminishing returns the soil experiences from the time the primary forest is first opened for agricultural purposes to the time the various plots are abandoned.

It is the purpose of this study to determine the pH, nitrogen, phosphorus and potassium contents present in the soil from various successional stages. Nitrogen (N), phosphorus (P) and potassium (K), known as NPK, are involved in this study because these macronutrients are usually limiting in the growth of food crops. The percentage of organic matter content of the soil is dependent on its nitrogen availability. The best of all agricultural soils are the organic soils, those with the highest percentage of organic matter.

STUDY AREA AND METHODS

The primary forest, abandoned croplands of various ages and actively farmed plots at Lake Balinsasayao are the subjects of the study. Lake Balinsasayao is situated within the boundaries of the municipalities of Sibulan and San Jose, Negros Oriental. The topography of the area is generally mountainous with slopes ranging from 35 to 66 degrees.

The soil is of the Guimbalon series which was formed from the older alluvial and washout materials from Canlaon Volcano and other venta in the island. The soil surface (0-36 cm depth) is reddish brown to dark brown when wet, brown to dark brown when dry, clay with fine granular structure. The subsoil (30-70 cm) is also clayey and the substrate (70-100 cm death) is weathered rock andesite (Antone, 1983).

Field work and sampling were carried out from March to May 1988. Six soil samples (1 kg/sample) were taken from each study plots and were analyzed to determine the pH and NPK.

RESULTS AND DISCUSSION

Tables I, II and III show the pH, amount of nitrogen (N), phosphorus (P) and potassium (K) present in the soil of a primary forest, abandoned croplands and actively farmed plots.

pH

The primary forest has a higher pH, 6.3 which is near neutral: in abandoned croplands the pH ranges from 4.9 to 5.5 while in actively farmed plots, the pH ranges from 5.0 to 6.1. The result of the study by R. Cadeliña, (1987) shows a pH value for all continuously farmed plots to range from 5.0 to 5.5, which is still lower compared to that in the primary forest soil. This shows that continuous farming activity can result to accumulation of acidity which cannot be restored even after several years of abandonment. The plots with trees (plot sample F) however, has a higher pH which is almost similar to that of a primary forest.

Nitrogen (N)

For the total available nitrogen content, the farm plot (plot sample pH), which is newly opened by fire and recently planted to agricultural crops together with reforestation activity, has the highest nitrogen content — 52.4 mg/kg compared to the primary forest — 45.8 mg/kg and abandoned croplands which range from 21.4 mg/kg to 44 mg/kg. The high nitrogen content can be attributed to the fact that fire which destroyed the vegetation releases the nutrient from plant tissues in the form of soluble mineral ash (Mutch, 1970). However, as cropping activities continue, the amount diminishes and is restored after long years of abandonment (see Table II and III). Most farm plots in Lake Balinsasayao were opened through slash and burn method and and the farmers in the area when asked, revealed that as the length of cropping activity increases, their farm becomes less productive and the soil becomes poor. The slash and burn method enhances the nutrient regimen in the soil only temporarily. The fire destroys mychorrhizae within the soil and thus its recycling mechanisms. The nutrients are released in a single large dose and their availablility probably exceeds the exchange capacity of the soil. thus nutrients are quickly leached out of the root zone (Jordan and Kline, 1972) making plant uptake difficult.

Abandoned croplands vary in their nitrogen content, lower at early years of abandonment and on plots without trees while higher on plots with trees. After 8 years of abandonment, the nitrogen content of the soil is only 21.4 mg/kg compared to 40.5 mg/kg after 20 years of abandonment. The two plots have different vegetational status, a grassland without trees results after 8 years of abandonment whereas shrubs and small trees dominate a plot of 20 years of abandonment. The low nitrogen content in the soil after 8 years of abandonment can be explained by the existing vegetation itself which is a grassland. Grasses and decomposers use up soil nitrates and ammonium ions so rapidly (Ricklefs, 1979).

Phosphorus

Although continued cropping activities can result to lower phosphorus content in the soil (Cadeliña, R. 1987), this study shows that the actively farmed plots have higher values which range from 600 to 1300 mg/kg. The high value can be attributed to the contouring method practiced. Contours help hold the top soil and the subsoil, this soil nutrient run-off can be checked.

