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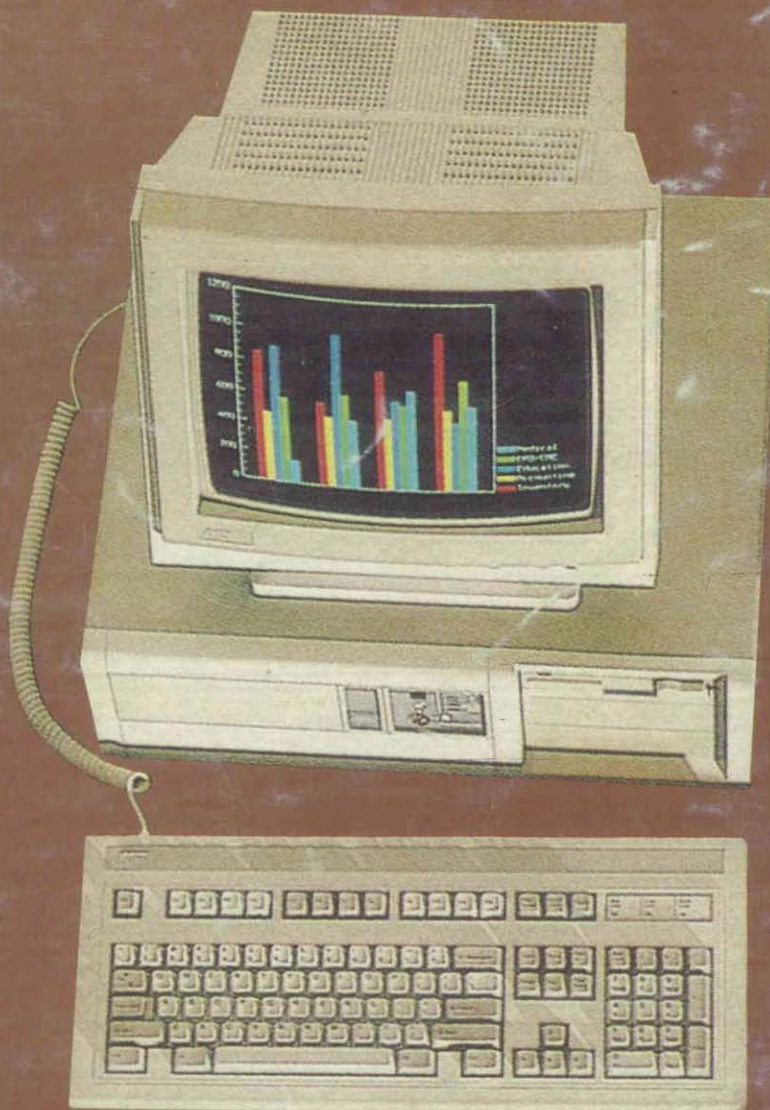


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# CONCEPTUALIZING PEOPLE EMPOWERMENT: A PILOT STUDY OF COOPERATIVES AND PEOPLE'S ORGANIZATIONS IN SELECTED PHILIPPINE COMMUNITIES

by  
*Carolina G. Hernandez, Ph.D.*  
and  
*Segundo E. Romero, Ph.D.*

## PART ONE: THE STUDY

### Introduction

This study is the pilot of a two-pronged exploratory study which seeks to determine the extent and manner in which people empowerment may have occurred over the last five years.

First, at the organizational level, it documents dynamic and structural manifestations of people empowerment in the Philippines. It conducted a survey of 14 people's organizations purposively selected among the country's 13 regions and CAR.

The survey compared currently active peoples' organizations (1) formed or reinvigorated after the People Power Revolt, (2) located in urban and rural areas, (3) focused on livelihood and non-livelihood goals, and (4) distributed in Luzon, Visayas, and Mindanao.

The study has produced mini-case studies of each of these peoples' organizations based on interviews with five key informants for each.

Second, at the individual level, all of the key informants on the peoples' organizations were interviewed to obtain information on their political awareness, political values, political attitudes, political trust, sense of political efficacy, expectation of government, and political behavior.

Data from both levels were correlated to formulate indicative generalizations

applicable to these 14 organizations about the extent and manner in which people empowerment may have occurred over the last five years. (A larger study of an additional purposive sample of 186 peoples' organization will be subsequently conducted based on the tentative generalizations and insights which would have been called from this proposed pilot study.)

The pilot study took three months to complete, from 01 April to 30 June 1991.

### OBJECTIVES:

The pilot study shares with the larger study the following objectives:

- (1) to explore the extent and manner in which people empowerment, as manifested in peoples' organizations as well as among individuals, may have begun or developed in urban and rural communities nationwide since the People Power Revolt in February 1986.
- (2) to explore the factors that may have encouraged or discouraged such an empowerment process, and
- (3) to recommend ways by which government could help hasten and strengthen the empowerment process through government policies, programs, and

The pilot project was intended to produce

- (1) a study of the level of empowerment of officers, members, and non-members of these 14 peoples' organizations based on an analysis of their political awareness, values, attitudes, efficacy, and behavior
- (2) a comparative case profile for each of the pilot sample
- (3) a distillation and classification of the different empowerment models that the pilot survey results suggest
- (4) an identification and prioritization of the positive and negative factors associated with these different empowerment models and key features of the empowerment process
- (5) an evaluation of the peoples' organization studied based on exemplary accomplishments, techniques, structures, processes, in the area of people empowerment, in effect assessing them as possible models of people empowerment
- (6) a preliminary set of recommendations addressed to government on how the empowerment models may be propagated and replicated in other areas of the country, and the empowerment process generally encouraged.

(A fuller presentation of these outputs will be done in the larger study.)

This report presents the results of the project. An audio-visual presentation/briefing of the same material will also be made available. Workshops to generate further implications of the findings of the study

especially on other related concerns of the client may be arranged under a separate project undertaking.

## STRATEGY OF IMPLEMENTATION

The primary subjects on which generalizations or conclusions were made by the study are two: (1) individuals associated with people's organizations, and (2) people's organizations themselves. The unit of analysis for both was the respondent, whose responses were systematically recorded and analyzed.

## Sampling Considerations

The pilot study looked at "successful" peoples' organizations selected by representatives of government according to a combination of the following guidelines:

- (1) capacity for local resource mobilization
- (2) capacity for community problem-solving
- (3) capacity for confidence-building among members
- (4) capacity for organizational mobilization
- (5) results achieved (whether the peoples' organization made a difference to the community)
- (6) partnership with governmental organization
- (7) partnership with other sectors
- (8) capacity for entrepreneurial development, and
- (9) skills training.

As a result of the application of these guidelines by government representatives in consultation with RTVM's Research Department, the proponents adopted the following samples of peoples' organizations for the pilot study, each representing a region:

<b>REGION</b>	<b>NAME OF ORGANIZATION</b>	<b>LOCATION</b>
<b>RI</b>	<b>Malasigui Teacher's Community Cooperative</b>	<b>Malasigui Pangasinan</b>
<b>CAR</b>	<b>Kapangan Sericulture Multi-Purpose Farmers' Association</b>	<b>Kapangan, Benguet</b>
<b>R2</b>	<b>Aritao Fruit and Vegetable Growers Bagsakan Project</b>	<b>Aritao, NuevaViscaya</b>
<b>R3</b>	<b>Alay-Tangkilik Foundation, Inc.</b>	<b>Cabiao, N. Ecija</b>
<b>NCR</b>	<b>Sambayanihan Urban Poor Credit Cooperative</b>	<b>Valenzuela, MM</b>
<b>R4</b>	<b>Laguna West Multi-Purpose Cooperative, Inc.</b>	<b>Calamba, Laguna</b>
<b>R5</b>	<b>Malinao Socio Economic Dev't. Cooperative</b>	<b>Legazpi, Albay</b>
<b>R6</b>	<b>Talungadian Multi-Purpose Coop.</b>	<b>Sta. Barbara, Iloilo</b>
<b>R7</b>	<b>Kawasan Nature Park Multi-Purpose Cooperative</b>	<b>Badian, Cebu</b>
<b>R8</b>	<b>Silago Multi-Purpose Cooperative</b>	<b>Southern Leyte</b>
<b>R9</b>	<b>Yuta Uli Sa Tawo Project Mabuhay PEC</b>	<b>Zamboanga del Sur</b>
<b>RL0</b>	<b>Magallanes PEC (Sta. Ines Credit Cooperative)</b>	<b>Agusan del Sur</b>
<b>R11</b>	<b>Davao Free Farmers Cooperative</b>	<b>Davao del Norte</b>
<b>R12</b>	<b>Sta. Catalina Cooperative</b>	<b>Pres. Roxas, N. Cotabato</b>

## Respondents

The key informants were asked to supply information not only on their respective people's organizations, but on themselves as citizens or actors in the political process. They were personally interviewed with the aid of a two part interview schedule (see Appendix A), Part A on The People's Organization, and Part B on The Respondent's Opinion on Government and Politics.

The following were the key informants for each organization:

1. The President or recognized Leader of the peoples' organization. Referred to as Leader or "L" in the attached prototype interview schedule.
2. An ordinary member/worker in the organization. Referred to as Member or "M".
3. A beneficiary/dependent/spouse of a member/worker who is not himself or herself a member of the enterprise. Referred to as Dependent or "D".
4. An outsider who is not a member of the organization but is familiar with its operations and its relations to the larger community. Referred to as Outsider or "O".
5. A representative of the government agency or non-government organization that gives the greatest assistance to the organization. Referred to as Representative or "R".

The respondents were selected by the interviewer/case writer with the assistance of the provincial survey cooperator(s) for that particular location. The provincial survey cooperators were the government or non-government organization personnel who lent

assistance in setting up and arranging the conduct of the interviews in a particular province.

## Controls and Validation

The two proponents jointly managed the project with the assistance of a field research coordinator who directed field operations. At least 25% of all interviews were observed or backchecked.

## PERSONAL DATA OF THE RESPONDENTS

This section generates some generalizations about the respondents of the 14 case studies of peoples' organizations. These generalizations are by no means conclusive, for the leaders and members of these organizations, nor for the leaders and members of the communities in which the organizations are found. Rather, these generalizations, based on a purposive sample of respondents in a pilot study, are mere hypotheses that would be tested in the larger study.

### Socio-Demographic Profile,

- *Half of the respondents belong to socio-economic classes AB or C.<sup>1</sup> Only two out of five belong to the lower classes, D and E.*

This clearly indicates that the respondents the study team purposively selected to represent "successful" people's organizations came from the middle class.

Alternatively, it could suggest that "successful" people's organizations really cater more to the middle classes rather than the lower classes including the poorest of the poor (supposedly the targets of the government's development efforts). This may be evaluated in the light of the suspicion voiced elsewhere in the literature that

<sup>1</sup>As classified by the interviewers/case writers based on the appearance of the respondents' households.



government agencies involved in development assistance see the poor as hardly "bankable" in terms of credit, lack productive skills and other human capital, and do not have an entrepreneurial orientation. As a result, the really poor lose out to their wealthier and more educated counterparts in the game of governmental (and non-governmental) "grantsmanship." The larger study should more systematically test this "bypassed poor" hypothesis.

Moreover, five out of seven leaders belonged to classes AB or C, compared to only two out of five dependents. The leaders are better-off socio-economically than the intended beneficiaries of their organizations. The larger study should measure the income and wealth gap between the leaders and members of the people's organizations.

**All of the leaders of the people's organizations studied are males.** The leadership and membership of people's organizations are male-dominated. Dependents are more likely to be female. Government agency representatives are evenly balanced among males and females. The larger study must determine the extent to which the potential of women to play prominent roles in these organizations is not tapped.

**Only one out of 70 of the respondents belongs to the 25 years old and below category.** This suggests similarly that the youth do not play any prominent role in these people's organizations. The larger study should also determine the extent of youth participation in people's livelihood organizations.

The tentative general conclusions from these data are

- (1) Leaders are more knowledgeable and politically active than members and dependents of people's organizations.

- (2) Leaders are more economically and educationally better off than members and dependents.
- (3) Women and youth have minimal leadership and membership roles in people's organizations.

Successful people's organizations cater to the poor, but not to the poorest of the poor.

## Political Orientation

**Leaders are far more knowledgeable about government and politics than the members, dependents and outsiders.** This is consistent with the findings about the leader's socio-economic and educational status.

**Two out of five respondents are not satisfied with government performance in general, three out of ten cannot tell, while one in four are satisfied.** It is interesting to note that the leaders are the most dissatisfied group, followed by the government representatives. This suggests the hypothesis<sup>2</sup> that government assistance to people's organizations is not tied nor designed to influence leaders' and members' evaluation of government. Another hypothesis is that government personnel assigned to the field are not particularly enthusiastic about the government's record either.

**Two out of five respondents grant that the government is being run in the interest of the people.** This may reflect the respondents' belief that despite middling performance, the intentions of government are good.

**One of four respondents trust in the ability of the Aquino administration to solve the problems of the country, one of four do not.** The leaders are the most

<sup>2</sup>In fact claimed by President Vistan of the Land Bank.



trusting group (half of them), compared to the dependents (one of seven), or even the government representatives (one of five).

***Some three out of five respondents do not believe that without government assistance, the people's efforts to solve livelihood problems go to waste.*** This indicates that the respondents have a strong sense of community efficacy. This applies to all categories of respondents. The larger study should explore the extent to which membership in a people's organization must have helped induce this feeling.

***Some three out of four respondents say they have great control over their own lives.*** This indicates that the respondents have a strong sense of personal efficacy. This applies to all categories of respondents. Similarly, the existence of the people's organization might have helped induce this feeling.

***More than half of the respondents do not believe that the only way for government to notice the complaints of the people is for them to join strikes, protests, and demonstrations, compared to one in four who do.*** This indicates that the respondents have a strong sense of external efficacy (i.e., that they have influence because government listens).

***Seven out of ten respondents say they have not contacted any local government executive (barangay captain, mayor, governor) about a personal matter. Only one out of four say they have. Less than half of the respondents say they have contacted a local government executive regarding a barangay problem, compared to two out of five who say they have not.*** Contact with politicians is not prevalent among the respondents. Of those who have contact, respondents would rather contact politicians for public rather than personal interests.

***Three out of ten respondents say that the last barangay meeting they attended was less than a year ago, one out of five***

***say it was more than a year ago, while one out of five say they have never attended a barangay meeting.*** The respondents do not exhibit active participation in barangay affairs. Leaders are more active in attending meetings compared to the other respondents, especially the dependents and the government representatives.

***Three of five respondents say they are members of a barangay organization, compared to two of seven who say they are not.*** The leaders followed by the members are more active joiners of barangay organizations, compared to the dependent, outsider, and government representative.

***Seven of ten leaders say they are officers of barangay organizations, compared to only three of seven members and one of seven dependents.*** This indicates that the leaders of the people's organizations also tend to be leaders of other community organizations.

***Three of four respondents do not consider themselves members of political parties.*** One of seven do. The leaders tend to regard themselves as members of political parties more than do the other respondents.

***Some two out of three respondents say they prefer to live in the Philippines even if given the choice to immigrate to any country in the world. One in four prefer to live elsewhere.*** On the whole, the respondents prefer to stay in the Philippines than go abroad. Nevertheless, there is a significant number which indicates a general attraction to live in other countries.

***More than half of the respondents think the country's problems are great, but that we should gradually solve them through reforms. Almost three out of ten think the country is seriously ill and needs to set aright through radical means. Only one out of fourteen think the nation is in good shape and must be***

***defended against those who wish to change it by reform or revolution.*** These findings suggest that while a majority of the respondents are reformist in orientation, there is a significant group which is impatient and feel the need for radical change.

In summary, the tentative generalizations that are culled from the political orientation of the respondents, for testing in the larger study, are the following:

### **People's Organizations vis-a-vis Politics**

Support for or positive orientations towards government does not correlate with government support for people's organizations.

### **People's Organizations vis-a-vis Empowerment Potential**

- (1) There is evidence of a genuine sense of community and personal empowerment (efficacy).
- (2) Community level participation by the respondents is low.

### **People's Organizations vis-a-vis Change**

Leaders and members of people's organizations are generally reform-minded, but a significant portion believe radical solutions are called for by the nation's problems.

### **Framework**

People empowerment can be evaluated at two levels -- organizational and individual. At the organizational level, such empowerment may be manifested in (1) increasing control and management of local resources, (2) organizational growth and stability, (3) networking and alliance-building, and (4) increase of organizational prestige.

## **Local Resource Management**

One of the key factors for the poverty and powerlessness of the rural poor is their lack of control over the resources on which their livelihood and well-being depend on, especially land and other natural resources. The people get empowered to the extent that they obtain and increase their control over such resources.

LRM is high when the organization obtains significant control and management over the material and human environment on which the livelihood and well being of its members depend. It is demonstrated by the following illustrative critical incidents:

- The redistribution of agricultural land to tenants who are or become members of the organization.
- The construction of major infrastructure such as feeder or farm-to-market roads that make the communities of the members accessible to the outside world at the instance of or through the efforts of the organization.
- The introduction and use of technology that tremendously increases the production of the members, or allows them to produce a different crop, good, or service.
- The breaking of control by exploitative outsiders, such as usurers, farm input traders, etc. by the organization.
- When the natural resources and environment of the community are effectively conserved by the organization and its members.

Score on this dimension is low when only 0-1 incident is demonstrated by the

organization, medium when 2-3 are demonstrated, and high when 4-5 are demonstrated.

### **Organizational Growth and Stability**

The establishment of an organizational mechanism dedicated to the people's socio-economic well-being and development harnesses and multiplies the potential of individuals in the rural areas. The very growth and stability of these organizations (internal structural and development) may be considered manifestations of people empowerment.

OGS is high when the organization increases its membership and organizational structure, develops further specialization of its functions, demonstrates effective decisional efficacy, and proven survivability, crisis-avoidance and resolution. Among the illustrative critical incidents are:

- The organization has a regular, full-time staff of 5 persons or more for every 100 members.
- It has sound business operations, as tested through standard business financial analysis.
- It is able to sustain its organization development using internal resources.
- It has opened a major new program, project, or facility on its own initiative over the past two years.
- Its membership has increased by ten percent over the past five years.

Score on this dimension is low when only 0-1 incident is demonstrated by the organization, medium when 2-3 are demonstrated, and high when 4-5 are demonstrated.

### **Networking and Alliance-Building (NAB)**

Apart from the growth and stability of

people's organizations, the establishment of horizontal linkages with similar organizations, and of vertical linkages with larger, more comprehensive structures (external structural and functional development) expands the power and capabilities of these organizations.

#### **NAB is high when:**

- There is vertical networking with a number of governmental and non-governmental organizations
- There is demonstrable horizontal networking with similar people's organizations
- There is cooperative and coordinative relations between the people's organization and the local government and other institutions in the community
- There is organizational effort to influence government and government policy affecting the organization
- There is an important joint project between the organization and another organization.

Score on this dimension is low when only 0-1 incident is demonstrated by the organization, medium when 2-3 are demonstrated, and high when 4-5 are demonstrated.

### **Increase in Organizational Prestige (OPR)**

Organizational prestige refers to the reputation of the organizations for effectiveness in accomplishing its aims, as well as for its generic organizational capabilities. Prestige is an overall, if subjective, indicator of people empowerment.

#### **OPR is high when:**

- The organization has won a major

recognition or award at least at the regional level during the last three years.

- The organization has been featured as an exemplary organization in the mass media.
- The organization regularly attracts visitors and observers from outside the region.
- The organization has a good positive image in the communities where it is located.

- The organization has consciously been emulated by other organizations as to its organization, projects, processes, etc.

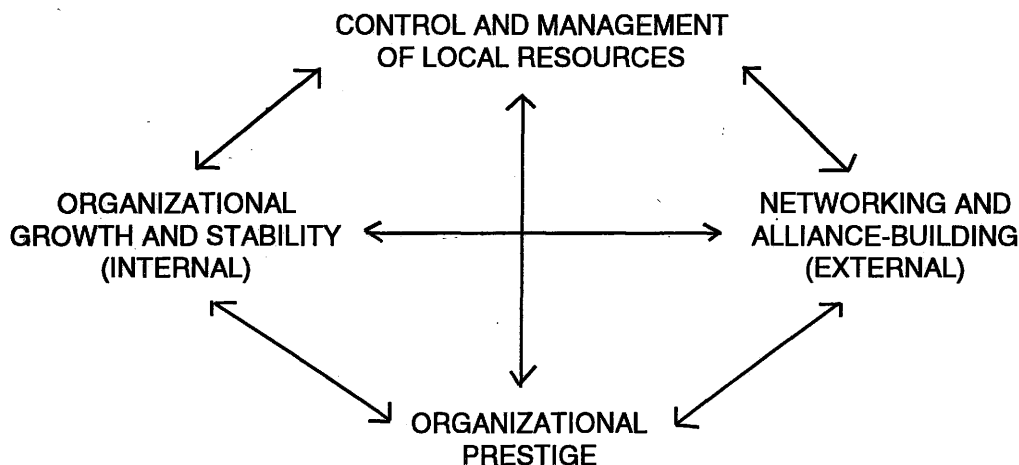
Score on this dimension is low when only 0-1 incident is demonstrated by the organization, medium when 2-3 are demonstrated, and high when 4-5 are demonstrated.

### Inter-relationships

One may conceptualize the relationship of these organizational dimensions of people empowerment as follows:

Diagram 1

### ORGANIZATIONAL DIMENSIONS OF PEOPLE EMPOWERMENT Selected People's Livelihood Organizations All Regions, April-May 1991



## Applications and Findings

In applying the above framework to the 14 people's organizations studied in this project, the following comparative matrices are arrived at:

Table 1

### PEOPLE EMPOWERMENT AT THE ORGANIZATIONAL LEVEL Selected People's Livelihood Organizations All Regions, April-May 1991

Organization/ Location	Loc Res Mgmt	Org Growth & Stability	Networking & A Bldg	Org'l Prestige	Total	Rank
Alay Tangkilik	4	5	5	5	19	1
Sta Catalina	3	5	5	5	18	2
Davao Free	4	4	3	5	16	3
Kapangan	5	3	3	4	15	4
Laguna	4	5	1	3	13	6
Talongadian	3	3	3	4	13	6
Aritao	5	3	3	2	13	6
Malinao	3	5	1	3	12	8
Silago	3	2	4	2	11	9
Magallanes PEC	1	2	4	3	10	10.5
Sarayanihan	2	1	4	3	10	10.5
Kawasan	1	3	0	2	6	13
MaTeCCo	1	1	3	1	6	13
Mabuhay	2	2	0	2	6	13
Legend:	0-1 = Low		2-3 - Medlum		4-5 - High	
Note: Coding based on five-point criteria for each dimension as presented in the write-up.*						

#### Local Resource Management

The most important contribution of people's organizations to local resource management demonstrated in the study is self-control and management by the farmers themselves -- the freeing of the farmers from the perennial clutches of usurers, traders, and businessmen who provide production loans and inputs at usurious interests, and postharvest facilities and services at exorbitant rates, and buy the farmer's

produce at depressed prices. For once, the farmers need not pawn their production only to sink deeper in debt as their harvests fall short of their loans and advances. People's organizations have successfully demonstrated their efficacy in freeing the farmers from the bondage of exploitative traders and businessmen.

This contribution is most strongly demonstrated in Alay Tangkilik, Sta. Catalina, Davao Free Farmers, Talongadian, Silago, and Malinao. What was true of the

Malinao farmer was true for all the rest: "every planting and harvesting season is an admixture of hope that there would be a surplus, and despair that after the usurers and merchants have exacted their share, there would again be little left for his family."

The Alay Tangkilik foundation was set up in a town in Central Luzon that had been a hotbed of communist dissidence because of the agrarian problem. Farmers were poor. They did not own the land they tilled, and even if they did, they could not source the necessary production inputs, except through exploitative traders and usurers. Alay Tangkilik began as a church-oriented self-help foundation to make religious services affordable and accessible even to the poor. It eventually was to expand rapidly to serve the socio-economic needs of the farmers in the area.

As is indicated in the case write-up, the visible contribution of Alay Tangkilik to the welfare of its members is that it has freed them from the exploitative traders and usurers. As a result, they have security of income. It has also increased the productivity of the farmers, although tangible evidence of improvements in their quality of life have yet to be definitively observed.