Potassium

The primary forest has the highest total potassium content, 970 mg/kg, while actively farmed plots have the lower values. However, those with trees regardless of being abandoned or farmed have high values too. These values are lower than that of the primary forest soil. These results parallel that of R. Cadeliña, (1987) wherein continuously farmed plots with trees regardless of cropping system ave the highest content. These results would indicate that trees help in retaining potassium in the soil, preventing against the leaching effect of rainfall. And in the tropical soils, fertility is maintained by vegetation, it traps and retains nutrients imported by rainfall (Ricklefs, 1979).

Table I

Soil Nutrients From A Primary Forest

Plot Sample	pH	Total Available nitrogen (N) mg/kg	Total phosphorus (P) mg/g	Total potassium (K) mg/kg
A	6.3	45.8	320	970

Table II

Soil Nutrients From Abandoned Croplands

Plot	No. of yrs. abandonment	Vegetation type	pH	Total available nutrients (mg/kg)		
				N	P	K
B	8	grassland with-cut trees	5.0	21.4	760	250
C	10	grassland with trees and shrubs	4.9	44.0	1085	195
D	14	grassland with shrubs at farm's edge only	5.5	28.1	265	650
E	20	tall shrubs and small trees w/o layering	5.0	40.5	510	240

Table III

Nutrients from Actively Farmed Plots

Plot Sample	No. of years of farming	Types of cropping	pH	Available Nutrients		
				N	P	K
F	20, contoured 2 yrs. ago	mixed with trees	6.1	31.8	600	485
G	20, contoured 2 yrs. ago	mixed w/o trees	5.0	19.4	1300	180
H	2, newly opened by fire	mixed with reforestation activity	5.6	52.4	870	250

Summary

It is shown in this study that farmers need not expand their clearings. Cutting additional primary forest is not necessary. Maintenance of soil fertility can be done even without application of fertilizer. Proper upland soil management as tree planting on hilly edges, hedgerows and contouring are simple but fruitful practices that may result in increasing the amount of available soil nutrients, as shown in this study.

As an adjunct to this study, plant responses and soil performance could be tested by growing experimentally various species of plants on the different study plots.

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EFFECTS OF CONTOURED ROCKWALLS ON SOILS: THE ATA EXPERIENCE

Rowe V. Cadeliña and Rodrigo Puracan

Introduction

As mentioned elsewhere in the other paper in this volume the farms of the Ata are undergoing rapid deterioration. Top soils are virtually gone and those that have remained are no longer fertile. Through our Silliman University Research Action Development Program in the Uplands, an intervention project had been introduced to the Ata during the last three years. This intervention project is generally known as farming systems development.

The farming systems development project of the Ata has two major components. One is on cropping system and the other is on soil conservation and development. While soil conservation and development is essentially introduced to protect the remaining soils on the farms of the natives, cropping system also indirectly addresses the improvement of the fertility and the restoration of organic composition of the soil. Hence, the two related activities as implemented are designed to improve the soil condition of the farms of the Ata.

Having been introduced to the community around three years ago, the Ata project is expected to have brought in some positive effects on the soils of the farms. This paper, therefore, attempts to asess the present conditions of the soils of the Ata farms.

ISSUES AND PROBLEMS

Considering the limitation of the laboratory services available to us, we decided to limit our analysis of the soil condition on two major indicators. One is on the level of acidity and the other is on the macronutrient counts of the soil. Nitrogen, potassium and phosphorous were three macronutrients considered.

One of the anticipated effects of rockwalls is the accumulation of eroded soil from the hillside on the catchment areas along the sides of rockwalls. If the accumulation of erosion is effective, it is assumed that the thickness of "trapped" soil increases. This increasing accumulation of top soil is expected to improve the pH level of the soil. In a highly eroded land area, the pH value is expected to decline tremendously making the soil highly acidic.

Since both the soil conservation and the cropping systems are designed to improve soil fertility, some macronutrients will be positively affected. The introduction of leguminous crops such as cajanus cajan along rockwalls is expected to improve nitrogen content of the soil. The growing of peanuts, mung beans and other legumes are also assumed to bring higher nitrogen reading on the soil.

The decomposition of organic matter will cause all those macronutrients trapped in the plant tissues to be pumped back into the soil. Assuming that the "nutrient pumping" into the soil is approximately positive for all macronutrients, an increase on most of the macronutrients can be expected in areas where rockwalls have been installed. Since erosion is prevented from taking place, "pumped-in" macronutrients from organic materials can also be trapped in the soils held by the rockwalls.

The following questions are raised in this paper:

(1) Are there soils trapped by rockwalls? Is there any indication of increase?

(2) What is the status of macronutients in farms where rockwalls have been installed?

FIELD PROCEDURE

For trapped soils, monitoring was done by ocular inspection of soil catchment areas of rockwalls. This ocular inspection was done regularly with occasional measurements of thickness of soil trapped especially after heavy rains.

To determine the effects of rockwalls on soil pH and macronutrient content, soil samples were taken from two sites. Soil samples were taken from areas where rockwalls are constructed and from areas where no rockwalls are established. Holes with a diameter of six inches were dug four inches deep into the ground and around one-fourth of an inch of soil was scrapped from the side of the soils. Holes were randomly distributed within a specified area.

Ten trials were made for each area with rockwalls and those without. The soil samples were analyzed by the provincial soils laboratory in Negros Oriental.

RESULTS

It should be noted that cropping development has been only limited on area where soil conservation measures have been introduced. Hence, it must be assumed that whatever changes in soil macronutrients are taking place on the developed areas, those changes should be considered as the results of cropping and coil conservation measures.

Soils Trapped By Rockwalls

Field observation on soil catchment areas of rockwalls shows that a substantial amount of soil has been trapped. Trapped soils range from one inch to two inches in thickness with a width of around four to six inches. During a period of 12 months, observation showed an increasing thickness of the soil trapped by rockwalls. This suggests certain level of efficiency of rockwalls in preventing soil from erosion. Hence, the soil within the 18-hectare farm land which the Ata now cultivates is no longer threatened by erosion.

Soil pH

The higher the pH level of the soil, the more favorable the soil is for crops. Otherwise, the soil will have poor supporting capacity of plant life. This is expected since pH value usually results from extensive soil erosion and loss of nutrients either by leaching or by plant use.

The pH level can be improved by keeping soils from erosion and increasing organic materials on the ground. Since the new system of the Ata allows more biomass and tissues to decompose in the ground and the soil conservation measures protect the soil from erosion, an improvement on the pH reading can be expected on the developed farms of the Ata.

Table 1 shows the results of the laboratory analysis of two sample groups of soils. Soil samples for rockwalled areas yielded a higher pH reading compared to that yielded by the soil samples taken from those sites without rockwalls. The former is higher by around four percent compared to the latter.

Variation from the mean of the pH value for soil samples taken from areas with rockwalls is smaller compared to those found among soil samples from areas without rockwalls. This suggests that in the former category of samples, we tend to find a consistently high pH reading, although they may not be statistically significant. In those areas without rockwalls, pH reading tends to be on a lower level and more erratic. This implies that the cropping system and the soil conservation measures tend to have a positive uniform effect on the soil pH. Such effect is now taking place in the Ata farms.

Macronutrients

Three macronutrients are considered. These are nitrogen, potassium, and phosphorous.

Nitrogen: Measured by percentage of organic materials, soil samples were tested for nitrogen content.

Table 2 shows that the soil samples taken from sites with rockwalls have higher nitrogen contact compared to soils from areas without rockwalls.

The former is higher by around 72% than that of the latter Percentage of organic matter content in the soil tends to be consistently high in most of the soil samples from areas with rockwalls. This is suggested by the low coefficient of variation from the mean (33%) of soil samples from areas with rockwalls compared to that established (81%) for soil samples coming from areas without rockwalls. Nevertheless, the difference appears to be not statistically significant yet.

The data sugest that both the cropping system and the soil conservation development have improved the nitrogen supply in the soil. Obviously, the emphasis on leguminous crops as one of the buffer plants against the rockwalls must have contributed to the increment of the reading on organic matter content. The level may still be low for both, but indications suggest an improvement in those areas where rockwalls have been introduced.