The Sta. Catalina cooperative operates in the town of President Roxas, North Cotabato, situated within the Arakan Valley stretching from Maguindanao to Bukidnon. Rice is the primary product, and farming the main occupation. Farmers attempted to improve their lot, but had always fallen prey to exploitative traders and usurers. In addition, farmers had to cope with natural calamities such as storms and the perennial "El Nino" drought. The distance of President Roxas to its neighboring towns, and the scarcity of markets for their produce, had often constrained farmers to sell their crops to traders at very low prices.

In order to meet the needs of the community, particularly those of the farmers, the cooperative was first organized as a community-type consumers cooperative and was named the Cooperative Store in the Parish of Sta Catalina. As the cooperative

grew, it also became multipurpose, providing the farm inputs of farmers, meeting their marketing needs, generating their production capital, and even granting emergency loans in the wake of natural calamities. With the cooperative, the members have attained significant control over their human and natural environments. Shortly after the cooperative began operating, the farmers were no longer dependent on traders.

The Sta. Catalina cooperative is now introducing its members to organic farming, which uses local resources such as animal wastes. This tends to reduce the dependence of the farmers on expensive commercial chemicals for their production. This endeavor opens a new additional dimension to the management of local resources.

The Davao Free Farmers cooperative, and the Federation of Free Farmers that preceded it, were both organized in response to the agrarian problem. The number of land disputes settled in and out of court pointed to the then prevailing tenancy problems, particularly unjust eviction. The problem was exacerbated by the entry of agriculture-based corporations such as Davao Fruits Corporation, Hijo Plantation, etc. to whom landlords sold their lands.

In addition to access to land, there was also the question of the lack of capital and the high interest rates charged by usurers, the lack or high rental of farm equipment, and the lack or high rates of farm labor.

Over the years, the cooperative has steadily changed the situation, giving the farmers control over the land as well as over their production inputs. It has provided its members insurance and security--rehabilitation assistance in case of typhoons and poor harvests, as well as benefits in case of personal calamities such as sickness and death.

Kawasan demonstrates a different kind of local resource management and control. As has been pointed out in the case study, it was purposively organized to protect Kawasan Valley in Matutinao, Badian, Cebu from kaingineros and reforest the area, in conjunction with the operation of a new mini-

hydroelectric plant to harness Kawasan Falls. The cooperative fields sinampalok-wielding patrols to regulate hunting in Kawasan Valley<sup>3</sup>. The cooperative operates a nature park-- which attracts a lot of tourists -- and a commercial fishing vessel, engages in citronella farming, mat-weaving, bag-making, livestock raising, maintains a nursery of Philippine hardwood, and undertakes a reforestation of Kawasan Valley. The cooperative has been sustained by the German Agency for Technical Cooperation as the "watchdog" of the immediate environment of the plant, but the cooperative has expanded into various collateral projects made possible by the local resources in the area. The relative importance of the control and management so far done by the Kawasan is indicated by the observation that "the cooperative has done more service to the (local) ecosystem than the Department of Environment and Natural Resources through all these years."

It must be mentioned that while Kawasan demonstrates management and control with respect to its natural environment, it has problems with its human environment -- landowners whose lots are along the trail to Kawasan Falls charge entrance fees to the nature park while the cooperative itself gets no share of these fees.

The Kapangan case demonstrates that hitherto unproductive local resources could be made productive through technological innovativeness. The production of the traditional crops, fruits and vegetables, had been constrained by the rugged terrain, scarcity of water during the dry season and erosion during the rainy season. In addition, farmers could not invest in farm inputs -- fertilizers, pesticides, and farm equipment. The land was so inhospitable residents had been moving to the city. The introduction of sericulture helped to reverse these trends.

The Laguna cooperative showcases the assumption by the farmer of control over land. The members were beneficiaries of the Recovery of ill-gotten wealth of former

President Marcos, and the implementations of the Comprehensive Agrarian Reform Program. Until 1987, they were merely tenants of the land they now own.

The Magallanes PEC is proposing two projects with tremendous local resource management and control potentials. The first is the "Utilization of Natural Gas Seepages" which could provide the entire community's household cooking gas requirements. The other is the development of a water supply system in the municipality. Presently, there are only three sources of potable water in the municipality, including rainwater. The development of an adequate source of water would free the community from a vexing problem and release its energies, far more than would any infrastructural project. As one resident has exclaimed, "Aanhin namin yung roads and bridges kung wala naman kaming mainom dito sa bayan!" Both these projects would be in keeping with the objective of the Magallanes PEC formally stated in its by-laws "to identify local resources and develop the same, to achieve a higher degree of economic sufficiency."

### **Organizational growth and stability**

Organizational growth and stability is evidenced among other things by the number of members, the annual increase in membership, the net assets of the organization, the number of full time employees of the organization, and the longevity of the organization.

The three outstanding people's organizations along these criteria are the Alay Tangkilik, Sta. Catalina, and Davao Organizations.

The Alay Tangkilik has grown rapidly. Organized in December 1976, now boasts of a membership of 1,002 farmer-members, and 154 non-farmer members. It covers not only Cabiao, but also the neighboring town. Apart from palay production, the members are involved in hog dispersal, bamboo craft,

<sup>3</sup>Sinampalok is a native bolo widely used by Cebuanos for cutting buri palm, so called because it is shaped like a tamarind (sampilok).



salted egg making, rice milling and drying, welding shops, hollow block making, and sari-sari stores. The foundation has 22 full time, salaried employees. Initially, the Land Bank extended a P2.895 million loan to the organization, followed by a hefty P11.732 million loan last year.

The Sta.Catalina cooperative directly employs 120 persons, members and non-members alike, in the cooperative. Of these 120, 53 are regular employees engaged in specialized areas of work, from managerial positions down to cooks and grain classifiers. Their monthly salaries range from P1,950 to P7,000. Aside from salaries, regular employees also receive one-half sack of rice subsidy monthly and are covered with Social Security and Medicare insurance and benefits.

The cooperative has also increased its area of operation beyond President Roxas, now including the towns of Antipas, Magpet, and Matalam. In these town, the cooperative has sponsored the creation of small cooperatives and farmers associations (called FACTs -- Farmers Associations for Cooperative Technology).

In recognition of its organizational growth and stability, the Land Bank considers the cooperative as a quasi-secondary cooperative, a "big brother" that could adopt and guide "small brother" cooperatives in the area. The cooperative is groomed to lead the Land Bank-initiated Cooperative Federation in District 2 of North Cotabato.

The Davao Free Farmers cooperative was established in 1975, has more than 3000 members increasing on the average by 164 per year, has P18 million in net assets, and employs 45 full time staff. The amount of loans handled by the organizations also point to their organizational growth and stability. The Davao Free Farmers cooperative obtained a P400,000 truck load in 1984, a P1.5 million Integrated Rice Production Program (IRRP) loan in 1987, a similar loan in the same amount in 1988, a P4.2 million production loan in 1989, and a P7 million multipurpose loan in 1991.

The ability to weather natural calamities is another indicator of organizational growth

and stability. To this day, the Davao cooperative is still reeling from the disastrous effects of three successive typhoons which struck Davao in 1985 and destroyed the crops. The cooperative helped the farmers to recover using existing but limited funds, including loans it received for purposes other than rehabilitation assistance. Without this "creative" organizational response, the defaulting farmers would have had to turn once again to usurers. This response, while taken amidst the lack of rehabilitation assistance from government, did not impair the ability of the cooperative to meet its commitments to its creditors. The Land Bank manager attests that the cooperative is a good borrower, and has a good credit line.

In contrast, the Kawasan, Sambayanihan, MaTeCCo, and Mabuhay are fairly recently organized, have relatively few members and employees, and small net assets. Kawasan was established in late 1989, has 200 members increasing at about 67 members per year on the average. Sambayanihan was organized only last year, has 62 members, 4 full time volunteer staff. MaTeCCo was established in 1985, has 950 members increasing by 18 members yearly on the average, and 4 full time staff. MaTeCCo's net assets is reported to be only over P281 thousand. Mabuhay was organized in 1987, but to date has not been registered, and thus has no legal personality, has only about 40 members, has no full time employees, and no recorded assets.

Despite reversals due to typhoon Ruping and the July 1990 Earthquake, the Kapangan cooperative continued to grow in membership, sustained by the promise of the new technology and the accompanying governmental and non-governmental assistance.

### **Networking and Alliance-Building**

Networking and alliance-building refer to the supportive and coordinative linkages the organization has formed with governmental and non-governmental organizations. The highly successful cooperatives -- Alay

Tangkilik, Sta Catalina, and Davao have had extensive linkages.

Alay Tangkilik has linkages with the Land Bank, Department of Trade and Industry, Department of Agriculture, and the Department of Agrarian Reform. It has been affiliated with the Nueva Ecija Forum, the Association of Free Farmers, Inc., the Agency for Community Educational Services, Inc., and the Philippine Rural Reconstruction Movement. It must also be mentioned that Alay Tangkilik is considered to be modeled after the Tarlac Integrated Livelihood Cooperative of Bernabe Buscayno in Capas, Tarlac.

Sta. Catalina availed of a P600,000 loan from Miserior, the German non-government organization. Later in the year, it obtained a P100,000 loan from PBSP's Cooperative SEA Program. That same year, it obtained a P177,000 loan from the government, through the Regional Cooperatives Development Assistance Office of Region 12. All these point to the wide and effective networking that the Sta. Catalina cooperative has undertaken. In addition, because of its success, the Sta. Catalina cooperative is being groomed to lead the LBP-proposed cooperatives federation in North Cotabato.

Among the other non-governmental organizations Sta. Catalina is involved with are the Consortium for the Development of Southeastern Mindanao Cooperative, Inc. of which it is a member, the Cotabato-Davao Sur Federation of Cooperatives in Kidapawan, North Cotabato, the Mindanao Alliance of Self-Help Societies - Southern Philippines Educational Cooperative Center (MASS-SPEC); the Credit Mutual Benefits Services, Inc., and the Mindanao Inter-Trading Cooperatives.

Among the government agencies supporting the cooperative are the Land Bank, the Department of Agriculture, and the National Food Authority. The cooperative is also represented in different workshops and seminars sponsored by government and non-governmental institutions. It was also represented during the National Cooperative Congress on March 8-12, 1990 at the Philippine International

Convention Center, sponsored by the National Training Center for Cooperatives.

The Davao Free Farmers cooperative has an extensive, multilevel, multisectoral network. Apart from its relations with national government agencies, local government, the Church and other non-government organizations, it also networks with other, smaller cooperatives. For instance, it provides credit assistance to the Nabunturan Integrated Cooperative, Inc. The Davao cooperative is a participant of the "Big Brother" program of the Land Bank, through which successful and established cooperatives help guide and nurture the smaller and newer ones.

Effective networking and alliance-building is also demonstrated by the Davao cooperative in the sense that it has a national office which provides financial assistance and lobbying and networking support for the cooperative and other local units.

The Magallanes PEC (a.k.a. the Sta Ines cooperative) is an organization that has forged close relations with national government agencies and the local government. It has also established linkages or alliances with other organizations, federations, or government agencies both in the local and national levels. It has organized small cooperatives, such as the Bangus and Prawn Growers Cooperative in the community or nearby areas. The Sta. Ines cooperative is a stock-holder in the Rural Cooperative Bank in Butuan City.

The Kapangan case demonstrates the salutary effects of multilateral external assistance. Assistance has poured in from no less than seven government departments and banking institutions (LBP, DA, DTI, DAR, DOST, BPW11, and PTRI), four private institutions (Catholic Relief Services, Western Silk, PLAN International, Jaime V. Ongpin Foundation), foreign governmental agencies (JICA and JOCV), and even private individuals.

### **Organizational Prestige and Image (OPI)**

Organizational prestige is indicated by awards and citations of the organization,

media publicity, number of visits to the organization by government officials, newsmen, tourists, extension professionals, etc.

Among these heralded people's organizations are Sta Catalina, Davao Free Farmers, Alay Tangkilik, Magallanes, and Talongadian.

The Sta Catalina cooperative won the Land Bank's Most Outstanding Cooperative Award of North Cotabato in 1989. The cooperative sometimes addresses resolutions to local government to recommend or influence local policy. For instances, the cooperative has joined environmental groups non-government organizations, and local tribes in blocking the proposed PNOC geothermal power plant that will cover 701 hectares of Mt. Apo in Kidapawan, North Cotabato.

The Davao Free Farmers cooperative received the Land Bank's Most Outstanding Small Farmers' Cooperative Award in 1989 in Region 11, and the national level award in 1990. It has also been the Outstanding Farmer Borrower Award by the Quedan Guarantee Fund Board in 1988 for its active Participation as an organized group in the Quedan Finance Program.

Apart from awards, organizational prestige and image is evidenced by the regard of similar business establishments in the area. The extent of the business network of an organization tells of its organizational growth and stability, as reflected in the regard for the organization by its peers.

A survey of the business linkages of the Davao Free Farmers cooperative clearly indicates this regard. Its market outlets are DANECO and other cooperatives. It supplies rice to JOS Trading, Hijo Twin Rivers Corporation, Farmingtown Corporation, Davao Fruits Corporation, and others in places as far as Tandag, Surigao del Sur. For its input dealership, it has open credit with Jade Petron, Ferchmx, Hoechst, Ciba-Geigy, Planters Products, FertiPhil, Dating Bayan Agro-Industrial Corporation, and LMN

Marketing. In many cases, the national cooperative (FFCI) handles the negotiations with the head offices of these corporations.

Organizational prestige and image is also reflected in the cooperative's relationship with the local government and community. The cooperative leaders are approached by the local government for its activities. The general manager is a member of the provisional crisis committee and the provisional monitoring committee. He is also a resource person on cooperatives in government-sponsored symposia. The local leaders are seen as community leaders, always approached by purok leaders to help mobilize community members for community projects and activities.

Magallanes PEC has been cited as Most Outstanding PEC of Region 10 in 1989, and at the national level in 1990.

## **Framework**

People empowerment at the individual level is the more direct and significant type of empowerment. Organizational level empowerment should but does not always contribute to individual empowerment. Individual level empowerment is manifested in three ways: (1) higher income and increase well-being of individuals, (2) greater individual participation in decision-making that affects his life (especially at the organization and governmental arenas), and (3) enhanced self-confidence or sense of political efficacy.

## **Income and Well-Being (IWB)**

Powerlessness is synonymous with poverty, empowerment means higher incomes and increased well-being. Individuals begin to be empowered when they earn an adequate livelihood that enables them to escape poverty. The poverty threshold is also the threshold to self-actualization.

IWB is high when:

- Members and their dependents declare that their income and well-being has improved.
- Members purchase consumer durable or improve their houses.
- There is a significant increase in the agricultural production of members.
- Previously unemployed or underemployed members or their dependents get employment.
- There is an increase demand of the supply of social, educational, and recreation services in the community.

Score on this dimension is low when only 0-1 incident is demonstrated by the organization, medium when 2-3 are demonstrated, and high when 4-5 are demonstrated.

### **Participation in Decision-Making (PDM)**

Higher income alone will not guarantee the non-material aspects of human well-being. Individuals must increasingly participate in decision-making at the organizational and governmental arenas, for them to help shape their social and political futures. Participation cannot guarantee total well-being, but total well-being is unlikely to ensue without participation.

PDM is high when:

- More than half of the members attend the annual and special general assemblies.
- There are at least quarterly consultative, informational, educational interactions sponsored by the organization and open to the general membership.

- The organization has local cells where members participate in the discussion of organizational problems and issues and arrive at significant decisions.
- Elections of officers are genuine and positions are actively contested.
- The members look to the organization for their social, affiliation, religious, and other non-economic needs.

Score on this dimension is low when only 0-1 incident is demonstrated by the organization, medium when 2-3 are demonstrated, and high when 4-5 are demonstrated.

### **Self-Confidence and Efficacy (SCE)**

The feeling that he has become "empowered" -- with enhance overall capabilities with respect to his human and material environment -- is the overall indicator of such empowerment. Without that sense of the need, ability, and willingness to reach for higher level goals, the individual is not really empowered. Empowered must contain its own drive towards sustainability.

SCE is high when:

- Members take on increased obligations (financial or otherwise) in the organization.
- Members increasingly participate in community decision-making and activities.
- Members report that they feel they have increased knowledge, skills, better outlook in life, and other competencies.
- Members articulate pride of their organization.

- Members demonstrate a greater need to achieve, self-reliance, and dignity.

Score on this dimension is low when only 0-1 incident is demonstrated by the organization, medium when 2-3 are demonstrated, and high when 4-5 are

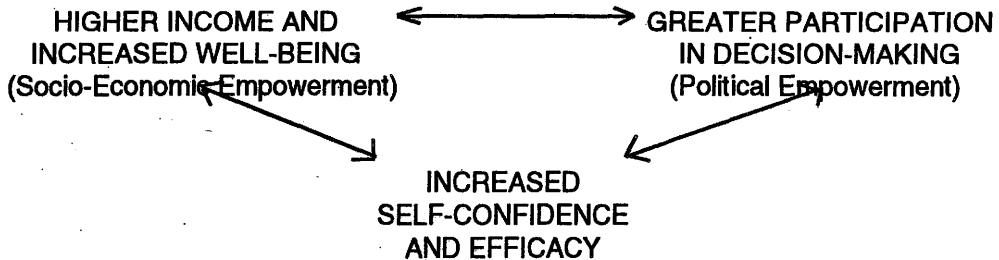
demonstrated.

### Inter-relationships

The inter-relationships of these three dimension of individual level people empowerment may be conceptualized as follows:

**Diagram 2**

### **DIMENSION OF INDIVIDUAL LEVEL PEOPLE EMPOWERMENT** **Selected People's Livelihood Organizations** **All Regions, April-May 1991**



## Application and Findings

The application of the model above to the 14 people's organizations produces the following rankings.

Table 2

### PEOPLE EMPOWERMENT AT THE INDIVIDUAL LEVEL Selected People's Livelihood Organizations All Regions, April-May 1991

Organization/ Location	Income and Well-being	Participation in Decision Making	Self- Confidence	Total	Rank
Davao Free	5	5	5	15	1
Sta Catalina	4	5	5	14	2
Alay Tangkilik	4	5	4	13	3
Aritao	4	3	5	12	4.5
Magallanes PEC	4	3	5	12	4.5
Kapangan	3	3	4	10	6
Malinao	4	1	4	9	8
Laguna	4	1	4	9	8
Talongadin	2	4	3	9	8
Sambayanihan	1	3	4	8	10
Silago	3	2	1	6	11
Kawasan	2	3	0	5	12
MaTeCCo	1	0	0	10	13.5
Mabuhay	0	0	1	1	13.5
Legend:	0-1 = Low	2-3 = Medium	4-5 = High		
Note: Coding based on five-point criteria for each dimension as presented in the write-up.					

#### Income and Well-being

The potential of the cooperative to significantly increase the income and improve the well-being of its members is dependent on a lot of factors. One of this is precisely how poor the members are.

The poorer the members, the greater the potential. This should be the case in cooperatives such as Kawasan, where 70% of the people are marginal fishermen. The increase in incomes, however, can only be

assumed, because no dramatic and visible improvements have occurred in the economic status of the people.

The Magallanes PEC (Sta Ines cooperative) arose from a situation of massive unemployment brought about by the closure of two lumber companies in the area. It may be inferred that income and well-being of the members have improved as a result of the economic development in the area characterized by infusion of financial assistance to support various small-scale

livelihood projects and the conduct of basic skills training seminars.

The members of the Sta Catalina cooperative were poor farmers. The cooperative started as a consumers cooperative. A year after its formation, the cooperative was already extending credit services to its members, in collaboration with the Rural Bank of President Roxas. Loan application of cooperative members were approved upon endorsement of the cooperative's management. In the specific situation of the farmers of the place, this constituted a significant improvement in their well-being, which eventually led to their break-away from the control of local exploitative traders and usurers.

The Sta Catalina cooperative also benefits the parish church. The church receives a monthly subsidy of P1,500 from the cooperative, to finance its activities such as leadership, catechetical, youth, and family formation. the convent also receives one sack of rice monthly, and free mechanical service for the parish vehicle.

The Davao Free Farmers cooperative induced a marked improvement in the quality of life of its poor members. Incomes increased and poverty was eased. Television antennae have sprouted on rooftops. Appliances have proliferated and houses have undergone repairs. Some have made long-term investments, others have bought expensive farm equipment such as tractors. More children are in school, and housewives are less anxious about making both ends meet.

Since the Davao cooperative espoused "total human development", it has also taken efforts to inspire a change in values and attitudes of members, perhaps resulting in the reduction of the vices of its members.

For coops with members who are not so poor, the contribution is perhaps not so much in increases in income, but in providing security of income. This is perhaps best exemplified by Alay Tangkilik.

The coop where there appears to have been visible improvements in the economic well-being of its members is Laguna West, judging from the improvements in their

houses and reported purchases of consumer durables.

The Kapangan project demonstrates wide intended beneficiary participation (80% of farmers in the municipality) but the increase in income (about P18,000 per year) may not be all that significant unless productivity sharply increases.

### **Participation in Decision-making**

The variability in participation in decision-making demonstrated by the cases studied is wide.

The Davao Free Farmers cooperative shows a high level of individual participativeness in decision-making, as a manifestation of its organizational cultures, as well as of, the formal decision-making procedures adopted by the organization.

The local units in the barangays elect their own leaders who constitute the Local Management Committees. (Even new recruits can run for local positions.) These Committees send representatives to the General Assembly, which meets annually. Representatives of the local units in the General Assembly. The General Assembly is the highest policy making body and elects the 15-member Board of Directors. (Other cooperatives have as low as five board members; non-officers at the local unit level have no chance of getting elected to the board.) The Board elects from among themselves a Chairman and the other officers. BOD members have one-year terms, and are allowed only three re-elections. Members who wish to be members of the Board have to formally file a Certificate of Candidacy.

While the local units are implementing arms and are under the supervision of the provincial center of the cooperative, they are free to barangay officials, etc. It is at the local level that the cooperative has a "human face". There is greater interaction among the members, and they are more involved in one another's life and in that of the community. In Gamao, for instance, the local unit requested for a loan on their cash bond of P25,000 to purchase a building in the



barangay. They were also able to previously purchase a water tank using the same arrangement.

Greater participativeness is also encouraged when the youth and women are formally given more functions and responsibilities. In Gamao, the credit assistance project was formally turned over to the Women's committee of the Local Management Committee.

In the Sta Catalina cooperative, ultimate power rests with the General Assembly, which consists of all the members of the organization. The Board of Directors makes policies. On equal footing with the Board are the three committees of the cooperative -- election, audit and invoice, and credit. Each of these have eight members elected by the general assembly through secret balloting. As a business enterprise, the cooperative is run by the general manager and the department heads of the organization, namely, merchandising, marketing/production, loans and savings, finance/administration, and extension and training.

Members are also required to attend monthly meetings, seminars, training, the annual general assembly. These seminars and training include the cooperative secondary education program, which conducts cooperative refresher courses such as simple farm family recordskeeping, planning and budgetting, rapid compost seminar, and simple accounting and bookkeeping.

The cooperative expects its members to render voluntary service during social gatherings such as organization anniversaries or Christmas balls. Members construct temporary platforms and tents bayanihan-style. It is reported that as many as three members of a family come to give assistance.

During the general assemblies, it is reported that 60 to 70% of the members usually attend. General assemblies are day-long affairs and members who aspire to be elected to the Board and committees file their certificate of candidacy in the morning. The election committee presents them to

the members, and they outline their general programs of action. Election through secret balloting is done in the afternoon, and counting lasts until early evening. Winners are announced by the election committee the next day.

Members have the right to run for any elective position, the right to vote in these elections, and the right to see the accounts of the cooperative.

The profile of members of the Sta Catalina cooperative is as follows:

Farmers	70%
Housekeepers	9
Government employees	8
Private firm employees	6
Self-employed	3
Youth	2
Laborer	1
Institutions	0.5
Professional	0.5

The growth of the membership has been as follows:

1983	47
1984	181
1985	336
1986	436
1987	566
1988	744
1989	868
1990	940

Decision-making is exclusively exercised by the 15-member Board of Directors through resolutions. It has the sole power to decide issues of membership, wage and benefits, management, and policies. Consultation with members about these subjects is the prerogative of the Board. Special general assemblies, however, can be called at the instance of 10% of the total membership.

The participation of members in the decision-making process is limited only during the general assembly, where they elect the officers, ask for clarification on

financial reports and resolutions, and perhaps make suggestions. Final decisions, however, remain with the Board.

Alay Tangkilik has a lower level of participation in decision-making than Davao and Sta Catalina. Members do not participate in the management of the foundation. Apart from the initial pre-membership briefings, members usually go to the office only when they want to avail of loans provided by decision-making -- they are employees hired to prepare the necessary papers and various other requirements of members.

The local units of the Alay Tangkilik are called clusters. It is interesting to note that these cluster are not headed by farmers - members but by technicians employed by the foundation. These technicians are the ones who represent the foundation to the farmers.

The Magallanes PEC shows high participativeness. Much like other organization, there is an annual general assembly attended by members and officers, where problems and issues in the community are raised and discussed. The presentation is more systematic and thorough in the PEC considering that four committees -- trade, industry, services, and allied matters -- report on problems in their respective areas of concern. A truly participatory device is the classification, after the initial discussion, of all the problems and issues into two categories -- those which would be delegated to the executive committee, and those which must be decided upon by the general membership. The general assembly then proceeds to discussion, of all the problems and issues into two categories -- those which would be delegated to the executive committee, and those which must be decided upon by the general membership. The general assembly then proceeds to discuss and decide on the second category.

The Magallanes PEC is highly

participative perhaps because the PEC is a consultative and deliberative forum and as such naturally encourages participation. Membership in the PEC is on an individual basis, and every member is entitled to a single vote in internal votations. The other factor is the fact that the members of the PEC are also members of the Sta Ines cooperative, a member-oriented organization on whose behalf many of the projects, deliberation, and actions of the PEC have been taken.

Participation in decision-making has generally been controlled by leaders than by the members. A bias against greater participation of the members "too soon" is evident.

In the case of the Kawasan cooperative, the emerging crisis in participation in decision-making is not between the leaders and the followers, but between the members coming from the three barangays from where the cooperative's members come from. As has been mentioned, the Balha-an and Solsogon factions begrudge the fact that all seven members of the Board of Directors of the cooperative are all Matutinao residents. They also complain that the livelihood programs other than the maintenance of the nature park meant to benefit them have been "turtle-paced."

### **Self-Confidence and Efficacy**

While easy to conceptualize as an important component of individual empowerment, self-confidence and efficacy is difficult to illustrate.

The best active illustration perhaps comes from the Sta Catalina cooperative, where, during their sixth general assembly (1988), an ordinary member moved that the cooperative purchase a needed truck using the members patronage dividends. This is member confidence at its best-- offering to plow back individual benefits for the

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<sup>4</sup>Industry includes agriculture, manufacturing, mining, and construction; trade includes wholesome, retail, and real estate; services include transportation, communication, education, and electricity; and allied includes labor, academe, civic organizations, and religious groups.

collective good, not as a token, but as a tangible, significant contribution.

Another illustration, from the same cooperative, is the individual members doing their obligations, which include the payment of their subscription of stocks, participating in the activities of the cooperative, papers. These are secular activities that require self-confidence and a sense of efficacy for poor farmers to be involved in.

In general, self-confidence and efficacy is inferred or indirectly demonstrated in

- (1) freedom from the control of exploitative traders and usurers,
- (2) greater individual sense of contribution to the community via participation in community decision-

making, projects, and activities,

- (3) the acquisition of skills and knowledge related to farming as well as non-farming subjects (e.g., family and farm budgetting), and

- (4) greater income.

The Kapangan case has created self-confidence as the farmers-members have gained knowledge and modern productive skills.

Putting together the organizational and individual empowerment rankings of the 14 organizations, we arrive at the following summary ranking to represent overall empowerment capability and accomplishment:

Table 3

**OVERALL PEOPLE EMPOWERMENT CAPABILITY**  
**Selected People's Livelihood Organizations**  
**All Regions, April-May 1991**

Organization/ Location	Organizational Empowerment Rank	Individual Empowerment Rank	Total	Summary
Davao Free	3	1	4	2
Sta Catalina	2	2	4	2
Alay Tangkilik	1	3	4	2
Kapanga	4	6	10	4
Aritao	6	4.5	10.5	5
Laguan	6	8	14	6.5
Talongadian	6	8	14	6.5
Magallanes PEC	10.5	4.5	15	8
Malinao	8	8	16	9
Silago	9	11	20	10
Sambayanihan	10.5	10	20.5	11
Kawasan	13	12	25	12
MaTeCCo	13	13.5	26.5	13.5
Mabuhay	13	13.5	26.5	13.5

This section culls from the 14 case studies the internal and external factors that have been identified to be associated with the relative success (and lack of success) of the people's organizations as instruments of people empowerment.

## Internal Factors

Internal factors refer to the elements of the people's organizations themselves, grouped into five general categories -- organizational trace, leadership, membership, motivation, and management.

## Organizational Trace

The cooperative and foundations studied here were not organized out of nothing -- in many instances, they were resuscitations of old, moribund formal organizations, or formalizations of informal cooperative societies. This organizational trace represents an important factor for the success of people's organizations, to the extent that it has given the core members of the new organizations shared organizational experiences, familiarity with one another's interests and capabilities, a formal organizational shell complete with articles of incorporation and by-laws, and even existing assets.

The Magallanes PEC is an excellent example of positive organizational trace. While the People's Economic Council is a recent creation (1987) of the present administration's Department of Trade and Industry, the Magallanes PEC is constituted by members of the Sta Ines Credit Cooperative, Inc.<sup>5</sup> The cooperative was revived by the PEC through a series of loans the Council has negotiated with DTI-TST-SELA on behalf of the cooperative -- P150 thousand in 1988, P500 thousand in 1989, and P1.2 million in 1990.

The Sta Ines Cooperative was not an ordinary cooperative. Before it was shattered

by the closure of the manufacturing plants that employed its members, it had a history of rapid organizational growth coupled with a militant tradition. Undoubtedly, these attributes of the cooperative are crucial to its rescuscitation, never mind that it does so apparently with a parallel organizational form for legitimization.

The cases suggest that the two most important attributes of organizational trace is that a common interest exists and that the total environment is hospitable. This includes the policy environment, or whether the present administration encourages or discourages organizations formed and mobilized during the previous administration.

Judging from the sentiments expressed by the respondents in the case studies, the present administration does not require political loyalty or a positive orientation towards the current administration for a cooperative or a foundation to obtain assistance. This is in marked contrast to the mobilization of these cooperatives during the previous regime, which also entailed their mobilization as political support for that administration.

The implication of this may be that these cooperatives and foundations are politically indifferent, and would not be unduly prejudiced by the impending change in administration.

## Leadership

The cases demonstrate that the organizations were established and nurtured through the vision of individuals with leadership skills and stature in their communities. In some cases, the leadership is based on previous or current positions of responsibility, in government; church, and non-governmental organizations. In others, it is based on experience and education.

The problem with leadership is two fold: (1) oftentimes leadership is considered an antidote to the lack of, or absence of capacity

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<sup>5</sup>The PEC is designed to be a forum where economic problems and issues in the community are identified and offered solutions. It has no funds of its own. Its operations cover the whole municipality.

for, active member participation, and (2) oftentimes the self-interest of the leader conflicts with the collective organizational interest.

The first problem is usually compounded where the members agree that they do not have the capability to participate more actively. The second problem is usually compounded where a leader's self-interested manipulation is not manifest or, worse, is considered legitimate by the very members of the organization.

As to the second problem, some leaders, while dynamic and full of rhetoric about the welfare of the members of the coop, nevertheless are suspect as to their ultimate motives, because of the conflicts of their personal interests with those of the cooperative or organization they lead.

The leader of Laguna West, for instance, appears to have developed and intertwined his personal business interests with those of the cooperative he heads.

The leader of MaTeCCo has been President of that cooperative since 1956, even as the members appear in the dark about the criteria for awarding production loans to the members.

For this reason, leaders of church-supported people's organizations have become more effective in mobilizing their membership, although not all of them have completely been above suspicion of conflict of interest.

The cases suggest that the two most important attributes of leadership are that it is trusted and development-oriented.

## **Membership**

In the early days of the Davao Free Farmers cooperative, the leaders and members offered their services for free, oftentimes even using their own money. Majority of the founding members were farmers who were singularly motivated by the desire to give a better life for their families. Some were young people who worked as volunteers while still in college, later on getting absorbed as regular employees. The high level of success of the

Davao cooperative.

The response of the membership to opportunities to get involved deeper and more extensively in the affairs of the cooperative has been crucial. In some of the local units of the Davao Free Farmers cooperative stores, performing tasks ranging from the inventory, purchase, and pricing of stocks, to store supervision, cashiering, and accounting. The experience develops transparency in the store operations, provides practical training, and promotes honesty and discipline.

The Kapangan case demonstrates that a "policy of attraction" goes a long way towards ensuring that partakers of a new technology-based assistance program are genuinely committed to it. Because sericulture was introduced as a source of livelihood supplementary to the traditional production of fruits and vegetables, farmers in the Kapangan area were afforded the time to gradually overcome their initial cultural resistance to "propagating worms that have been their traditional enemies" as vegetable growers. They in fact now derive psychic satisfaction in the use of a novel, "modern" technology, in addition to increasing and stabilizing their per capita income, as sericulture allows year-round harvesting while vegetable farming allows only two harvests in a year. That they did not have to give up vegetable farming, however, provided the "insurance" that allowed them to take the "bold" move to adopt sericulture.

On the other hand, the additional annual income of about P18,000 (six harvest at P3,000 each) may not be sufficiently attractive in the long run to supplant the abundant start-up external assistance provided by government and private institutions.

The cases suggest that the two most important attributes of membership are that it is motivated and participative.

## **Purpose**

A strong and coherent sense of purpose -- an ideology -- propels a successful, empowering and empowered people's

organization. That ideology could be a secular, relentless, collective strategy to escape from poverty, or a religion-based, holistic view of how man ought to develop as a total, moral, human being.

Each of these secular or religious wellsprings of human purposiveness is powerful in its own right. Imagine their combined propelling power -- exemplified in the Davao Free Farmers cooperative.

The organizational purpose of the Church has effectively been borrowed for cooperatives organizing. In Gamao, Tagum, the local management committee chairman's organizing strategy was that of forming a core group for Gagmay nga Kristiyanong Katilingban (GKK or Basic Christian Community). This she slowly infused with cooperative ideas and principles until she was able to organize eighteen people into a local unit of the Davao Free Farmers cooperative. At present, the local unit has fifty-four members.

Strategic purpose can also be gleaned from the formal objectives of the organization. In the case of the Davao cooperative, its business orientation permeates all the seventeen objectives states in its Amended Articles of Cooperation. It intends to undertake extractive business and entrepreneurial activities such as mining.

The Sta Catalina cooperative similarly leans heavily on church organizational props. As has been mentioned, it also originated from Basic Christian Communities. It also conducts social activities and gatherings such as cooperative anniversaries and Christmas parties to foster a harmonious relationship between its members and the community as a whole. It sponsors value-orientation classes in collaboration of love, trust, and faith. These classes are open to members and non-members alike.

The Sta Catalina cooperative aims for the total development of its members.

The Alay Tangkilik foundation similarly espouses a secular "ideology" of welfare based on religious teachings. The Alay Tangkilik philosophy states that "A Christian Trust is the systematic and equitable

distribution of our time, talent and property according to our ability because these are given to us by God to be used in praising Him and in the service of other people as a response and sign of being grateful to the love of Christ."

## Management

The general rule that has made cooperative and other people's organizations successful is that they have been run as no-nonsense business enterprises, with the same rigor and attention to management principles as any private business. That the organization is a people's organization does not get in the way of ensuring the financial viability of the organization.

Management standards and procedures. Needless to say, the maintenance of rigorous management standards is difficult, given the managerial and entrepreneurial attitudes, skills, and knowledge of cooperative members and officers, not to mention the pressure on cooperatives to immediately respond to myriad, deeply felt socio-economic needs.

Setting and maintaining standards and procedures is a key operational requirement. Several cooperatives demonstrate it can be done.

The Davao Free Farmers cooperative, for instance, ensures that its members use their loans for production, and that they pay their obligations. It has computed the amount needed for production per hectare (about P8,000), which it has further broken down into cost per hectare production stage -- land preparation, planting of seedlings, maintenance (weeding and spraying), and harvesting -- and crop insurance of about P340 installments according to the schedule of his needs. Field technicians employed by the cooperative to provide technical know-how also make ocular inspections and certify to the credit and Collection Committee the stage of production that borrowers have attained. This systems has been successful in ensuring that diversion of funds is eliminated.

The recruitment process itself is a crucial

aspect to manage in a people's organization, because many farmers have the singular purpose of obtaining access to loans. Proper screening and training prevent the mismatch of purpose and obligations that sour the individual member's relationships with his organization.

In the case of the Davao cooperative, recruitment is done by local units. Prospective members are required to attend pre-membership seminars which take about five days. A year after acceptance, a member has to undergo a refresher membership course. There are other requirements, such as applicants applying in writing and purchasing capital stock.

The Davao cooperative also demonstrates the value of documentation and formalizations of procedures as a basis for transactions between and among members and the officers.

The Alay Tangkilik foundation similarly has well-developed procedures and standards for undertaking its various functions, and governing transactions between the members and the foundation.

**Financial records.** The cases indicated that the more successful organizations have no-nonsense bookkeeping and recording capabilities; procedures, and practices as a basic foundation of their operations. This has dispelled unnecessary suspicion among officers and members interacting without a history of trust and cooperation, and avoided unnecessary temptations for privatizing collective resources.

The Aritao cooperative cites the hiring of a bookkeeping as one of their most significant organizational events.

The Kapangan cooperative also emphasized the importance of keeping proper financial records.

Apart from making good business sense, good records keeping indicates openness and transparency that encourage the participation of the members. Shady transactions and lack of information, on the other hand, breed distrust and passiveness among the members.

The cases suggest that the two most

important attributes of management are that it is informed and disciplined. Management must be attuned to the latest in management trends, especially of cooperatives. And it must give great importance to the aspect of control, not only in the external sense, but the incremental inculcation and internalization of discipline among the members.

## Communication

The cases demonstrate that where information dissemination to members is adequate, their appreciation of the collective effort required to make the organization succeed in its objectives increases. Members are encouraged to contribute their individual share for the common good.

A case in point is Kapangan, where the members understood why, for instance, they each had to contribute 10 cans of gravel and sand towards the construction of their organization's office.

Other organizations have neglected communications between officers and members to the point where their relationship has deteriorated into a lender-borrower relationship, with no semblance of organization, much less of community. This is perhaps exemplified by the case of MATECCO, where members appear in the dark as to the financial status of their organization as well as the criteria for the giving out of loans.

The cases suggest that the two most important attributes of communication within the organization are that it is pervasive and interactive.

## Government

The people's organizations studied here have at least two views of the contribution of the government to their development.

One group lauds the positive effects of government support. The kind of government support that translates into the empowerment of the people could be many things. What immediately comes to mind is financial and technical assistance.



In the case of the Davao Free Farmers cooperative, the members feel that the government is responsive and that private citizens have been uninhibited in actively participating in the affairs of government. This is attribute to the fact that "the people's leaders are not in government." This is what political scientist call "external efficacy" -- the sense that citizens have influence on their government, because men in government listen.

Under the present government, there is the perceived positive shift in that attitude of line agencies and lending institutions with respect to non-governmental institutions. In the past, the Davao respondents said external assistance was wanting. Rural development projects of the governments were dismal failures, while private organizations implemented projects too small in scale to really have a significant impact on the community.

The other group laments the lack of such support, at present and in the past.

In Cabiao where Alay Tangkilik operates, the government sponsored the organization of "pre-cooperatives" called Samahang Nayon. While much enthusiasm, effort, and funds attended the organizational and mobilizational phase of the Samahang Nayons, only the intrinsically viable remain operational to date. Many withered away because their common funds invariably ended in the hands of the leaders of the organizations. Members who obtained loans failed to repay them, perhaps because of the false security engendered by the fiction of collective responsibility for the debt. *Government, therefore, may have set up the prospective members of cooperatives to be cynical of government-sponsored or initiated organizations as a result of experience with half-baked but massive government organizing efforts in the past.*

Before the founding of the Sta Catalina cooperative, the people of President Roxas received scarce support from the government. For various reasons, projects such as Masagana 99 and infrastructure projects were ineffective in uplifting the economic conditions of the people. The five

respondents in the study registered negative sentiments about the agrarian reform program of both the previous and present governments. As for the marketing assistance provided by the NFA, the respondents claim that the agency functioned better under the previous administration.

The assistance from government became more effective and focused when it was coursed through the cooperative. Loans from government agencies such as the Land Bank and assistance from the Regional Cooperatives Development Assistance Office of Region 12 combined with assistance from the church and other non-governmental organizations such as the Philippine Business for Social Progress has to create a significant impact on the whole community. *This suggests that the government assistance becomes more focused, targetted to real community needs, and better appreciated by the communities concerned when coursed through indigenous non-governmental or people's organizations.*

Nevertheless, the cooperative's relations with the local government has not been harmonious. The local military has suspected the cooperative of being communist-inspired. The parish has been accused by the military as pro-communist.

It also appears that the municipal governments perceives the cooperative as some sort of a rival. This is compounded by the fact that the cooperative no longer has to pay taxes in accordance with the new Cooperative Code which took effect on March 10 this year. Last year, the cooperative paid P80,000 in taxes to the municipal government. *This suggest that oftentimes, the national government and the local government operate with different agenda and lack coordination of their efforts. It may also suggest that local governments suffer in comparison to the dynamism and efficacy of people's organizations, and that structural reforms are needed to mobilized them as parallel vehicles for people empowerment.*

The Talongadian cooperative is particularly incensed at a government

agency. They need an irrigation pump the most, but have been unsuccessful in obtaining the necessary loan from the National Irrigation Administration. Yet, in its television advertisement of its accomplishments, the NIA showed the members of the Talongadian cooperative enjoying the fruits of their NIA supplied irrigation pump. *This may suggest that the national government agencies are often interested more in their record and image of accomplishment, rather than in really understanding and responding to the needs of people's organizations they purport to assist.*

The Malasiqui cooperative blames the government for its financial misfortunes. After the cooperative has deposited almost P50,000 in hard earn money in a bank, the Government ordered the bank closed. *This suggests that in applying government procedures and standards, government is often insensitive to far greater damage that results from its actions. The same government spends far more than P50,000 to organize and mobilize cooperatives elsewhere.*

The Kawasan cooperative demonstrates "classics" governments neglect: "Kahit gamay na suporta, walang ginhatag ang gobyerno (The government has not given even small assistance)," says the barangay chairman. "We were virtually forsaken by the government -- during the rehabilitation period after Typhoon Ruping, we had to turn to the German Agency for Technical Cooperation (GATC) for assistance," says the chairman of the cooperative's board of directors. These sentiments are on top of old feelings of mistrust, as a result of the ill-fated Biyayang Dagat program of the previous administration which enabled local elites to amass deep-sea fishing vessels while on the other hand the small fishers of Badian wound up with loans they could hardly amortize. Base on sentiments expressed in the study by leaders and members of the cooperative, they are not enthusiastic about assistance now being proffered by government agencies such as the Land Bank and the Department of Trade

and Industry. *This suggest that government assistance is most welcome where there is no alternative private sector-sourced assistance, or that government assistance be packaged with private sector assistance.* Government agencies must be conscious of the past experience of the people in the community with regard to government programs, and have an awareness of how the people currently feel about government. This should be a part of the basis of planning further government programs and assistance to the community.

The Magallanes PEC was organized in a place where the government has a reputation of being neglectful of its citizens. "Walang naitulong ang gobyerno sa amin noon (before 1987) claimed the leader of the cooperative. This sharply contrasts with the assistance that the church, personified by the parish priest, was able to extend to the members of the cooperatives during their time of direst need (discussed in the section on NGOs below). *This suggests that the national government is really in a disadvantage in responding quickly and adequately to the needs of local people, while the local governments do not seem to have the capacity to response at all. The operation of the Church as an indigenized institutions must be a model for improving the government's relationship with the people, and having some control and influence over the direction of the people's daily lives.*

The role of government appears most useful as a sustainer rather than an initiator of cooperatives. Only when strong cooperativist initiatives from elsewhere (e.g., the prospective members themselves or from some other institution such as the Church) lead to the formation of a cooperative should the government come in to provide extension work, financial assistance, etc. Apart from this, however, government assistance appears to be most useful where it is sufficiently massive, appropriate, coherent, goal-oriented, coordinated, and reliable.

The cases suggest that the two most important attributes of government are that it is capable of responding quickly and

adequately, and that it is consistent, across administrations, and across national to local government instrumentalities.

If the selected people's organizations in this study were representative of successful cooperatives and foundations nationwide, it would be tempting to say that the active initiation and support of the Church is a necessary condition to success, such as the role of the (Catholic) in Sta. Catalina, Davao Free Farmers, and Silago organizations.

The Alay Tangkilik foundation in Cabiao, Nueva Ecija, was initiated by the parish church, and to a large extent, is managed by it. In contrast to the other people's organizations studied here, Alay Tangkilik is a foundation controlled by the church in organizing and mobilizing the organization is perhaps the greatest. This is the only organization where the parish priest himself is management and leadership to the organization.

The Sta Catalina cooperative of President Roxas, North Cotabato, was initiated by the parish church itself. The roots of the cooperative date back to the late 1970s when the parish church launched an organizing program using the Basic Christian Community Organizing (BCCO) approach. A series of education fora were conducted in different barangays of President Roxas under the leadership of the parish priest, leading to the creation of 43 barangay-level chapels within and outside the municipality. Each chapel appointed a lay leader who represented the group in parish-wide consultations where problems and needs of the chapel members were discussed. Attempts to form a cooperative to answer the immediate economic problems of the members were taken in these early meetings.

In June 1983, a group of dedicated lay leaders of the parish and the parish priest met, conceptualized, and planned the community-type consumers cooperative which is now the Sta Catalina cooperative. The store was stationed within the parish church compound. The initial 47 members were farmers from the various barangay chapels of the parish. The cooperative

started with a capital of P17,000. The P7,000 was put up by the 47 members, while the parish provided the other P10,000 as a loan.

The Davao Free Farmers cooperative traces its beginnings to the Federation of Free Farmers (FFF) which was one of the major apostolates of the Jesuits in the Philippines. The FFF developed rapidly beginning in the Social Action Centers of various parishes nationwide. The Davao cooperative was the "economic arm" of the FFF, which focused on the legal settlement of agrarian disputes.

The Davao cooperative illustrates how effective the Church has been as a community organizer. This was the very idea of putting up a farmers' organization in Cabuyao, Laguna by Maryknoll priest in the early 1960s. Representatives from Davao were farmers who would later take the lead roles in organizing local FFF and DFFCI chapters.

The Church factor was significant in four -- the Magallanes PEC, Talongadin, Malinao, and Kawasan cases.

The Magallanes PEC presents the most eloquent illustration. The parish priest helped the residents of Magallanes through the difficult three years (1985-1988) when the two lumber companies both shut down their operations. He provided five forms of assistance: the rice sold at subsidized prices, extended subsidized medical assistance, extended interest-free tuition loans, launched a hog-dispersal program, and started a poultry project to help finance the other assistance projects, apart from creating additional employment in the community.

While such heroism tends to put the government in a bad light, the Magallanes PEC case nevertheless demonstrates that despite the odds, government could redeem itself with an adequate assistance program, as the DTI-TST-SELA appears to have been in this case.

The Kawasan cooperative's organization was preceded by the so-called Kawasan Labor Cooperative organized by Fr. Francisco Silva, the General Manager of the Cebu Electric Cooperative. While not a real cooperative, ("it was simply a labor cooperative where members were very

cooperative to one another") the KLC gave the future Kawasan nature park cooperative members a crash course in savings generation through payroll deduction.

The only organizations without a pronounced Church involvement were six -- MaTeCCo, Kapangan, Aritao, Laguna West, Mabuhay-PEC, and SamVal.