Potassium: For potassium, the treated areas yielded higher reading compared to those coming from the untreated sites. Soil samples from sites with rockwalls yielded 61 parts per million of potassium; while soil samples from sites without rockwalls yielded only 56 parts per million. The former is higher by around nine percent from the latter (see Table 3). This result, however, is not statistically significant.

Reading of potassium level for soil samples from sites with rockwalls tends to be consistently high and homogeneous. This suggests that the farming systems intervention program or the Ata must have a unifying effect on the condition of macronutients. like the amount of potassium available in the soil for plant use. In areas where no such intervention is implemented, potassium content level tends to be generally low while its distribution on the ground is generally erratic and fluctuating. This is expected since the areas do not have any controlling machines on the supply and utilization of soil nutrients.

It is apparent from the data that the intervention package must have started to have its effect on the soil. The continuation of this effect will obviously have to depend on a sustained practice of the recommended appropriate cropping systems and soil development.

Phosphorous: Unlike other macronutrients, phosphorous yielded the highest margin of content from the sites with rockwalls compared to the sites without rockwalls. The difference is around 83%. For sites with rockwalls, the average parts per million of potassium is 174 in contrast to only 95 for sites without rockwalls (see Table 4).

Like the other two nutrients just discussed, phosphorous content tends to be uniformly high on sites that are developed toward appropriate farming systems. The opposite is taking place on sites where such development is not taking place.

Table 1

The pH Value of Soils From Two Samples

Samples Types of Soils	No. of Test Soil Samples	Average pH Value	Coefficient of Variation	
Soils from areas with rockwalls	10	7.2	44%	3.168
Soils from areas without rockwalls	10	6.9	57%	3.933

t = .1878 NS .30

Table 2

Nitrogen Content of Soil From Two Samples

Types of Soil Samples	No. of Test Samples	Average Percentage of Organic Matter	Coefficient of Variation	
Soil Samples taken from sites with rockwalls	10	4.5	33%	1.485
Soil Samples taken from sites without rockwalls	10	3.7%	81%	2.997

t = .7563 NS

Table 3

Potassium Content Level From Two Soil Samples

Types of Soil Samples	No. of Soil Test Samples	Average Parts Per Million of Potassium	Coefficient of Variation	—
Soil samples from sites with rockwalls	10	61	51%	31.11
Soil samples from sites without rockwalls	10	56	71%	39.76

t = .3131 NS

Table 4

Phosphorous Content Level From Two Soil Samples

Types of Soil Samples	No. of Soil Test Samples	Average Parts Per Million of Phosphorous	Coefficient of Variation	
Soil samples from sites with rockwalls	10	174	57%	99.18
Soil samples from sites without rockwalls	10	95	65%	61.75

t = 2.138 Sign .05

SUMMARY AND CONCLUSIONS

Three issues were explored: (1) soil trapping capability of rockwall; (2) pH level, which suggests the general nutrient condition of the soil; (3) macronutrients. Because of the limitation of the laboratory facility, only the macronutrients were tested.

For the last two issues, a comparative approach was used. Soil samples from farms with and without rockwalls were taken and their average pH and macronutrient readings were recorded. The effects of rockwalls on these issues were measured by the difference of readings between the two samples.

On the basis of the data just presented, the following conclusions are drawn:

(1) Indications show that the contoured rockwal s on the Ata farms are effectively trapping eroded soils;

(2) The pH level of the soil has been improved by rockwalls since soils are prevented from erosion. The introduction of new cropping system into the rockwalled areas must have also helped improve the general nutrient condition of the soil;

(3) Contoured rockwalls and the appropriate cropping system introduced have collectively brought positive effects on the macronutrient condition of the soil. In all three types of macronutrient (nitrogen, potassium and phosphorous), indications for higher readings have been noted for samples taken from sites where rockwalls have been established;

(4) Improved farm productivity can be expected in the next ten years especially if there is a continuing practice of appropriate cropping system as well as maintenance and expansion of rockwalls.

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