It seems that the Church provides the element of trust that serves as the catalyst in the organization of a cooperative among poor but unrelated individuals. The reputation of the clergy as men of God attains special significance when taken in conjunction with the mistrust and cynicism the people have developed as a result of earlier cooperatives-organizing activities under the Marcos administration.

It is precisely among the cooperatives without any significant church involvement that there are questions of conflict of interest arising among the members and leaders of the organization, notably MaTeCCo, Laguna West, Mabuhay PEC, and Kawasan.

Because there is no evident conflict of interest, church-supported people's organizations have more transparent financial operations, and more participative modes of decision-making.

Non-governmental organizations play a significant role in the organization and support of people's organizations. Among the 14 cases studied here, non-governmental organizations have been indispensable to the organization of the Kapangan, Kawasan, and SamVal cooperatives, and significant in the organization of the Kapangan, Aritao, Alay Tangkilik, SamVal, Kawasan, Silago, Davao Free Farmers, and Sta. Catalina.

Among these non-governmental organizations were agencies of foreign governments (German and British). They included secondary cooperatives and federations of people's organizations. Among them were universities in the area.

A case in point is the Central Philippines University (CPU) which must be indirectly credited for the Talongadian cooperative.

As far as the Kawasan cooperative is concerned, the presence of the University of San Carlos Area Research and Training

Center (USCARTC) was conducive to its organization. The Center staff helped organize the cooperative, and undertook the feasibility study that confirmed for the Germans that their idea of organization to make the area hospitable to the mini-hydroelectric plant would work.

The cases suggest that the two most important attributes of non-government organizations are that they are *sincere and advocate*.

## Technology

Production technology increases people empowerment in that it increases their income, and enhances their self-confidence as a result of the knowledge and skills gained, as well as sense of increased control over the natural environment.

The Case of Kapanga has already been mentioned. Farm technology has invariably enabled the member-farmers of the people's organizations to increase their productivity. It has also allowed them additional sources of income, such as handicraft.

The cases suggest that the two most important attributes of technology are that it is *appropriate and assimilable*.

## Models

The cases suggest that the two most important attributes of working models are that they are *comprehensible and attainable*. People's organizations develop faster when they are guided by some implicit or explicit models. The success of the Church in organizing people's organizations that have high growth may be attributable to the organizing skills of the clergy, a capability that is almost intrinsic to the Church as an institution. The organizing principles that work for spiritual development apparently work for socio-economic development as well.

Among the people's organizations which exist at different levels of development, the younger, smaller ones could adopt more advanced organizations as their models, and if such could be arranged, their "learning

laboratory."

## Learning

This factor calls attention to the fact that successful people's organizations do not occur by chance -- they learn to be successful. Learning is partly internally driven, based on the experiences of the members and learners, but they are also partly externally driven, based on similar and relevant experiences of other organizations. Where there is a need to organize and mobilize in a purposive, quick manner, all the more learning from the experiences of others is imperative.

David Korten has suggested that the three stages of learning to develop are three -- *learning to be effective, learning to be efficient, and learning to expand*. These stages can be applied to people's organizations learning to be successful. Learning to be effective basically refers to the organization accomplishing its objectives -- regardless of the cost in effort, time, and resources. Learning to be efficient is the next stage, where there is an effort to continue accomplishing the objectives of the organization, but this time with greater efficiency (i.e., the use of less resources). Learning to expand refers to the expansion of the organization in terms of geographic scope or functional range.

In any of these stages of learning, an organization would do well to seek conscious models, of people's organizations that are more effective, more efficient, and bigger. With a paragon, an emerging people's organization would be more sure-footed and confident in overcoming problems with proven solutions.

Among the 14 organizations studied here, the Alay-Tangkilik appears to be the only consciously modeled after another cooperative -- the Tarlac Integrated Livelihood Cooperative.<sup>8</sup> Nevertheless, the others may have been organized with basic organizational strategy or structure in mind, especially those that emerged from church

initiatives, as well as those that depend on organizational traces of the previous regime.

In turn, the more successful of the 14 people's organizations studied here (and the rest of the 186 to be further studied), could be put up explicitly as *working people empowerment models*. Which model could be a model for which emerging people's organizations is suggested by the empowerment strategies discussed below.

In addition, the 14 cases studied suggest common features and factors that are associated with successful people empowerment. These features and factors could be abstracted into an amalgamated or composite model to help further organizational and mobilizational efforts. These working and composite models should be documented, analyzed, propagated, and advocated as part of the larger effort to promote people's organizations as instruments of people empowerment.

It is in this light that the statement proposed study of an additional 186 other people's organizations assumes relevance -- it will uncover and document potentially working models of people empowerment, based on the theoretical insights and models generated in this pilot study.

## Time and Timing

In this study, we sought to study only people's organizations that were formed since the People Power Revolt 1986. It is interesting to note that in actuality, most of the organizations, including the more successful one -- Sta. Catalina, Alay Tangkilik, and Davao Free Farmers were all organized much prior to 1986. This indicates that much like other organizations, cooperatives need time to mature and demonstrate effectiveness and sustainability.

On the basis of these cases, it now appears that it is not possible to create and mobilize organizations from the ground up, and expect that they would be successful people's organizations in the economic,

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<sup>8</sup>This cooperative was not studied because it is already a "heralded" cooperative, with much media exposure.

social, and political sense, all within the term of one administration. It seems more likely that organizations that were organized and mobilized in one administration, will demonstrate success only in the succeeding administration. The organization and mobilization of people's organizations, therefore, is a cross-administration effort.

From this perspective, it seems important that people's organizations be insulated from politics, i.e., that they not be recruited as active political supporters of one or another political party or movement. The only politics that people's organizations should be involved in is for them to increasingly participate in the decision-making processes at the local government and cooperative or foundation levels, in order that they attain greater control over their lives.

*Politics will impair the ability of people's organizations to survive beyond the administration that nurtured them. Politics-driven cooperatives development programs should therefore be, ipso-facto, suspect.*

It is important to note that save in some cases, the present administration has supported cooperatives without regard for their political leanings. This much is manifested by the political orientations of the respondents in the survey where the respondents are not beholden to the current leadership, despite the assistance that the government has given their organizations.

Timing refers to the joint presence of key or important factors conducive to the successful creation and mobilization of a people's organization. The government and non-governmental organizations must make an effort to coordinate their assistance for synergy. If assistance does not come into play "just in time" to take advantage of the presence of other factors, the potential people's organization may not come into play.

Particularly, the cases demonstrate that people are particularly ready for cooperative endeavors in the wake of a major natural calamities that significantly restructure their fortunes. The church has demonstrated ability to respond to this need, but the government and other non-governmental organizations need to develop their response capacities. *One would think that in the face of massive natural calamities such as the July 1990 earthquake, typhoon Ruping, and now the Pinatubo eruption, that people are ready and willing to form such cooperatives and foundations. Is the government and non-governmental organization response primarily relief and rehabilitation, or does it consider the situation as ripe for a more creative, longer-lasting, livelihood and cooperation based framework of assistance?*

## Framework of Analysis

From this identification of the key factors that may have contributed to the relative success of people's organizations as instruments of people empowerment, we have developed the following descriptive typology of these people's organizations.

The typology looks into two variables -- the extent to which the organization's decision-making is controlled by the members and or the leaders (internal control), and the extent to which the organization is impelled by internal and/or external factors (external control).

### Internal Control

The locus of "internal control" is the real decision-maker(s) in the organization, indicated by such variable such as the frequency and manner in which the general membership are informed, are consulted, and participate in decision-making.

Diagram 3 illustrates the internal control continuum in an organization.

Diagram 3

**INTERNAL CONTROL IN AN ORGANIZATION**  
**As Developed for and Applied to**  
**Selected People's Livelihood Organizations**  
**All Regions, April-May 1991**

CONTROL BY THE LEADER		BALANCED CONTROL			CONTROL BY THE MEMBERS
Norm	1 Norm	2 Norm	3 Norm	4 Norm 5	
<b><i>Dictatorial:</i></b>	<b><i>Authoritarian:</i></b>	<b><i>Open:</i></b>	<b><i>Participatory:</i></b>	<b><i>Populist:</i></b>	
Leader (Pres/Chmn) makes decision and announces to the BOD and membership GA	Leader and BoD make decision and announce to the membership	Leader and BoD present tentative strategic plan/ decision subject to change/ validation by GA; exercise administrative discretion.	Leader and BoD present problem/s issues, get suggestions from membership regularly, and do Norm 3.	Leader and officers facilitate general assembly, report on org. status; membership defines, discusses problem/ issue and makes decision.	



The source of organization energy is indicated by the independence or dependence of the organization on external assistance. Diagram 4 illustrates the external control continuum for an organization.

Diagram 4

**EXTERNAL CONTROL OF AN ORGANIZATION**  
**As Development for and Applied to**  
**Based on Selected People's Livelihood Organizations**  
**All Regions, April-May 1991**

CONTROL BY EXTERNAL ACTORS				
BALANCED CONTROL				
CONTROL BY LEADERS/MEMBERS				
Norm A				
Controlled	Dependent	Influenced	Independent	Autarkic
External actors initiated the organization, continue to determine its goals and strategies, and provide the resources that keep it alive.	Without the external assistance it has habitually received, the organization will not be sustainable. Goals and strategies are heavily influenced by external actors.	External actors and resources interact or coordinate with internal actors and resources to determine goals and strategies.	External actors and resources influence policies, but do not determine organizational survival, goals, and strategies.	External actors and resources virtually have no influence on the organization's policies, goals, and strategies.
Norm B	Norm C	Norm D	Norm E	

A cross-classsification of these norms give us a 5 by 5 matrix, as follows.

Table 4

**MODELS OF PEOPLE'S ORGANIZATIONS  
AS INSTRUMENTS OF PEOPLE EMPOWERMENT**  
As Development Based on  
Selected People's Livelihood Organizations  
All Regions, April-May 1991

	1 <i>Dicta- torial</i>	2 <i>Authori- tarian</i>	3 <i>Open</i>	4 <i>Partici- patory</i>	5 <i>Popu- list</i>
A Autarkic	A <sup>1</sup>	A2	A3	A4	A5
B Independent	B1	B2	B3	B4	B5
C Influence	C1	C2	C3	C4	C5
D Dependent	D1	D2	D3	D4	D5
E Controlled	E1	E2	E3	E4	E5

**Application and Findings**

Based on these criteria, there are twenty-five possible models. For the purpose of describing people's organizations as instruments of people empowerment, we extract a selected set of nine types by discarding the extremes. The 14 cases are (tentatively) classified accordingly for illustration purposes:

Table 5

**MODELS OF PEOPLE'S ORGANIZATIONS  
AS INSTRUMENTS OF PEOPLE EMPOWERMENT**  
As Developed Based on  
Selected People's Livelihood Organizations  
All Regions, April-May 1991

Independent <B>	ALAY TANGKILIK LAGUNA WEST	STA CATALINA DAVAO FREE	
Influenced <C>	SILAGO MALINAO	TALONGADIAN ARITAO KAPANGAN SAMBAYANIHAN	
Dependent <D>	MATECCO MABUHAY PEC	MAGALLANES PEC KAWASAN	

#### **Model B4: Independent-Participatory**

This type of organization is internally driven and member controlled. None of the organizations studied in the pilot study squarely falls within his category (although the Davao Free Farmers cooperative appears to have begun to enter this category).

This is the ideal type of people's organizations as instruments of empowerment. The organization is not dependent on external assistance or impetus, and it is not dependent on any leader or particular set of leaders. This does not mean that the organization may not obtain external assistance -- only that such assistance supplement supplements its internal resources.

The main test of whether an organization is externally driven or internally driven is that withdrawal of external resources will not endanger the survival and normal functioning of the organization.

On the other hand, the main test of whether an organization is member-controlled or leader controlled is that the leader or present set of leaders are not indispensable to the survival and normal functioning of the organization. The members can produce a new set of leaders from their ranks (or hire a professional manager who is responsible to the general membership through the board of directors that is representative of that membership).

Operationally, a leader or a set of leaders who has served for more than six years, or the equivalent of 3 to 6 terms as president or board of directors, respectively, of the organization, is suspect of having undue control over that organization. In these cases, it is necessary to look into other indicators of the locus of control, i.e., the dynamics of the relationship between the general assembly and the board of directors, and the board of directors and the president/chairman. A good indicator would also be the actual distribution of benefits from the operation of the organization -- the rate improvement in the well-being of the leader/leaders vis-a-vis the rate of improvement in

the well-being of the ordinary members.

#### **Model B3: Independence-Open**

It is the type that is internally driven and equily controlled by members and leaders.

The Davao Free Farmers belongs to this category. While the cooperative depends on externally provided loans, it has shown that it has the ability to survive the effects of natural calamities on its members and organization without external assistance for this purpose. The Davao cooperative appears to be more participatory than the rest of the cooperative studied here.

The Sta Catalina is similarly able to survive on its own resources. Nevertheless, it still obtains huge loans from the government. The members of the organization participate in decision-making through the general assembly, but the board which the assembly elects really make the policies and control the organization.

#### **Model B2: Independent-Authoritarian**

The organization of this type is internally driven and leader controlled. It is exemplified by the Alay Tangkilik foundation and the Laguna West cooperative.

Alay-Tangkilik remains primarily leader-directed, partly perhaps as a function of the exalted role of the leader as the parish-priest of the municipality. The organization's offices adjoin the church. The organization itself is still a foundation, and not a cooperative. The organization is classified as independent because of its considerable internal resource, despite its exposure to loans coming from external sources.

Similarly, Laguna West is not dependent on external loans. The organization, however, is till largely controlled by the leader. The Board of Directors and the general membership do not appear to have any real participation in decision-making.

#### **Model C3: Influenced-Open**

Organizations belonging to this category are equily member- and leader-controlled

and externally and internally driven. This model is exemplified by the biggest set of organizations among the 14 studied. These are Talongadian, Aritao, Kapangan, and Sambayanihan. These organizations follow the usual model where the Board of Directors sets the policy for the organization. A general assembly elects the members of the board, but otherwise, participation of the members in decision-making does not warrant description as "participatory." The classification of "influenced" is in recognition of the extensive external assistance that these organizations receive, or expect, to be able to attain their objectives.

### **Model C2: Influenced-Authoritarian**

Organizations belonging to this category are leader controlled and equally internally and externally driven. Silago and Malinao appear to belong to this category.

In Silago, the nine-man Board of Directors acts as the policy-making body. There is not much participation from the members, except the pre-membership seminar, and the annual general assembly. The board members serve two year terms.

In Malinao, the leader is influential in the municipality. He himself is a businessman who operates a ricemill in the municipality and is president of the Albay Rice and Corn Millers Association, Inc. The Board of Directors is the policy-making body. It is composed of five members who serve as its officers, the top three of whom serve two-year terms, the other two serve one-year terms, with possibility of re-election.

### **Model D3: Dependent-Open**

This type of organization is externally driven and equally member- and leader-controlled.

The Magallanes PEC (Sta Ines cooperative) exemplifies this type because it is dependent on external assistance at this point, while its organizational trace and present organization give the members approximately equal participation and control over the organization as its formal

leadership.

The Kawasan cooperative also belong to this category, although it has been difficult to classify, because it has been in existence for just over a year and a half, and not enough information could be obtained about its decision-making process. The case study reports that "Programs and policies are primarily drawn up by the seven-man Board of Directors. These, however, are inutile without the approval of the General Assembly." Nevertheless, "Managerial powers belong to the Board of Directors" and that general supervision and control of the affairs of the cooperatives is exercised by the Board as a body and not by any of the directors is acting in their individual capacity." On the basis of this information, the Kawasan cooperative is classified as "dependent-open."

The Kawasan cooperative is a model of contrasts -- it is unabashedly dependent on its German benefactors (the German Agency for Technical Cooperation), while on the other hand it has the rare distinction of having been organized and sustained without any governmental assistance. The Board of Directors is deemed unrepresentative of the three barangays from which the members come from, because the BOD members all come from one, albeit the biggest, barangay.

One reason why this classification (dependent-open) may be plausible is that there is no strong leadership personality in Kawasan as in the case of Laguna West, Matecco, and Alay Tangkilik because this cooperative was instigated by an external agent. The initial openness of the cooperative to membership participation in decision-making, however, is less institutionalized (and stable) than that demonstrated by the Sta Catalina and Davao Cooperatives, considering that these have existed longer and their openness is a result of the experiential and historical processes in these organizations.

### **Model D2: Dependent-Authoritarian**

This type is leader controlled and externally driven. The two organizations that

belong to this category are MateCCo and Mabuhay.

MaTeCCo is leader controlled, as indicated by the fact that the present leader founded the organization in 1956 and has been its president since. It is dependent because without DTI-TST-SELA funds, the organization's survival beyond formal existence would be threatened.

Mabuhay PEC (Yuta Uli sa Tawo Project) is classified as authoritarian because of the predominant influence and control of the leader on the organization. It is dependent because it does not have

resources of its own -- it has yet to attain a legal personality.

The preceeding section presents and describes a typology of working models of people's organizations as instrument of people empowerment. In this section, an attempt is made to indicate how people empowerment may be pursued through conscious, model-driven strategies. Given that the "Independent-participatory" model is considered the ideal, the alternative strategies of the various working models who have not reached that ideal are indicated by the arrows:

Table 6

**ALTERNATIVE STRATEGIES FOR PEOPLE EMPOWERMENT**  
**Based on Selected People's Livelihood Organizations**  
**All Regions, April-May 1991**

	<i>Authori- tarian</i>	<i>Open</i>	<i>Partici- patory</i>
Independent	ALAY TANGKILIK LAGUNA WEST  ====>	STA CATALINA DAVAO  ====>	FREE IDEAL
Infulenced	SILAGO MALINAO  ====>	TALONGADIAN ARITAO KAPANGAN SAMBAYANIHAN  ====>	
Dependent	MATECCO MABUHAY  ====>	MAGALLANES KAWASAN  ====>	

The digram suggest that there are three basic empowerment strategies that a people's organization could pursue:

- (1) increase its independence of external actors ("I" Strategy),
- (2) increase member participativeness ("P" Strategy),

- (3) increase both independence and participativeness ("IP" Strategy).

(It should be noted that an "IP" strategy could actually by a "PI" strategy, in the sense that emphasis is given to participativeness more than independence.)

## **SUMMARY, CONCLUSIONS, RECOMMENDATIONS**

### **Extent and Manner of People Empowerment**

This study evaluated an initial selection of 14 "successful" people's organizations as instruments of people empowerment. It seems clear from the study that people empowerment have in fact occurred over the past five years of the Aquino administration, as represented by the experience and accomplishments of people's organizations such as Davao Free Farmers, Sta Catalina, and Alay Tangkilik.

It also seems clear that some other people's organizations, largely considered novel if not successful, have not been as instrumental in empowering their members or the community at large. The MaTeCCo and the Mabuhay PEC, specifically, cannot be put up as models of people empowerment.

The first objective of this pilot study was to explore the extent and manner in which people empowerment, as manifested people's organizations, may have begun or developed in urban and rural communities nationwide since the People Power Revolt in February 1986.

Based on the analysis of the socio-demographic profile of the selected respondents, several hypotheses have been identified for more systematic testing in a subsequent, larger study. The specific hypotheses are presented in Part Three, Section A above. In summary form, they suggest the following:

#### ***"Poor" vi-a-vis the "Poorest of the Poor"***

Successful people's organizations cater to the poor, but not to the poorest of the poor.

#### ***Leaders vis-a-vis followers***

- (1) Leaders are more knowledgeable and politically active than members and dependents of people's

organizations.

- (2) Leaders are more economically and educationally better off than members and dependents.
- (3) Women and youth have minimal leadership and membership roles in people's organizations.

Based on the analysis of the political orientation of the selected respondents, several hypotheses have been identified for more systematic testing in a subsequent, larger study. The specific hypotheses are presented in Part Three, Section B above. In summary form, they suggest the following:

#### ***People's Organizations vis-a-vis Politics***

Support for or positive orientations towards government does not correlate with government support for people's organizations.

#### ***People's Organizations vis-a-vis Empowerment Potential***

- (1) There is evidence of a genuine sense of community and personal empowerment (efficacy).
- (2) Community level participation by the respondents is low.

#### ***People's Organizations vis-a-vis Change***

Leaders and members of people's organizations are generally reform-minded, but a significant portion believe radical solutions are called for by the nation's problems:

Based on the analysis of the accomplishments, techniques, structures, processes, and other attributes of the people's organizations studied, the following analytical tools were developed:

- (1) A model of organizational level empowerment, consisting of the

dimensions local resource management (LRM), organizational growth and stability (OGS), networking and alliance-building (NAB), and organizational prestige and image (OPI). Five indicators were identified for each dimension, based on the case studies written.

- (2) Corollary to (1), a model of individual level empowerment, a consisting of the dimensions income and well-being (IWB), participation in decision-making (PDM), and self-confidence and efficacy (SCE). Five indicators were identified for each dimension, based on the case studies written.
- (3) An analytical continuum for internal control, consisting of five norms: dictatorial, authoritarian, open, participatory, and populist.
- (4) An analytical continuum for external control, consisting of five norms: controlled, dependent, influenced, independent, and autarkic.
- (5) A theoretical model of people empowerment types, consisting of twenty-five categories.
- (6) An application model of people empowerment types, consisting of nine categories, into which the 14 cases have been classified.
- (7) An application model of empowerment strategies, based on the application model of people empowerment types.

## **B. Factors for People Empowerment**

### **Factors for Empowerment**

A second objective of the study was to explore the factors that may have encouraged or discouraged the people's

organization-based empowerment process. The comparative analysis of the cases suggest that there are the following key internal factors were identified, illustrated using relevant case studies, and evaluated.

- (1) Leadership
- (2) Membership
- (3) Purpose
- (4) Management
- (5) Communication

The following external factors were identified, defined, illustrated using relevant case studies, and evaluated:

- (1) Government
- (2) Non-Government
- (3) Technology
- (4) Models

### **Government Role**

A third objective of the study was to recommend ways by which government could help hasten and strengthen the empowerment process through government policies, programs, and projects. The pilot study suggests that

- (1) There is a need to sharpen the empowerment focus of government strategy vis-a-vis people's organizations. The livelihood generation agenda of government agencies is sufficiently clear. However, the empowerment agenda (increasing participation in decision-making) needs to be conceptualized and worked on. An explicit policy or approach should be adopted on this, rather than left to the preferences of the leaders of organizations, and the government representatives they deal with.

Another aspect that government must look into is to determine whether in fact its assistance programs addressed to the poorest

of the poor, and not only to the poor as an entire class. Only then can the government find out whether it is indeed reaching the bottom 30 percent of the population in dire need of assistance, as it seems to assume it does.

- (2) Considering the complexity of the process of organizing, mobilizing, and nurturing people's organizations, there is a need for a comprehensive evaluation and monitoring system to oversee the total process, as well as the progress of each emergent organization. While more non-governmental organizations are being involved in the process, the responsibility of government for being on top of the situations through accurate and comprehensive information on the process becomes crucial for the guidance of all concerned.
- (3) Considering the number of government agencies and instrumentalities at the national and local levels, it is also necessary for government to organize more inter-Agency fora to foster coordination and cooperation. The case studies demonstrate that there is a lot of negative sentiment about the government, at whatever level. This attitudinal orientation gets in the way of more effective assistance by government, and can be addressed only by increasing consistency in government action.

### **Agenda for Further Research**

As has been mentioned, this study is exploratory, and was intended to generate hypotheses and insights and to test the feasibility of methods and procedures for a larger, more definitive study. The following insights have been gathered on what ought

to be done in the larger study, perhaps applicable to similar studies on the conduct of People's Organization-focused Empowerment Studies:

The larger study should be more definitive about the extent and manner in which people empowerment, as manifested in people's organizations as well as among individuals, may have begun or developed in urban and rural communities nationwide since the People Power Revolt in February 1986. This could be done using the analytical models that have been developed in the pilot study.

The examination of the political orientations of the officers and members should be done more systematically by taking random sample on which generalizations can be made. The theoretical linkage between these individual-level variables and the empowerment at the organizational level should be worked out.

The models should perhaps be subjected to validation and perhaps elaboration in a workshop by a practitioners in community organizing and representatives of government agencies assisting people's organizations.

The exploration of the factors that encourage or discourage the empowerment process should be undertaken in the larger study. The factors should be better conceptualized to distinguish, for instance, between various governmental factors, rather than lumping government into just one factor. The larger study should be set up in such a way that the effects of various factors could be systematically be measured.

The larger study should recommend ways by which government could help hasten and strengthen the empowerment processes through government policies, programs, and projects. To be able to do this, the larger study must be designed with the assistance of representatives of government agencies which assists people's organizations, in order that their experiences and insights could be more directly tested and incorporated in the results of the study. The study should also be open to more direct and operational questions and concerns that these agencies



might want to include.

As has been mentioned, the larger study should be based on a stratified random sample of organizations, and the membership of organizations belonging to the sample. Purposive interviewing will be done to obtain basic data about the organizations. Random surveys will obtain individual level empowerment data of the members.

The pilot study was interview and documentation intensive. The interview guide was open-ended. Guided by the frameworks of analysis that have been developed, a structure and precise questionnaire can be prepared, and comparative and quantitative information generated on the people's organizations and their members. The length of time required for data gathering on each organization will be reduced.

The deployment of the field survey team will also be modified. In addition to the Luzon Team, a Visayas and Mindanao Teams will be organized to recruit, train, and deploy interviewers in their respective areas of operation. This is a more decentralized deployment scheme, compared to the pilot study's scheme where all interviewers/casewriters came from Metro Manila.

### **Case Histories of People's Organizations**

- A. Davao Free Farmers MultiPurpose Cooperative
- B. Sta Catalina Multipurpose Cooperative
- C. Alay Tangkilik Foundation
- D. Kapangan Sericulture Farmers MP Cooperative
- E. Aritao Fruits & Veg Farmers' MP Cooperative
- F. Talongadian MultiPurpose Cooperative
- G. Magallanes PEC (Sta Inez Credit Cooperative)
- H. Malinao Socio-Economic Devt' Cooperative
- I. Silago Credit Cooperative
- J. Sambayanihan (Valenzuelo) Urban Poor Livelihood Credit Cooperative
- K. Kawasan Nature Park MultiPurpose Cooperative
- L. Malasigui Teacher's Credit Cooperative
- M. Mabuhay PEC (Yuta Uli sa Tawo Project)

**PEOPLE EMPOWERMENT THROUGH PEOPLE'S LIVELIHOOD ORGANIZATIONS**

## Appendices

### A. Empowerment Scores

[illegible]

**PEOPLE EMPOWERMENT THROUGH PEOPLE'S LIVELIHOOD ORGANIZATIONS**

[illegible]

## **TIPS: A COMPUTERIZED GLOBAL INFORMATION SERVICE NETWORK\***

*Dr. Ricardo T. Gloria*

*Acting Secretary*

*Department of Science and Technology*

I am greatly honored to speak before you on this most eventful day. For today marks the first time that the annual meeting of National Bureau Directors of the Technology Information Pilot Services is being held outside of Rome. Allow me to extend my sincerest gratitude to the Officers of your organization for this invitation.

Ten years ago, a gem of an idea came about with the aim of linking North with South and expanding their technology and trade transactions. The main vehicle of the project is an information service on technology and trade. The project started out with a trust fund of 6M USD from the government of Italy with the United Nations Fund for Science and Technology for Development. It started disseminating 8,000 words of technological and trade information per day in sectoral daily bulletins. A year after its pilot operation, it has resulted in the establishment of first ever contacts between more than 3,000 buyers and suppliers of technology, products, services in participating countries.

Now after five years in operation, the Technology Information Pilot Service has proven to be an invaluable information service among developing countries. TIPS has become a bridge between and among Third World Countries. It has developed a unique system of gathering, processing and distribution of straight from the source, up-

to-date information in new products and technologies, new equipment, requests and offers, joint ventures and consultancy services.

First launched as pilot project involving 2,000 users, TIPS commercialized its operation in late 1988 and has to date some 6,000 subscribers worldwide, approximately 300 of them from the Philippines. At present it has 50,000 technology and trade information entries. Its database expands at the rate of 1,000 a month. TIPS covers ten (10) broad industrial and technical fields, namely Agro-Industries, Business Opportunities, Biotechnology, Electronics, Energy, Fisheries, Food Processing, Machinery, Pharmaceuticals and Textiles. In the near future, I gathered that it shall include other fields as well.

Through TIPS, the Philippines has realized some significant commercial transactions.

A couple of years ago, Mr. George Chan-Dy, a Filipino technology developer signed a 1 M USD contract with a Thai company for the mass production of his multi-fiber extracting machine. Mr. Dy's contract covers transfer of technology, technical assistance and consultancy services for setting up a plant for the mass production of his machine at 100 units per month. Other countries which have expressed interest in the technology are

*\*Speech delivered at the Annual Meeting of National Bureau Directors, Technology Information Pilot System, Department of Foreign Affairs Auditorium, Pasay City, 28 September 1992.*

Ghana, Tanzania, Uganda, Belgium, France, India, Nepal, Peru, Bangladesh and Sri Lanka.

Last year, Mr. Benito Maray, former manager of a local company which exports organic fertilizer called guano left for Zimbabwe. He left to undertake a 12-month consultancy work worth 120,000 USD. Zimbabwe is known to have vast untapped guano deposit. A private firm took the initiative to hire Mr. Maray to develop the country's guano resources for export.

Another Philippine company dealing with the manufacturer of the veterinary products entered the export market for the first time. The firm closed deals with India and Singapore with orders for its vaccine amounting to 250,000 USD. Produced by Riverdale Laboratories Inc., Hemo Bac is used to immunize livestock, particularly cattle and water buffalo against shipping fever.

We in the science community highly appreciate what TIPS has been doing especially for our small and medium-sized enterprises, R & D institutes, and other associations. We cannot over-emphasize the importance of information packaging and marketing in relation to breakthroughs and inventions. Promoting and marketing our R & D results are some of the primary concerns of the DOST. Our continuous efforts to locally promote and market our products however are met with a large amount of reservations in the light of our present economic problems. The business community, understandably is adapting a wait and see attitude towards investing in new technologies and ventures. Government funds on the other hand are all tied up with recovery projects brought about by national calamities notably the Pinatubo eruption.

I, personally, am very enthusiastic about this meeting's theme: Marketing Directions in the '90s. TIPS began its commercial operations in 1988 and I believe it has laid down its foundations to become a self-funding organization in the future and thus it's time to think of new marketing directions. Marketing according to the book is a planned approach to identifying and gaining the support of users and developing appropriate

services like TIPS. It converts consumer power into effective demand by satisfying consumer needs while making profit in the process.

Applied to your organization, marketing also serves as a springboard to gaining new users, serving better existing users, developing new sources and initiating as well as sustaining a meaningful dialogue between your information service and your users. A successful marketing strategy requires an awareness of the characteristics, need and preferences of potential clients. Without these information, it is difficult to undertake promotional efforts and formulate pricing structure that will facilitate maximum exchange. An organization like yours which is built around the consumers adopts a consumer-oriented marketing. Because of the consumers' social, cultural and geographical differences, products and services must be responsive to their peculiarities.

Moreover, marketing tangible and intangible products follow similar underlying marketing principles but in practice, they are quite different because of their inherent differences. Tangible products can normally be felt, seen or tested while intangible products are often promoted based on a promise of satisfaction. Marketing of intangible products like information services requires more effective promotional approaches.

Information services are often under-utilized because potential users are not aware of such services and the benefits to be gained from their use. With this gathering, TIPS hopes to avoid this handicap. For one, hosting this annual event here in Manila should publicize more widely at a national level the potential benefits of TIPS.

I am also happy to note that the Philippines is host to the 1st regional center of TIPS. The second regional center, I've been informed will be inaugurated in Caracas, Venezuela later this year. From its original 10 member countries, TIPS is expanding to a 30-country network and thus extending its work and widening its coverage globally. TIPS is obviously going in the right

direction, towards creating a computerized global information service network.

My congratulations to this laudable

organization for making our world a better place to live in through Science and Technology.



**The science community gives Pres. Fidel V. Ramos a rousing welcome as he is ushered into the DOST by Science Secretary Ricardo T. Gloria. A first in the history of Presidential visits in the country was Pres. Fidel V. Ramos' initiative to dialogue with the employees of the science community.**



**Science Secretary Ricardo T. Gloria with Pres. Asst. for Mindanao Paul Dominguez during the opening of Science Centrum.**

## MATCHING SCIENCE AND TECHNOLOGY WITH INDUSTRY FOR PHILIPPINE DEVELOPMENT\*

*Secretary Rizalino S. Navarro  
Department of Trade and Industry*

Secretary Ric Gloria, Distinguished Guests and Friends of the Science and Technology (S&T) Community, Officials and Staff of the DOST Family, Ladies and Gentlemen.

Allow me first of all, to thank the DOST particularly Secretary Ric Gloria and the people behind this occasion for the opportunity to address you today.

The formation of the new Cabinet Family to the culmination day of this National Science and Technology Month Celebration apparently missed the availability of either President Ramos and Executive Secretary Garrucho to grace this occasion. As you all know, tedious tasks and challenges welcomed the new government and for about 17 days now, we are all trying to mightily cope up with.

I can not say no to Secretary Gloria to be here today inspite of conflicting schedule on my part, for he has been a long-time ally, both of us having worked together in the past at BOI. Now that our paths have crossed again in the Government's newly-formed Cabinet, and with DTI and DOST already having established closer ties specially during the Follusco Administration, I see that the friendship shared by Dr. Gloria and myself will "blossom" from personal to institutional relationship.

Now, allow me to go on to the tasks at hand.

This occasion provides the right venue to present the complementation and synergy of science, technology and industry; in relation to our national quest for agro-industrialization. How does one visualize industry to flourish without the support of science and technology? On the other hand, how does, one gauge the significance of research results and developed technologies if all of these will not be utilized by the Philippine industries?

Suffice it to say that science, technology and industry are the triumvirate factors which have a stranglehold on development. We, therefore, can not imagine these three to be divorced from each other if our common pursuit is that of agro-industrialization.

I am not pointing out a justification for the merger of DTI and DOST. That is only plain rumor as of press time. All I wish to present is how the outputs of DTI and DOST are intertwined with the growth, productivity and competitiveness of industry. There is this repetitive policy desiderata that technology development is the key to a wealthy industry, that the productive assets of the industry can be achieved only through efficient technologies.

So, how do we relentlessly strive for

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\*Speech delivered during the Closing Ceremonies of the National Science and Technology Month (NSTM) Celebration held on 17 July 1992 at DOST Executive Lounge, Bicutan, Taguig, Metro Manila

technology development? Most of the observers may turn their heads to the S&T Community.

With the formulation of the Science and Technology Master Plan which the DOST collaborated with the best brains from the government industry and academe sectors, a pragmatic orientation was done to identify the specific technology needs of the industry.

The Master Plan's strategy on the modernization of the production sector through technology transfer and commercialization will be effective basis for a mutual thrust and coordination of DTI and DOST to touch base with the countryside industrialization efforts. The strategy of technology development should try to balance the concern of technologies for modernization and technologies originated by the S&T Community. Both need to be commercialized to propagate the economic sector.

As the Philippines tries harder to catch up with the industrialization race with its neighboring countries, there is program under the Master Plan which, I believe, hits the right target for technology modernization -- the Global Technology Search. There is nothing wrong, and definitely nothing unnationalistic to patronize imported technologies. The first step, in innovation is "to copy" so that new designs and adaptations may evolve. The industries need the technology development support from the research phase through piloting, then project syndication and development and finally, implementation.

There is a need to focus on the productivity constraints of industry, the other side of which invariably involves technology upgrading. This need is being resolved by the Master Plan's strategy on research and development (R&D) upgrading.

The industry sector also realizes the very low R&D efforts in the country. With 85% of R&D being done by government and only 15% shouldered by the private sector, based on the Master Plan report, technology advancement has to be given the right impetus and support.

I, therefore, favorably support the DOST's programs of upgrading R&D capabilities through activities such as the promotion and encouragement of R&D incentives within the framework of 15 leading edges and other priority areas through attractive incentive packages for improved R&D activities.

The paramount importance of R&D upgrading will redound to technology development, thus, bring our industries to the level such that it can compete in the international market, and possibly make our domestic productivity at par with world-class standards. Technology has shrunk the world so much so that industries, no matter where, need to realize the competition it faces against a world industry. Unless Philippine enterprise becomes a world class industry through modernization and productivity upgrades, its growth and even its very survival will always be imperiled.

The DTI shares the vision and battlecry of DOST -- that the way to industrialization is through the avenues of productivity and science and technology development.

Thus at DTI, we express our continued support in forging linkages with DOST in the government's Agro-Industrial Cluster by means of full cooperation in activities like:

- Formulation of Agro-Industrial Development Plan with specific priority on agro-industrial sectors (since the role of technology is to support agro-industrial development);
- Supply of technology corresponding to the requirements of industry for value-added product development;
- Acquisition and mastery of foreign technologies including regulation of the import of technology;
- Inflow of foreign technologies via direct investment, joint ventures, technical assistance agreements and import of technology -



embodied capital goods;

- Development of technology-oriented human resources;
- Upgrading of domestic engineering capability ensuring market as well as enforcing performance standards for local engineering firms;
- Provision of incentives/funding for the use of improved technology by the private sector;
- Incentives to reduce the cost of R & D;
- Provision of financial incentives and assistance for industrial R & D;
- Improvement of standards and quality control; and
- Marketing of products with higher local technology content.

As a member of the Science and Technology Coordinating Council (STCC), the DTI intends to further strengthen its support to technology-oriented activities to enhance entrepreneurship not only in the urban areas but also in the countryside. Thus, the theme of this year's NSTM: "Accelerating..." is very appropriate. The DTI also commits to collaborate with DOST in the Technology Investment Package Development, the Technology Investment Plan for the the next five years, and in all activities concerning the developmental programs for the Small and Medium Enterprises.

All of these that I have mentioned are the major component of a working partnership which DTI has initiated and will continue to flourish with the S&T Sector.

The active tandem and continuing commitment -- I reaffirm wholeheartedly today.

Thank you and congratulations for this first ever month-long celebration of meaningful S&T events.

## **COPING MECHANISMS OF FILIPINO HOUSEHOLDS IN DIFFERENT AGRO-ECOLOGICAL SETTINGS**

*Nina T. Castillo*

### ***Introduction***

The Filipino family is considered as the backbone of our society. The family or more generally, the household is the unit of production, consumption and reproduction, both on a daily and generational basis. It is within the socioculture environment of the household that energy is expended and strategies are undertaken to attain individual and collective well-being and to improve one's quality of life. The household is where one's priorities are established and activities to pursue one's goals in life are carried out.

In his essay on rural development programs and the farm household as a unit of observation and action, Janelid<sup>1</sup> reiterates the inter-dependence between the household and the farm. In his view, "the interrelationships between the farm and farm household are found in the main tasks of production, organization, distribution and consumption processes."

### ***Coping Mechanism of Households in Different Agro-Ecological Settings***

In Abad's view, the following are characteristics of poverty in the Philippines as gleaned from case studies on poverty in the Visayas: (1) The poor are a heterogenous group; (2) The experience of poverty is varied; (3) The poor are assetless; (4) Poverty tends to be persistent; and (5) the poor are adaptable. The adaptability of the poor allows them "through a variety of survival strategies.....

to cope with their everyday hardships, adjust to the cycle of lean and peak seasons, expand\* their niche the best way they can, and philosophically resign themselves to their fates". It is such survival strategies or what may also be called coping mechanisms which will be discussed in this paper.

Household food security is the major aim of the various coping mechanisms employed by both rural and urban families. Carner has identified the following commonly utilized survival strategies among the rural poor: (1) diversification of employment activities; (2) dependence on the village support system (i.e. kinship ties and reciprocal arrangements); (3) "making do" with less; and (4) migration to other places as a last resort.

Income and livelihood sources would be the major criteria in categorizing urban poverty group. On the other hand, the rural poor can be classified on the basis of the people's access to and/or control of resources. The rural poor's "resource base, how they manage it and the income they derive from its" serve as the major criteria in classifying rural poverty groups.

The discussion of coping mechanisms of household in different agro-ecological settings would first focus on the following poverty groups: (1) Landless Agricultural Workers in Rice, Corn, Tobacco and/or Sugar-Producing Villages; (2) Upland Farmers; and (3) Sustenance Fishermen. Then the discussion will focus on the coping mechanisms employed by households in a coconut-based farming systems.

\* Department of Social Sciences College of Arts and Sciences University of the Philippines at Los Banos, College, Laguna

### ***Landless Agricultural Workers in Rice, Corn, Tobacco and Sugar-Producing Areas***

The Philippines farm population can be divided into two: "(1) those with currently recognized rights to a piece of land; and (2) those with no such rights". Subsistence production is only possible for the proportion of the farm populace belonging to the former category. "Landless agricultural workers belong to a marginal class in an agricultural, feudal society." Ledesma defines a landless agricultural worker as one who: (1) lives in the countryside and is dependent mostly on rural forms of employment, particularly farm work; (2) neither owns any land nor has tenancy rights to such; (3) hires out his labor, together with the labor of his family, to others as his principal source of income.

The following coping mechanisms have been employed by landless agricultural workers in rice, corn, tobacco and sugar producing areas:

- (1) Participation in different kinds of work groups (i.e., prendes/gama/sagod arrangements wherein landless workers weed the fields for free in exchange for harvesting rights or shares of the harvest; pakyaw/kabesilyahan wherein flat rates are given for the performance of various farm operations; work-exchange groups for hire).
- (2) Cooperation (whether intra- or inter-family) as a form of "shared poverty" (i.e. pooling together of labor and other resources to maximize income).
- (3) Engaging in diversified income and livelihood sources (i.e. carpentry, gardening, livestock raising, vending, hiring oneself out as construction worker or domestic helper both here and abroad). These activities may also be viewed as means by which the

landless leaves the category of agricultural worker.

- (4) Borrowing money or selling/ mortgaging whatever little assests (if any) the worker has with relatives, neighbors and friends as usual sources of credit.
- (5) Borrowing money to repay previous loans which leaves the landless worker in a state of perpetual debt.
- (6) Migrating to other places or geographical mobility in search of job opportunities.
- (7) Collective decision-making by the household or clan members usually resulting in cautiousness in the adoption of innovations or risk-sharing.
- (8) Prayer or resignation to one's fate.

### ***Upland Farmers***

Upland farm households have been describe as "tough, hardworking, resilient and ingenious". Given the environmental constraints uplanders have to live with, upland household indeed have to be tough and resourceful in order to survive. Compared to coastal and/or lowland households, upland households are characterized by smaller family size and lesser sex role differentiation and these characteristics may also be viewed as adaptive responses to environmental constraints. The two aforementioned characteristics of upland households may perhaps be attributed to the fact that sustaining a large family in the uplands would be extremely difficult and that all household members have to contribute towards the maintenance of the household.

The coping mechanisms utilized by upland households have been documented in various studies. Those studies have shown that households of both upland and coconut farmers generally employ a two-pronged survival

strategy which involves the diversification of income sources. The diversification of agricultural practices would primarily be a response to food scarcity while the diversification of income sources would primarily be a response to the household's need for cash.

Diversified agricultural practices and other responses to food scarcity which were identified in the researches cited in the preceding paragraph included the following:

- (1) Niche shifting wherein the farm is extensively utilized during months of food abundance and during the months of food scarcity, swinddeners shift to wage labor.<sup>14</sup>
- (2) Mixed cropping wherein subsistence/food crops and commercial/cash crops are combined on the same piece of land. "Upland farmers adopts mixed farming as a reaction to their limited access to land resources and in response to market forces. Thus, they raise subsistence crops for food, cash crops for immediate income returns, and other perennial commercial crops for regular and long-terms cash returns."
- (3) Planting crops of different maturity periods to ensure that harvests are spread throughout the year.
- (4) Changing the way agricultural products are disposed or used (e.g. Instead of selling most of the agricultural products during periods of food scarcity, they are used for home consumption only).
- (5) Niche diversification<sup>16</sup> which is dependent upon the availability of resources. It involves the simultaneous exploration of resources found in different environmental zones. An example of niche diversification would be for household members to go fishing in a nearby lake aside from gathering wild fruits/plants in the forest and/or raising crops or animals in their backyard.
- (6) Raising livestock or growing vegetables in the home garden.
- (7) Gathering of forest products to be used as alternative food resources.
- (8) Land sharing wherein upland households with no access to land are allowed to cultivate small portions of the land which their relatives are not currently using. This results in a shorter fallow period for the farm, and the uplanders who have no access to land do this even though they are aware of the delaterious effects of such a practice.
- (9) Practicing ecologically sound farming techniques or employing conservation methods in order to protect the uplanders' resource base.
- (10) Reliance on institutional support systems, both internal support systems (i.e. kin; friends, etc.) and external support systems (i.e. non-governmental organizations; credit facilities, etc.) or what Cadelina had described as "social networks".
- (11) Scarcity adjustment or making do with less (i.e. having meals once or twice daily only instead of the usual three meals a day; tolerating low levels of nutrition and poor health; eating rootcrops if rice is scarce, etc.)
- (12) Migration as the "ultimate strategy resorted to by upland farmers after exhausting all possible remedies in the village.... Generally, migration helped the upland households

survive. Working outside the village during lean months enabled the household to buy rice and other prime necessities for the family. On the other hand, staying in the village during hard times (rainy days) just after planting season would mean hunger to some upland families”.

Diversified income sources as responses to the upland households' need for cash included the following:

- (1) Borrowing money, with or without interest, from friends, relatives and neighbors.
- (2) Engaging in wage labor either as agricultural laborers, domestic helpers, construction workers, etc.
- (3) Gathering of forest products such as rattan, bamboo, orchids, firewood, etc.
- (4) Handicraft production.
- (5) Engaging in small-scale entrepreneurial activities such as operation of sari-sari stores and the buy-and-sell of different products.

### ***Sustenance or Articanal Fishermen***

“Unlike most agriculture and forestry lands which involve specific property rights, the sea is considered to be common property or an open-access resource. Essentially anyone is eligible to become a fisherman and exploit the resource as he can.....Access to a fishery resource may be open, but success in exploiting it depends to a large extent on the availability of capital to invest in efficient gear. Open access is not the same as equal access.”

“Sustenance or articanal fisherman are small-scale, traditional fisherman who fish both inland waters and marine coastal waters within three miles of the coastline.

“Articanal fisherman use gears which either do not require boats or which require boats of not more than 3 tons.”

As one proceed from the upland to the lowlands to the coastal areas, family size and division of labor increases. Inter-family cooperation in the coastal areas decrease with increased population/household because there is greater competition for available resources whose productivity remains constant.

Different studies of sustenance fishermen have identified the following coping mechanisms which have been utilized by fishermen's households:

- (1) Due to the very low income of sustenance fisherman, most households have augment their income by engaging in agricultural and service jobs and this usually involved out-migration. “Often sustenance fishing is taken up as an occupation of last resort by landless families unable to find other forms of employment.”
- (2) Other secondary sources of income were: livestock raising, vegetable gardening, small-scale business (i.e. sari-sari store; fish vending).
- (3) Borrowing money, with or without interest, for household and/or production needs from relatives, friends and neighbors.
- (4) Borrowing money to pay off previous debts hence, the sustenance fishermen's households are often caught in the trap of the debt cycle.
- (5) Selling or pawning household property or valuables, if any.
- (6) Buying goods on credit from the local sari-sari store.

- (7) Scarcity adjustment or making do with less (i.e. limiting the number of meals and amount of food intake; substituting rootcrops for rice; attending celebrations or vigils to save on meals and to eat good food).

### ***The Filipino Family in a Coconut-Based Farming System***

The data to be cited in this section of the paper were taken from various studies conducted by different researcher: Castillo, 1979; Cornista, 1983; De Vries, 1976; Gomez, 1976; Guerrero, 1966; Porio, et.al. 1975; Samonte, 1976; Sevilla, 1982; Tolentino, 1986 and from the household survey of the Philippines Coconut Authority - United Coconut Planter's Bank (PCA-UCPB) Countryside Economic Development Program (CEDP) which was conducted in November, 1986. Aside from the aforementioned sources of data, another major source of data was the author's masteral thesis which was on coping mechanisms employed by households in a coconut-based farming system. Both the PCA-UCPB household survey and the authors' field work were conducted in Barangay Malabanan, Balete, Batangas. Some of the statements which will be cited in this section regarding the family in a coconut-based system also holds true for families in other agro-ecological settings in rural Philippines.

With regard to household structure, the average household (hh) size is usually seven persons. Most households are residentially nuclear but tend to be functionally extended. This means that even if the household is a separate residential unit, it still maintains ties and has reciprocal obligations towards the members of its extended family. Most of the residents in the barangay are related to each other either by consanguinity, affinity or ritual kinship. Due to the high dependency ration in young nuclear families, extended households (hhs) may have higher socioeconomic status (SES) than nuclear households.

Family decisions are reach independently by husband or wife in some instances and jointly in others. In home management-related matters, the wife is usually the major decision-maker but in actual farm operations, it is the husband. Consumption loans are decisions usually reached by the wife while production loans are usually joint decisions.

There is inequality in the intra-household food distribution process with males and adults usually more adequately fed than females and younger people. Lower socio-economic status (SES) household have a more well-balanced and varied diet compared to higher SES households due to the greater use of vegetables in their meals. The hh food security of coconut farmers with no rice intercroops is more at risk than that of rice-growing farmers due to the farmer's need to purchased rice. It is during the rainy season that the hh's food security experiences the greatest risks/threats. Hence, the hh garden is an important food reservoir. But in the face of land scarcity due to population pressure, even the existence of this reservoir is in danger.

Extra-household assistance is extended to both relatives and non-relatives alike and this assistance is extended reciprocally to and from the household. Patterns of assistance take on many forms (in cash or in-kind) but it may be expected that due to economic difficulties, less sharing of resources may occur in the future.

Division of labor is a necessity for the hh's everyday functioning. It is not age and gender alone which determine task allocation in the household. The ability and availability of the HH members are also important determinants. Therefore, the sexual division of labor in Filipino families is not as rigid as is often assumed.

The household survey of PCA-UCPB CEDP showed the following trends: Since cocounut farming in Malabanan is generally a small holding enterprise, the income from coconuts is often insufficient for the household's basic needs. Food is the major expenditure of most hhs and a majority of them spend more than they earn (which is also

true for many hhs in different agro-ecological settings). Hence, friends and neighbors are important sources of credit.

Coconut farmers are often only part-time farmers because they engage in other occupations. Coconut farming families which practice intercropping and/or have off-farm jobs are better off financially than families dependent of coconut farming alone.

The actors in a coconut farming system constitute a heterogeneous group rather than a homogenous one as is often assumed. A majority of the coconut farmers are tenants; the others are landowners, owner-operators or hired agricultural laborers. Tenancy rights are usually inherited and social mobility (both vertical and horizontal) does exist. But access to land on an inter-generational basis seems to be declining due to increasing population pressure. This pressure has also led to increasing parcellization of large landholdings.

Landowners get a proportion or all of the coconut harvest. Traditionally, what is grown under the coconut trees and the proceeds from such accrue to the tenant. But with the increasing profitability of intercropping, some landowners are: (a) restricting or exerting control over what intercrops or livestock are raised under the coconuts; and/or (b) demanding a share of the intercrops grown. It is also interesting to note that hired labor is seldom used either in coconut and/or intercrop production in the barangay where this study was conducted. But when there is hired labor, preference may be given to kin rather than non-kin.

Optimism about their future, specially that of their children, was often expressed by many farmers. Education was seen as a means for upward social mobility particularly in the light of the farmer's own low educational attainment. In general, most farmers desire a better quality of life (i.e. economic stability, etc.) and they perceive equality with other farmers in terms of levels of living. But this perception of equality is changing as social stratification and social differentiation become more apparent due to worsening socioeconomic conditions.

Perhaps one of the most important survival strategies used by coconut farmers, specially in the Southern Tagalog region, is intercropping. The increasing profitability of intercropping vis-a-vis coconut farming per se had been noted in different studies." The availability of land for cultivation of vegetables and fruit trees enables landless workers to augment their income. It would seem therefore that landless laborers who are merely dependents on coconut farm work are worst-off while those who have access to other productive resources like land have better chances of improving their socio-economic status".

The following coping strategies of landless coconut workers had been identified by Cornista and Escueta in their study of the Southern Tagalog region:

### **(1) Work arrangements**

- (a) Seminahan - scheduled of the hired workers to enable all of them to work even for a limited period of time.
- (b) Sagpian - laborers form a work group in which everyone equally shares in the remuneration regardless of sex and the difficulty of tasks performed
- (c) Pakisamahan - allows the inclusion in a work group of non-members who are in dire need of work

### **(2) Employment patterns**

- (a) Seeking other farm and non-farm employment
- (b) Out-migration to the poblacion or cities or overseas

### **(3) Other coping mechanisms**

- (a) Development of patron-client relationship with their employer.
- (b) Cultivation of other social ties to ensure regular employment and ready source of credit.

Just like the households of the landless agricultural workers in rice, corn, tobacco and/or sugar; upland farmers; sustenance fishermen; and coconut workers/farmers found in other parts of the country, the households in the coconut-based farming system of Malabanan utilized the following coping mechanisms/survival strategies.

### **1. Household Structure**

- a) Establishment of extended households as means of sharing limited resources; or
- b) Establishment of residentially nuclear but functionally extended households
  - (1) Reliance on intra- and inter-household patterns of assistance (i.e. extension of credit to kin and friends, etc.)

### **2. Employment Patterns**

- a) Increased out-migration in search of employment opportunities elsewhere
- b) Employment of out-of-school youth to augment household income
- c) Reliance on family labor rather than on hired labor for farm operations
- d) Hiring oneself out as agricultural labor

### **3. Pattern of Livelihood in a Coconut-Based Farming Systems**

- a) Diversification of agricultural practices
  - (1) Combination of coconut-intercrop-livestock production
  - (2) Crop diversity (i.e. multiple cropping; intercropping)
  - (3) Increased cropping intensity
  - (4) Borrowing of land
  - (5) Land transfer/land use arrangements (hublian; ariendo; sangla)

### **b) Diversification of income sources**

- (1) Augmentation of household income by exploiting three or more sources of income (i.e. combination of agricultural sources of income with non-agricultural sources)
- (2) Sewing of garments at home on a sub-contractual basic
- (3) Engaging in small-scale entrepreneurial activities such as store keeping

### **4. Socio-Psychological Coping Mechanisms**

- a) Satisfaction with present life or "making do" with whatever one had
- b) Optimism for the future as manifested in the respondents' aspirations; perceptions of agrarian reform; and perceptions of what constituted the good life.

The resource base of the households in the coconut-based farming system made possible the utilization of the different coping mechanisms cited above. The multiple livelihood strategies employed by most of the households were made possible by the resources found in the coconut-based farming system. If there are changes in the household's resource base, there will be concomitant changes in its survival strategies. The resources found in a coconut-based farming system contributed to both stability and change in the households contained therein.

### **Conclusion**

Although this paper has not involved a very extensive review of all the available literature on coping mechanisms of household in different agro-ecological settings in rural Philippines, some patterns/trends can be gleaned from the studies which were cited in this paper. The following coping



mechanisms or survival strategies are employed by households of landless agricultural workers in rice, corn, tobacco and sugar producing areas; upland farmers; sustenance or artisanal fishermen; and coconut workers/farmers:

1. Seeking other farm/fishing and non-farm employment opportunities (i.e. wage labor; service jobs; etc.) which usually results in out-migration.
2. Scarcity adjustment or "making do" with less.
3. Borrowing money either to pay back old debts ("debts trap/cycle") and/or to service a new need.
4. Cooperation and/or reliance on institutional support systems (internal or external) or "social networks" (kin, friends, etc.). This has led to situations wherein "shared poverty" is manifested in terms of the existence of collective decision-making; land sharing; formation of extended households or residentially nuclear but functionally extended households and other forms of "shared poverty".
5. Due to the resource base available to both upland and coconut farmers, they are able to employ a two-pronged strategy of diversification of both agricultural practices and income sources, sustenance fishermen and landless agricultural workers are only able to diversify their income and livelihood sources but not their agricultural practices.
6. Both upland and coconut farmers and sustenance fisherman utilize family labor rather than hired labor in accomplishing farming/fishing tasks. The same pattern is also true for landless agricultural workers whose major resource is their own manpower.
7. The establishment of small-scale

business enterprises such as "sari-sari" stores; buy-and-sell of various products, etc. are often resorted to by households in the uplands and in coconut farming areas.

8. Landless agricultural workers whether in rice, corn, tobacco, sugar or coconut-producing areas usually participate in different kinds of work groups or work arrangements.

The aforementioned patterns of coping mechanisms utilized by households in different agro-ecological settings have some implications for policy formulation. Farmers should be encouraged to engage in multiple and intercropping practices rather than monoculture alone. As was seen in the case of the coconut-based farming systems in Batangas, farmers who engaged in coconut-intercrop-livestock farming had more substantial income as compared to farmers who depended on coconut production alone. Members of rural poor households could also be taught some entrepreneurial and managerial skills which they can use to augment their family income. Engaging in small-scale business enterprises implies that credit from financial institutions should be readily accessible to the rural poor. Giving credit to the rural poor would also give them a chance to be free from the vicious cycle of being caught in the debt trap.

The problem of increasing landlessness could perhaps have come relief if and when the government decides to enforce the provisions of the comprehensive agrarian reform law (CARL). The growing numbers of landless agricultural workers has not been given adequate attention and appropriate action. As long as this problem continues to be ignored, the rumblings of discontent among the rural poor would increase in intensity.

Environmental degradation adversely affects the resource base availability to the rural poor. Unless ecological stability can be restored through the implementation of vigorous environmental conservation and preservation measures, the continued

survival of households not only in the rural areas but also in the urban areas is severely threatened.

In conclusion, it can be clearly seen that coping with problems rather than actively seeking changes in the conditions the rural poor are in, generally characterizes the attitudes of most poor rural Filipino households. In spite of everything which has been said and despite everything which has been left undone, there seems to be some reason for optimism given the demonstrated ingenuity of the coping mechanisms which have been employed by many of the rural poor. But as socio-economic-political-demographic condition worsen, perhaps trying to cope may not be enough in order to survive. The times call for what Fr. John Carroll, S.J. (in his analysis of what lies beyond the EDSA revolution) has called "pressure from below coupled with a creative response from above". The "pressure from below" has long been felt and is increasingly being manifested. What is missing is the crucial "creative response from above" and hopefully all of us will be able to render a creative response to the call of the times.

## Bibliography

Abad, R. G. "Introduction". In *Faces of Philippine Poverty: Four Cases from the Visayas*, pp.ix-xii. Edited by R. G. Abad, Philippine Social Science Council (PSSC), 1986.

Ardales, V. B. And F. P. David. "Poverty Among Small-Scale Fishermen in Iloilo". *Philippine Sociological Review* (PSR) 33:1-2 (January-June 1985): pp. 35-39.

Bailey, C. "Managing an Open-Access Resource: The Case of Coastal Fisheries". In *People-Centered Development*, pp.97-103. Edited by D.C. Korten and R. Klauss Connecticut: Kumarian Press, 1981.

Banzon, J. A., and Velasco, J. R. *Coconut Production and Utilization*. Pasig:

Philippine Coconut Research Development Foundation, 1982.

Bautista, G.: Thiesenhusen, W. C. ; and King, D. J. "Farm Households in Rice and Sugar Lands: Margen's Village Economy in Transition". pp.73-92. In *Second View from the Paddy*. Edited by A. Ledesma, P. Q. Makil, V. A. Miralco. Q.C.: Institute of the Philippine Culture, 1983.

Belsky, J. M. "Stratification Among Migrant Hillside Farmers and Some Implications for Agroforestry Programs: A Case Study in Leyte, Philippines". M.S. thesis, Cornell University, 1981.

Cadelina, R. V. "Social Networks: An Ecological Analysis of Social Transactions Within a Context of Crisis". *PSR* 33:1-2 (January-June 1985): pp. 60-72.

Cadelina, R. V. "Poverty in the Uplands: Lowland Migrant Swiddeners in the Balinsasayao Forest, Negro Oriental", pp. 163-186. In *Faces of the Philippine Poverty: Four Cases from the Visayas*. Edited by R. G. Abad, R. V. Cadelina and V. L. Gonzaga. Q.C.: PSSC, 1986.

Callanta, R. *Poverty: The Philippine Scenario*. Makati: Bookmart, Inc., 1986.

Carlos, M.B. "The Economics of Coconut and Integrated Farming Systems in Silang, Cavite". B.S.thesis, College, Laguna: University of the Philippines at Los Banos (UPLB), 1982.

Carroll, John J., S.J. "Looking Beyond EDSA", *Human Society*, Nos. 12 and 13. (May 1985).

Carner, G. "Survival, Interdependence and Competition Among the Philippine Rural Poor", pp. 133-143. In *Poeple-Centered Development*. Edited by D. C. Korton and R. Klauss. Connecticut: Kumarian Press, 1981.

- Castillo, G. T. *Beyond Manila: Philippine Rural Problems in Perspective*. Ottawa, Canada: International Development Research Centre, 1979.
- Castillo, N.T. "Coping Mechanisms of Households in a Coconut Based Farming System". M.A. thesis. Ateneo de Manila University, Quezon City, 1988.
- College of Human Ecology and Commission on Population. *Proceedings of the Workshop on the Filipino Family in a Dynamic Ecosystem*. College, Laguna: UPLB, 23-26 June 1984.
- Cornista, L. B. "Social Dynamics of Coconut Farming in Two Southern Tagalog Villages", Ph.D. dissertation. University of Wisconsin, Madison, 1981
- Cornista, L. B. "Coconut Farming System: A Sociological Perspective," paper presented at the Symposium on Coconut-Based Farming Systems, Visayas State College of Agriculture, 1-3 June 1983.
- Cornista, L. B. and Escueta, E. F. *The Structure of the Coconut Farming Industry*. Occasional Papers No. 10 College, Laguna: Agrarian Reform Institute, 1983.
- De Vries, P. "Some Observations on Landless Labor in a Village in Talavera, Nueva Ecija", 1976.
- Gomez, E. D., and Samonte, V. Pb. *Communication Patterns of Crop and Livestock Technology in Bulacan and Batangas*. College, Laguna: UPLB, 1966.
- Janelid, I. "Rural Development Programmes and the Farm Household as a Unit of Observation and Action. "In The Household, Women and Agricultural Development. pp.83-89. Edited by C. Presvelou and S. Spijkers-Zwart. Wageningen, The Netherlands: Agricultural University, 1980.
- Ledesma, A. J. "Landless Workers and Rice Farmers: Peasant Subclasses under Agrarian Reform in Two Philippine Villages". Ph. D. Dissertation, University of Wisconsin, Madison, 1980.
- Porio, E.; Lynch, F.; and Hoonsteiner, M. *The Filipino Family Community and Nation*. Q.C.: Institute of Philippine Culture, 1975.
- Samonte, V, Pb.; Porez, A.: and Macasaet, R. M. *Socio-Communication Factors and Agricultural Innovativeness of Coconut Farmers*. College, Laguna: UPLB, 1976.
- Sevilla, J.C. *Research on the Filipino Family: Review and Prospects*. Pasig: Development Academy of the Philippines, 1982.
- Suner, F. and Cabacunga D. "Siton Caimituhan: A Structural Analysis". PSR 33:1-2 (January-June, 1985), pp. 18-26.
- Tangonan, P. "Survival Strategies of Upland Farm Households in Labney, Mayantoc, Tarlac". Ph.D. dissertation, UPLB, 1985.
- Tolentino, L.L. "Social Change in an Upland Community in Quezon, Philippine." M.S. thesis, Universiti Pertanian Malaysia, 1987.
- Veneracion, M. C. J. "Coping Mechanisms with Crisis: Landless Agricultural Workers in Central Luzon". PSR 33:1-2. (January-June 1985): pp.27-34.

## SINGLE STAGE PULSED MOLECULAR NITROGEN LASER\*

*Hendrick Kurniawan, M. Barmawi, M. O. Tjia*

### ABSTRACT

Although a great varieties of discharge pumped gaseous lasers are available nowadays, transceivers excited nitrogen lasers operated at relatively low pressure is still widely used because of the ease of obtaining uniform discharge.

Murata ceramic capacitor was used as an energy storing element of this laser system and each of which has a capacitance of 600 pF and space every 30 mm along the electrodes. Each electrode has three lines of storing capacitors and each line has 19 storing capacitors. Total storing capacitors of this laser system can be arranged in three different configuration with 2x19, 4x19, 6x19 storing capacitors respectively.

The laser light extracted from this laser system is multimode, having propagation direction slanted with respect to the axis of the optical resonator. In order to suppress the undesirable modes, we have made a set of window system with different aperture size (no aperture, 4mm x 4mm, 2mm x 4mm) at each end, so that such modes cannot be reflected back into the laser tube.

A maximum light power of 4 mJ and beam divergence of 15 mrad has been obtained from this laser system operated with 4x19 storing capacitors at 15 KV and without window aperture. Using a 2mm x 2mm aperture size and operating at 15 KV this system has achieved a beam divergence of less than 2 mrad while lowering the power output to 1 mJ.

### INTRODUCTION

A few experiments have been carried out to set up and operate the nitrogen laser system. What these experiments have in common is: using single stage laser system, combination of oscillator-amplifier laser system, combination of oscillator, pre-amplifier and main-amplifier laser system.

In this work, a single stage TE nitrogen laser will be designed and constructed to produce pulse laser at MW output power. Two long aluminium electrode, separated typically by 1-3 cm are used. The pressure of nitrogen gas in the order of 20 - 80 torr and DC high voltage across the two electrode is between 10 - 20 KV. The electrical energy required for the laser is

stored on an adjustable bank of condensers, and efficient transfer of this energy to the laser tube requires that the impedance of the two system be very nearly the same. Condenser which is used should have very small ( nH ) inductance and it has to be connected with conducting strips of metal to reduce the overall impedance of this system. Energy from the storing capacitors to the laser cavity is transferred through a triggered spark gap.

The laser light extracted from this laser system is multimode, having propagation direction slanted with respect to the axis of the optical resonator. In order to suppress such undesirable modes, we have made a set of window system with different aperture size (5 x 5 mm.mm., 4 x

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4 mm.mm. , 3 x 3 mm.mm.) in each end, so that such modes cannot be reflected back into the laser tube.

## SYSTEM CONFIGURATION

Figure 1 shows a schematic diagram of the improved nitrogen laser. The system consists of Blumlein driven TE laser channel, spark-gap and triggering system, gas and vacuum system, DC high voltage source.

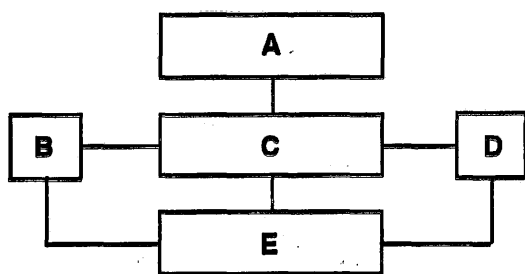
Figure 2 shows a cross sectional view of the laser tube. The length of the electrodes and the electrodes spacing are 512 mm and 18 mm respectively. These electrodes are made of alluminium plate of 10 mm thickness. Storing ceramic capacitor each of which has a capacitance of 600 pF are spaced every 30 mm along the electrodes. Each electrode has three lines of storing capacitor and each line has 19 storing capacitors. Total storing capacitors of this laser system can be adjusted into three steps in the order of 2x19, 4x19,

6x19 storing capacitors.

Two electrodes for the pre-ionization each of 100 mm are made of thin copper plate and placed above the main electrode. Each of these pre-ionization electrode is connected to the corresponding main electrode by a ceramic capacitor of 250 pF. The spacing between opposite pre-ionization electrodes is half that of distance between the main electrodes. Thus pre-ionization takes place just before the instant of main discharge and stabilizing the output. Figure 3 shows the side view of the laser channel.

The laser channel are connected to a common spark gap (Fig.4) by a transmission line which is made of 3 mm thick glass epoxy copperclad circuitboard. Triggering circuit for spark-gap is given in The laser system operates at an adjustable DC high voltage (7-18KV which is given in Fig.5. The pressure of the laser tube and spark gap is controlled with two vacuum valve and one vacuum pump which is given in Fig. 6.

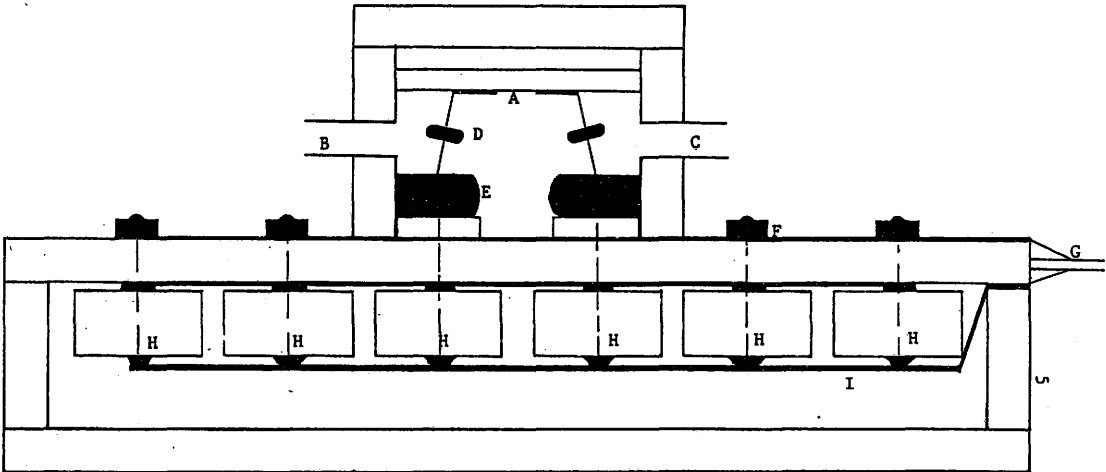
**Figure 1: Schematic Diagram of the Nitrogen Laser.**



- A: DC HIGH VOLTAGE SYSTEM.
- B: TRIGGERING CIRCUIT.
- C: LASER CHANNEL.
- D: GAS SYSTEM.
- E: SPARK GAP.

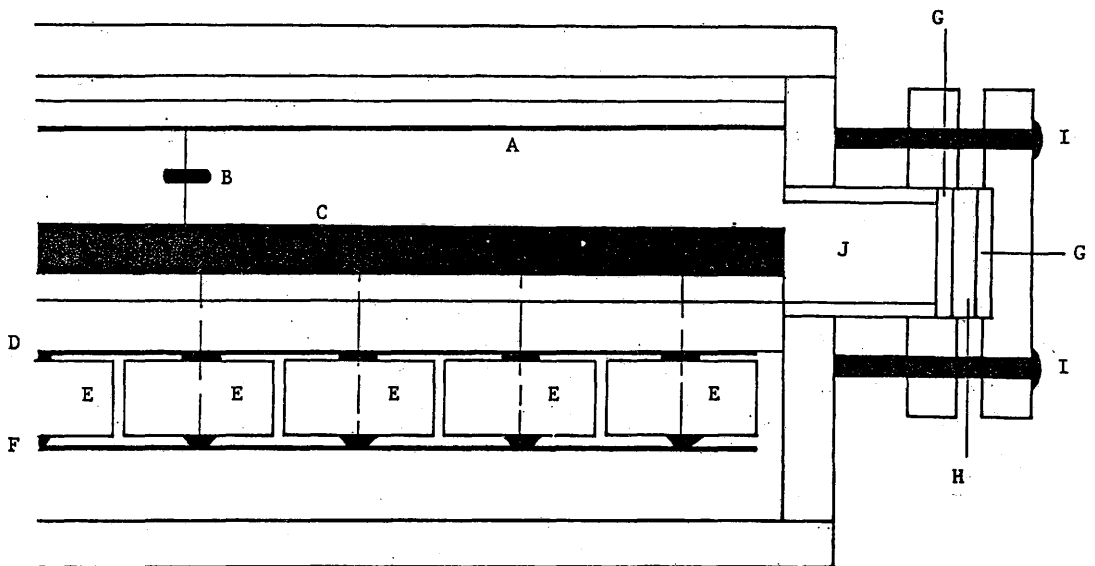
**Figure 2: Cross Sectional View of the Laser Channel.**

- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| A : PRE-IONIZATION ELECTRODES.        | F : CONDUCTING STRIPS.              |
| B : NITROGEN GAS INFLOW.              | G : COPPER CLAD CIRCUIT BOARD.      |
| C : NITROGEN GAS OUTFLOW.             | H : STORING CAPACITOR MURATA 600pF. |
| D : PRE-IONIZATION CERAMIC CAPACITOR. | I : GROUNDING STRIPS.               |
| E : MAIN ELECTRODES                   |                                     |

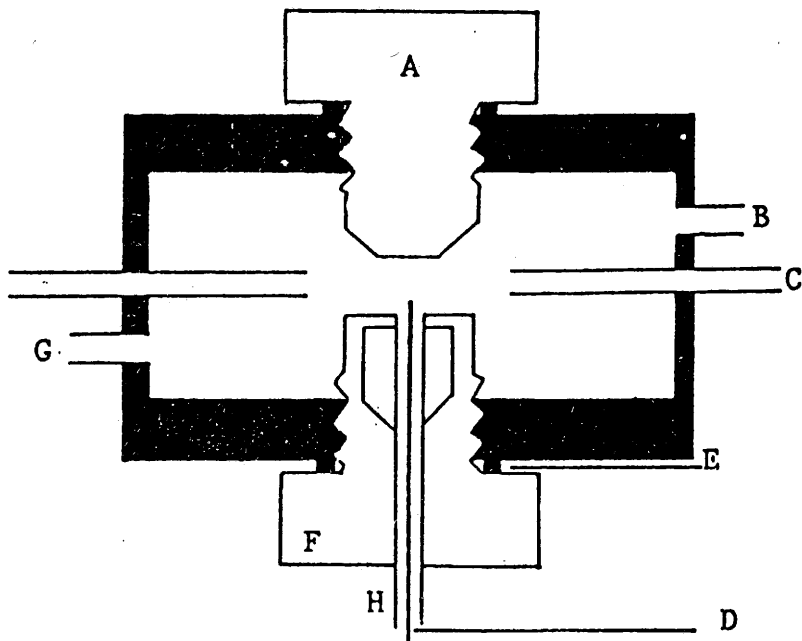


**Figure 3: Side View of the Laser Channel.**

- |                                       |                             |
|---------------------------------------|-----------------------------|
| A : PRE-IONIZATION ELECTRODES.        | F : GROUNDING STRIPS.       |
| B : PRE-IONIZATION CERAMIC CAPACITOR. | G : VACUUM O-RING.          |
| C : MAIN ELECTRODES.                  | H : OUTPUT QUARTZ WINDOW.   |
| D : CONDUCTING STRIPS.                | I : ALIGNMENT WINDOW SCREW. |
| E : STORING CAPACITOR MURATA 600 pF.  | J : ACRYLIC PIPE.           |



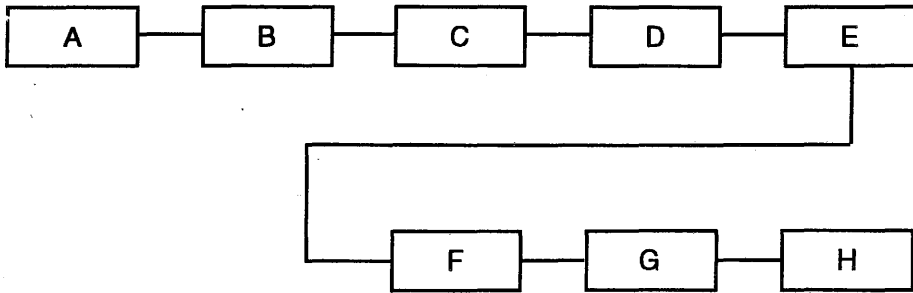
**Figure 4: Cross Sectional View of Spark Gap.**



- |                              |                       |
|------------------------------|-----------------------|
| A: UPPER ELECTRODE.          | E. O-RING.            |
| B: GAS INPUT.                | F. LOWER ELECTRODE.   |
| C: COPPERCLAD CIRCUIT BOARD. | G. GAS OUTPUT.        |
| D: TRIGGERING PIN.           | H. CERAMIC INSULATOR. |



**Figure 5: DC High Voltage System.**



A: INPUT 100V.

B: VOLTAGE REGULATOR 0 - 100 V.

C: VOLT - METER.

D: NEON TRANSFORMER 0 - 14 KV.

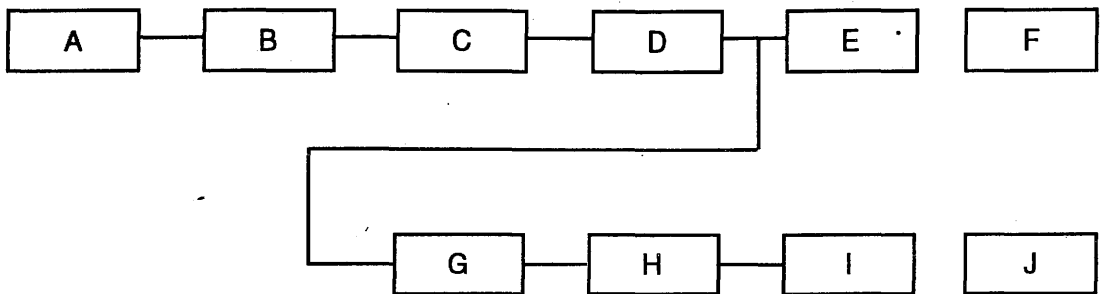
E: BRIDGE RECTIFIER 0 - 19, 6 KV.

F: KV - METER.

G: MILI-AMPERMETER.

H: LASER CHANNEL.

**Figure 6: Gas System of the Nitrogen Laser.**



A: NITROGEN TUBE.

B: MAIN VALVE.

C: TUBE FLOWMETER 1 - 25 l/min.

D: FLOWMETER 1 - 10 l/min.

E: VACUUM VALVE.

F: SPARK GAP.

G: LASER CHANNEL.

H: ANALOG PRESSURE GAUGE.

I: VACUUM VALVE.

J: VACUUM PUMP SYSTEM.

During this part of these experiments, the energy storing element were held constant at 4x19 capacitors and no aperture in the window system. Figure 7 shows the relation between output power

and gas pressure. High stability operation of this laser system lies between the pressure of 40 torr to 80 torr and the maximum output power is 4 mJ at 15 KV and 60 torr.

**Fig. 7. Relation between output power and gas pressure:**

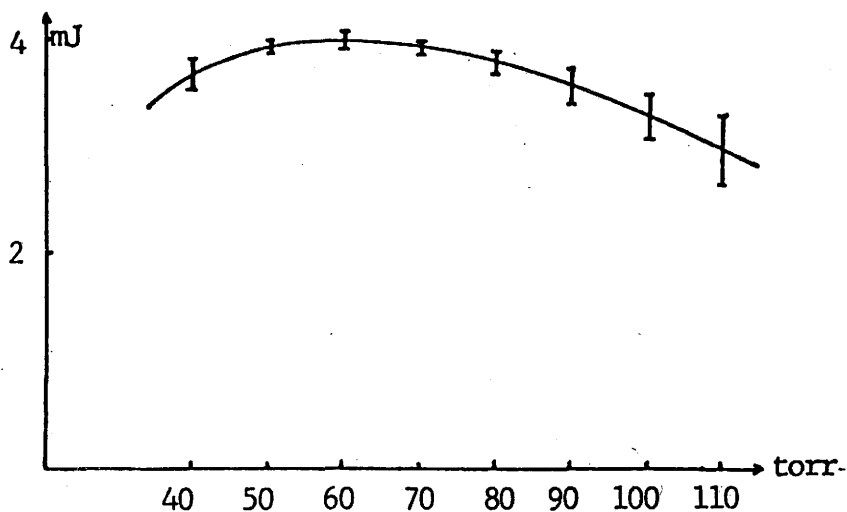


Figure 8 shows how the output energy from the laser system varies with increasing repetition frequency when the applied voltage is 15 KV and the gas pressure was kept at 60 torr.

**Fig. 8. Relation between output power and frequency.**

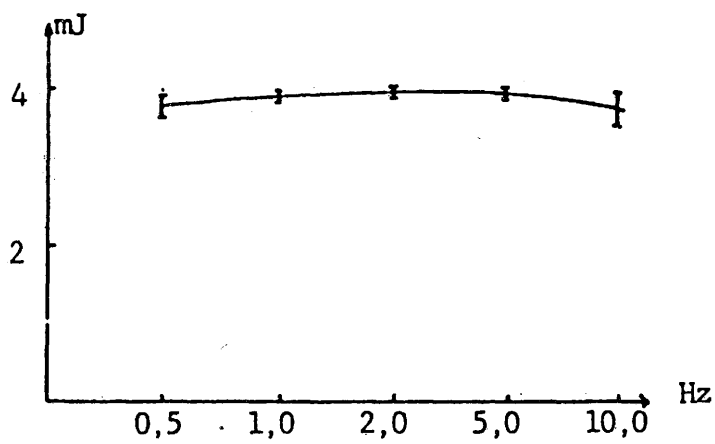
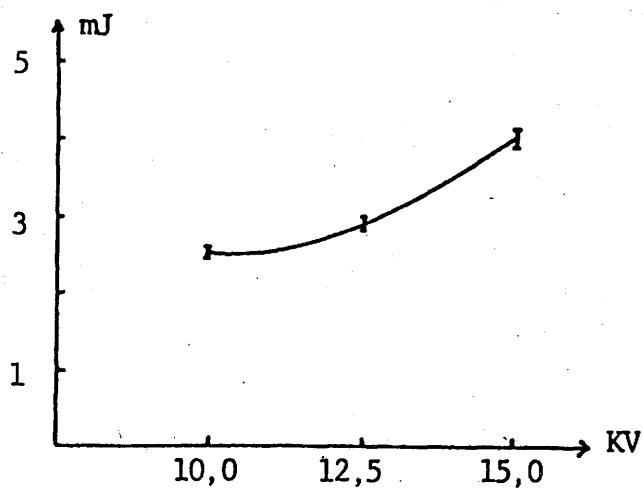


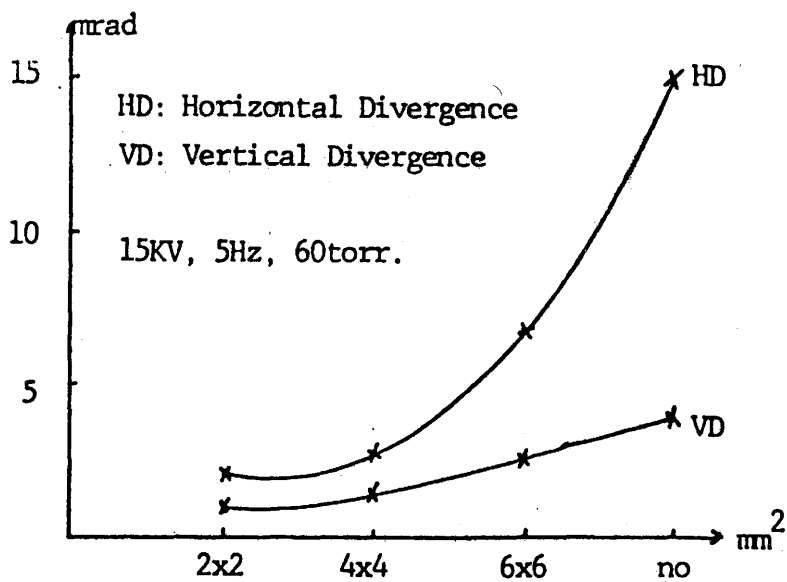
Figure 9 shows the relation between output power and applied voltage and

figure 11 shows the relation between beam divergence and aperture size.

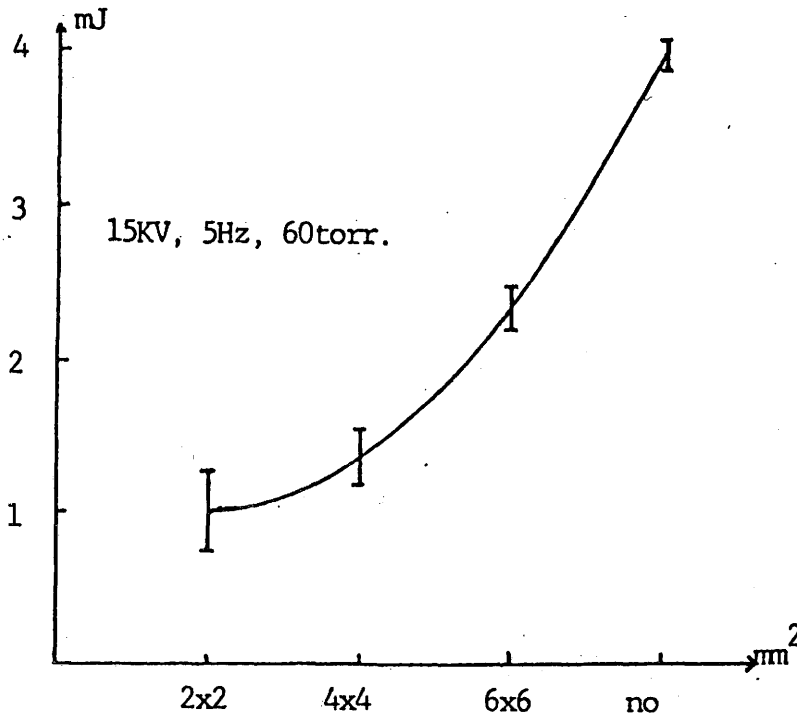
**Fig. 9. Relation between output power and applied voltage.**



**Fig. 10. Relation between beam divergence and aperture size.**



**Fig. 11. Relation between output power and aperture size.**



## CONCLUSIONS

From the experimental results, it was clear that single nitrogen laser system without aperture has a poor coherence (beam divergence=15mrad) but the output power becomes higher (4mJ at 15 KV).

Using aperture in each end of the window, we have been able to obtain high coherence with beam divergence = 3mrad at aperture size 4x4 mm<sup>2</sup>. Even higher coherence can be obtained if the aperture size is reduced. For the aperture size of 2x2 mm<sup>2</sup> the beam divergence is less than 2 mrad but the output power becomes lower (1 mJ at 15 KV).

Maximum output power of this laser system is around 4mJ at an applied voltage of 15 KV and no aperture. Higher energy can be obtained if we increase the applied voltage up to 20 KV and increase the storing element to 6x19 storing capacitors.

## REFERENCES

- Chigusa Iwasaki, Takahisa Jitsuno. *An Investigation of the Effect of the Discharge Parameters on the Performance of a TEA N<sub>2</sub> Laser*. IEEE Journal of Quantum Electronics, vol. QE-18, No. 3, March 1982.
- D. Basting, B. Steyer. *Gain Measurement in a Nitrogen Laser Amplifier*. Z. Naturforsch 27a, 1518-1519, 1972, Max Planck Institut Gottingen, West Germany.
- Kiichiro Kagawa, M. Tani, N. Shibata, R. Ueno, M. Ueda. *High Power Polarized Coherent TE N<sub>2</sub> Laser*. J. Phys. E; Sci Instrum, vol. 15, 1982.

## DEVELOPMENT OF OPTOELECTRONIC DEVICES IN THAILAND

*Choompol Antarasena*

### ABSTRACT

Thailand began her research activity on optoelectronic devices, such as photodiodes, photovoltaic cells more than ten years ago. These devices are based on silicon material. In 1984, GaAs technology was introduced to the Semiconductor Device Research Laboratory (SDRL), Faculty of Engineering, Chulalongkorn University. Liquid Phase Epitaxy (LPE) furnaces were installed and operated. Heterojunctions of GaAlAs-GaAs were mainly investigated. Infrared and visible light emitting diode (LED) were fabricated and tested. The emission wavelength could be varied from 5400 Å to 900 Å by changing aluminum composition in the mixed crystals. The present research status is to master the know-how of compound semiconductor technology which is fundamental for laser diode fabrication and optoelectronic applications.

### INTRODUCTION

In recent years, optoelectronics devices have become the key development of several advanced technologies such as optical communication, optical signal processing, optical instrument, new generation of consumer electronic products and industrial optical controls. GaAs and GaAlAs are the most promising compound semiconductor materials for these optoelectronic devices. Semiconductor Device Research Laboratory (SDRL), Faculty of Engineering, Chulalongkorn University, Bangkok, Thailand has chosen Liquid Phase Epitaxy (LPE) as the principal technology to develop optoelectronic devices since 1984. The heterostructures of GaAs/GaAlAs have been fabricated and characterized. Finally, GaAs/Ga<sub>1-x</sub>Al<sub>x</sub>As light emitting diodes and Ga<sub>0.6</sub>Al<sub>0.4</sub>As (n), emitter/GaAs (p<sup>+</sup>), base/GaAs (n), collector, bipolar transistor have been experimentally realized to learn the technical know-how. The

success in fabricating these two basic devices confirms and demonstrates the advantages of this compound semiconductor both on light emitting and high speed performances comparing to those of silicon materials. Hopefully, they will be further developed to be semiconductor laser and integrated optoelectronic devices in the near future.

### LIQUID PHASE EPITAXY

Although LPE is inferior to the molecular beam epitaxy (MBE) or the metal organic chemical vapor deposition (MOCVD) in thickness uniformity or the grown layers on substrates, LPE systems is low cost and simple. The quality of crystal prepared by LPE is superior since the growth is carried out under thermal equilibrium. For these several reasons on technical aspects and appropriateness, LPE system is chosen in our optoelectronic device research project.

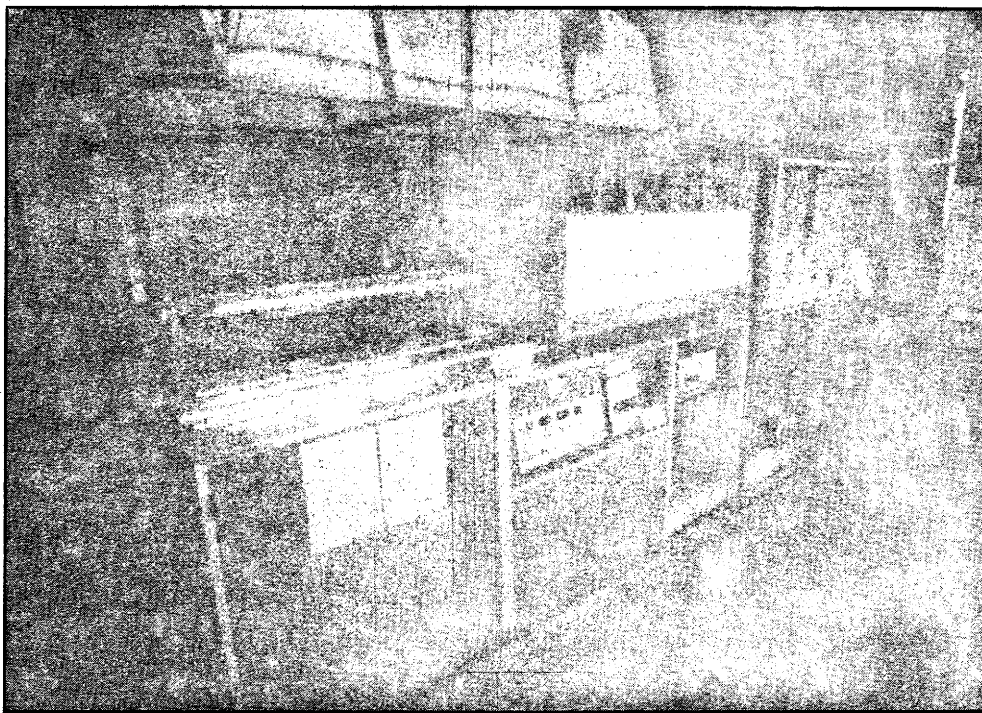
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Figure 1 shows the picture of the LPE system installed at SDRL. The consist of the electric furnace with an accurate temperature controller and the processor, a hydrogen purifier, a hygrometer, a nitrogen box and a quarts reaction tube. The horizontal sliding type carbon boat is located at the center of the furnace which consists of three zone heaters. The temperature flatness along the sliding direction of 0.050C within 20 cm long growth region can be obtained by adjusting the temperature controllers. The furnace can be quickly slided from the active section reaction tube in order to abruptly cool down the temperature of substrated and to avoid any thermal damage due to the vaporization of As in the compound semiconductor from the surface.

## **LIGHT EMITTING DIODE FABRICATION**

Figure 2 (a, h) show the cross sectional schematics of two basic structures for LED, i.e., surface emitting type and edge emitting type. A single heterojunction is used in a surface emitting type LED, but a double heterojunction which have both the electrical and optical confinements, is used in an edge-emitting type LED. The dopants and aluminum contents is each layer could be measured by a C-V technique and photoluminescence respectively. The experimental data are summerized in Table 1 and 2.



**Figure 1 : Liquid Phase Epitaxy Furnace**  
Au-7n

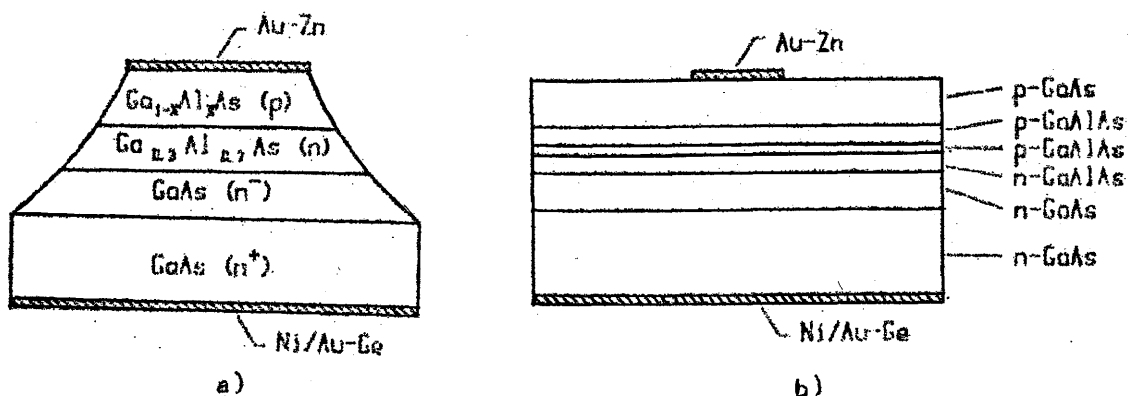


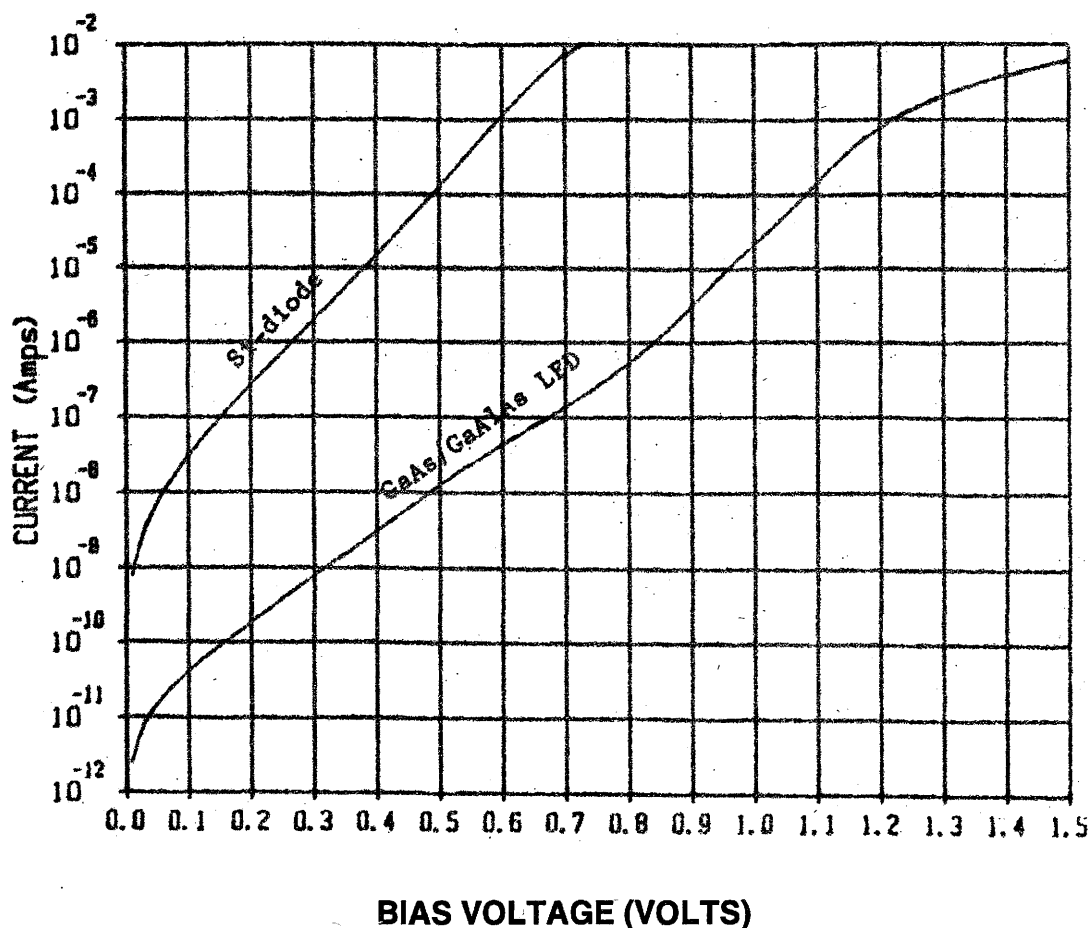
Figure 2: A) Surface Emitting LED b) Edge Emitting LED

Table 1: Surface Emitting Types

Structure 1	Structure 2
$\text{n}^+\text{-GaAs:Si}(-10^{18} \text{ cm}^{-3})$ <b>Substrate</b> $\text{n-GaAs}(-10^{15} \text{ cm}^{-3})$ $\text{n-Ga}_{0.3}\text{Al}_{0.7}\text{As:Sn}(-10^{17} \text{ cm}^{-3})$ $\text{p-Ga}_{0.83}\text{Al}_{0.17}\text{As:Ge}(-10^{18} \text{ cm}^{-3})$	$\text{n}^+\text{-GaAs:Si}(-10^{18} \text{ cm}^{-3})$ <b>Substrate</b> $\text{n-GaAs}(-10^{15} \text{ cm}^{-3})$ $\text{n-Ga}_{0.3}\text{Al}_{0.7}\text{As:Sn}(-10^{17} \text{ cm}^{-3})$ $\text{p-Ga}_{0.9}\text{Al}_{0.1}\text{As:Si}(-5.10^{18} \text{ cm}^{-3})$

Table 2 : Edge Emitting Type

Structure 1	Structure 2
$\text{n}^+\text{-GaAs:Si}(-10^{18} \text{ cm}^{-3})$ <b>Substrate</b> $\text{n-GaAs}(-10^{15} \text{ cm}^{-3})$ $\text{n-Ga}_{0.3}\text{Al}_{0.7}\text{As:Sn}(-10^{17} \text{ cm}^{-3})$ $\text{p-Ga}_{0.9}\text{Al}_{0.1}\text{As:Si}(-10^{17} \text{ cm}^{-3})$ $\text{p}^+\text{-GaAs:Ge}(-10^{18} \text{ cm}^{-3})$	$\text{n}^+\text{-GaAs:Te}(-10^{18} \text{ cm}^{-3})$ <b>Substrate</b> $\text{n-GaAs}(-10^{15} \text{ cm}^{-3})$ $\text{n-Ga}_{0.3}\text{Al}_{0.7}\text{As:Sn}(-10^{17} \text{ cm}^{-3})$ $\text{p-Ga}_{0.59}\text{Al}_{0.41}\text{As:Zn}(-10^{17} \text{ cm}^{-3})$ $\text{p-Ga}_{0.3}\text{Al}_{0.7}\text{As:Zn}(-10^{17} \text{ cm}^{-3})$ $\text{p}^+\text{-GaAs:Ge}(-10^{18} \text{ cm}^{-3})$

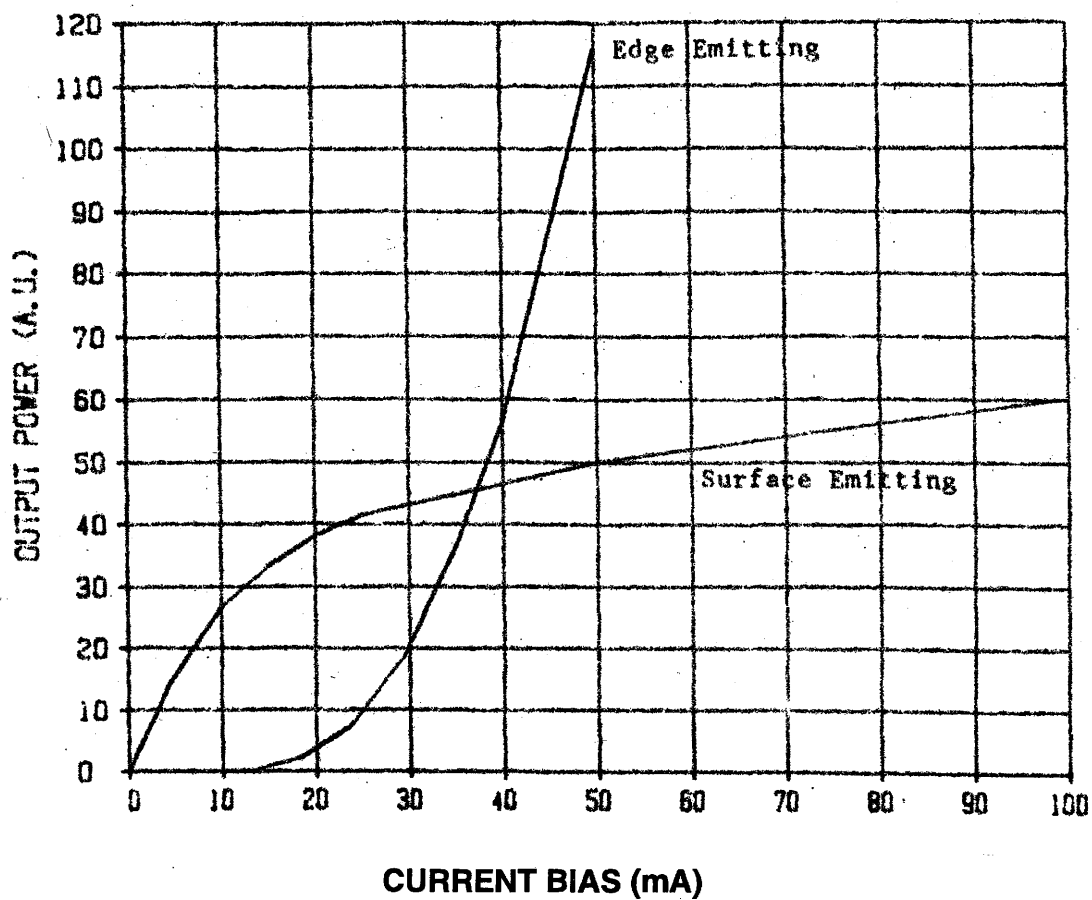


**Figure 3: Forward current-voltage characteristics for LED and Silicon diode**

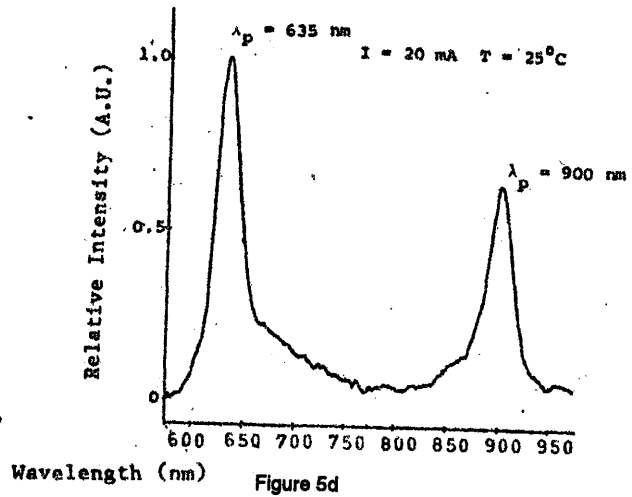
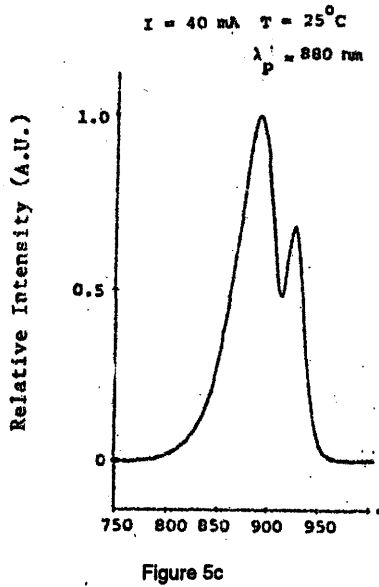
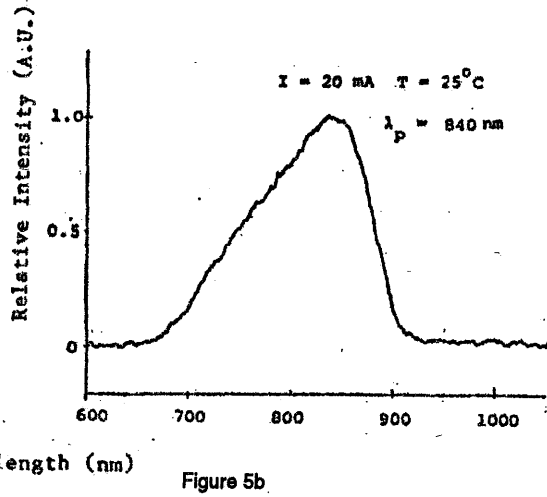
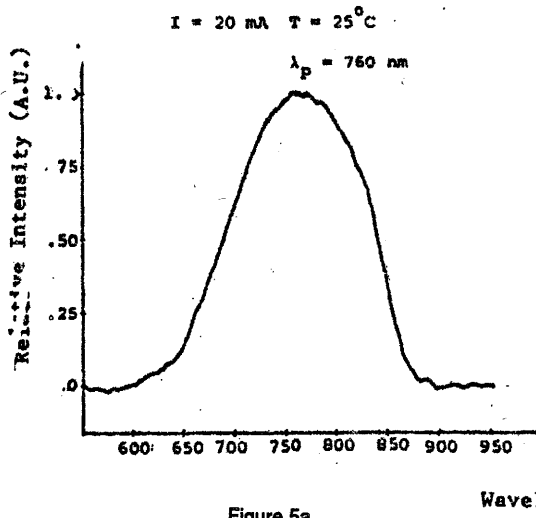
Typical forward I-V behavior for LED is shown in Figure 3. At any given level, the total diode current is the sum of a (radiative) diffusion current and a (nonradiative) recombination current. [Saul R.H. et al] No light emission was observed at low levels bias because of the domination of the recombination current which was caused by lattice mismatches between GaAs and GaAlAs. The diffusion current became significant at high level bias and led to light emission with its output intensity proportional to the bias current. I-V curve of silicon diode is also presented in the same figure for comparison.

The electroluminescent mechanism in a

light emitting diode is theoretically originated from band to band recombination between majority carries and injected minority carries. Consequently, light output is expected to vary linearly with drive current. However, as shown is Figure 4, output power of surface emitting type LED initially increase linearly with current but become sublinear at current higher than 20 mA. This reduction is quantum efficiency with increasing current is due to self heating effect. For the edge emitting structure, the superradiant has been obtained, resulting from stimulated emission at high injection current levels. If this mechanism is improved by structural design, the edge emitting LED will lase.



**Figure 4: Output power versus current for typical surface emitting and edge emitting LEDS.**



**Figure 5: Spectral Output Curves for**

- a) Surface Emitting LED, Structural 1
- b) Surface Emitting LED, Structural 2
- c) Edge Emitting LED, Structural 1
- d) Edge Emitting LED, Structural 2

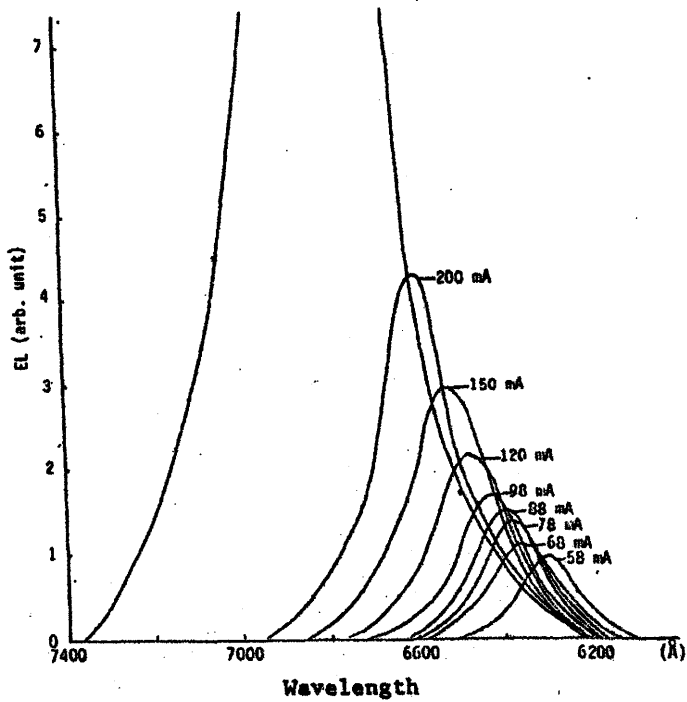


Figure 6: Dependence of  $\lambda_p$  on bias current

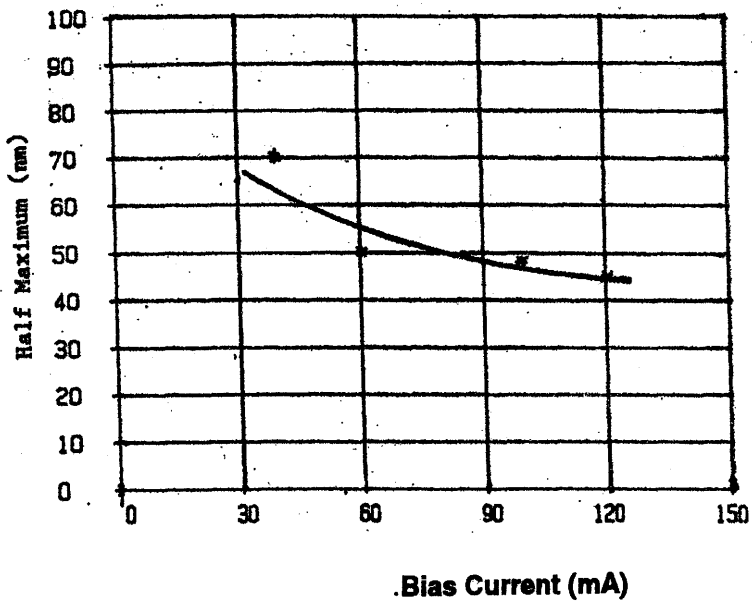


Figure 7: Dependence of spectral width on bias current.

Figure 5: a, b, c and d show the spectral outputs of surface emitters structure 1 and 2 and edge emitters structure 1 and 2 respectively. The peak electroluminescence wavelength  $\lambda$  is determined primarily by the band gap of the active region. The  $\lambda$  can shift toward longer wavelength since the band gap decrease at higher junction temperature. The second optical parameter is the spectral width which is defined by the full width at half-maximum intensity. The dependents of  $\lambda$  and spectral width with bias current have been shown in Figure 6 and 7 respectively.

### $\text{Ga}_{0.6}\text{Al}_{0.4}\text{As}(\text{n})/\text{GaAs}(\text{p}^+)/\text{GaAs}(\text{n}^-)$ HETEROJUNCTION BIPOLAR TRANSISTOR FABRICATION

Figure 8 shows the cross sectional schematic of  $\text{Ga}_{0.6}\text{Al}_{0.4}\text{As}(\text{n})/\text{GaAs}(\text{p}^+)$  heterojunction bipolar transistor, grown by LPE, fabricated at SDRL. The advantage of this bipolar over the conventional Si

transistor is the very value of the injection efficiency of the emitter-base heterojunction which determined by the difference of energy gape between the  $\text{Ga}_{0.6}\text{Al}_{0.4}\text{As}$  of emitter and the GaAs of base. [Kroemer H.] Under this condition the current gain does not strongly depend upon the emitter and base doping levels. It will be possible, therefore, to shape doping profiles such that  $N_{\text{DE}}$  is much smaller than  $N_{\text{AB}}$  as shown in Figure 9. and this will reduce both the base transversal resistance and emitter transition capacitance. By this advantage one can upgrade the high frequency performances of the devices such as cut-off frequency ( $f_T$ ) and power gain (G). [Rey G. et al] The compound semiconductor technology is possible for both high performance electronic devices and lasers. Therefore, these two properties can be combined and integrated on a single chip of semiconductor substrate. [Yariv A.] Integrated optoelectronic devices will be realized and functional.

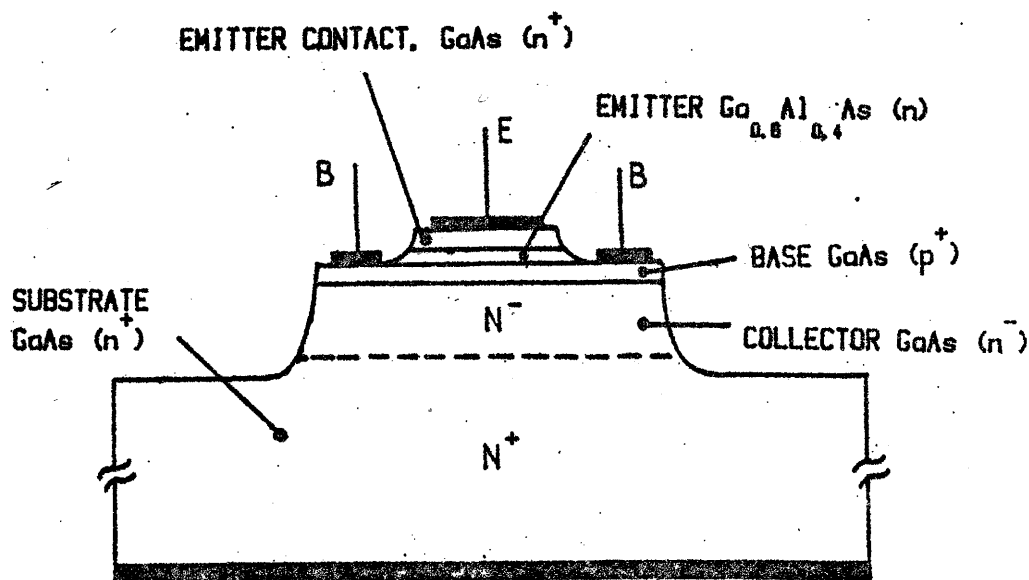
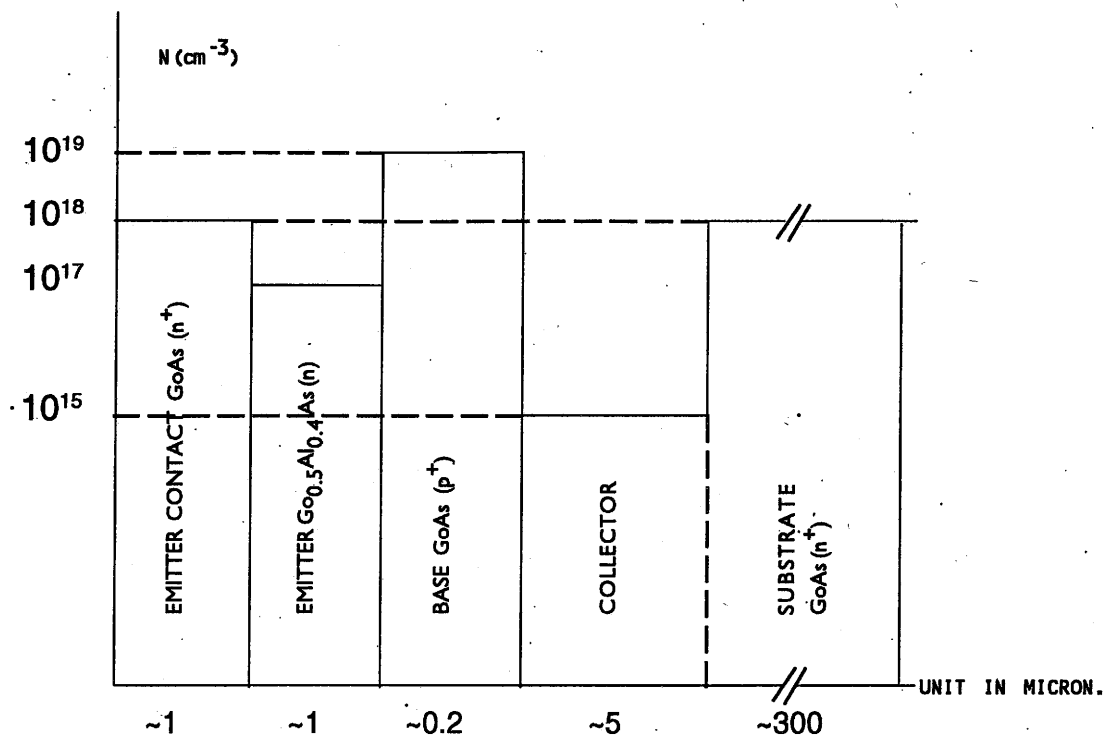
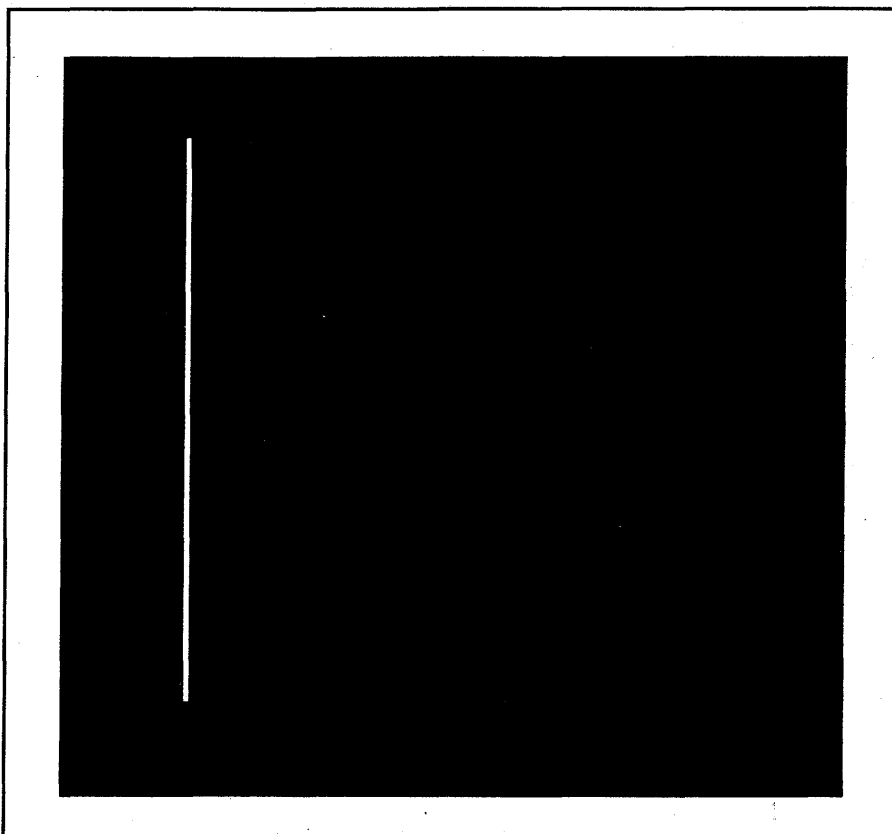


Figure 8:  $\text{Ga}_{0.6}\text{Al}_{0.4}\text{As}(\text{n}) / \text{GaAs}(\text{p}^+)$  Heterojunction Bipolar Transistor



**Figure 9: Doping Profiles of Ga<sub>0.6</sub>Al<sub>0.4</sub>As ( $n$ ) / GaAs( $p^+$ ) Heterojunction Bipolar Transistor.**





**Figure 10: ( $I_c$ ,  $v_{CE}$ ) characteristic of the transistor**

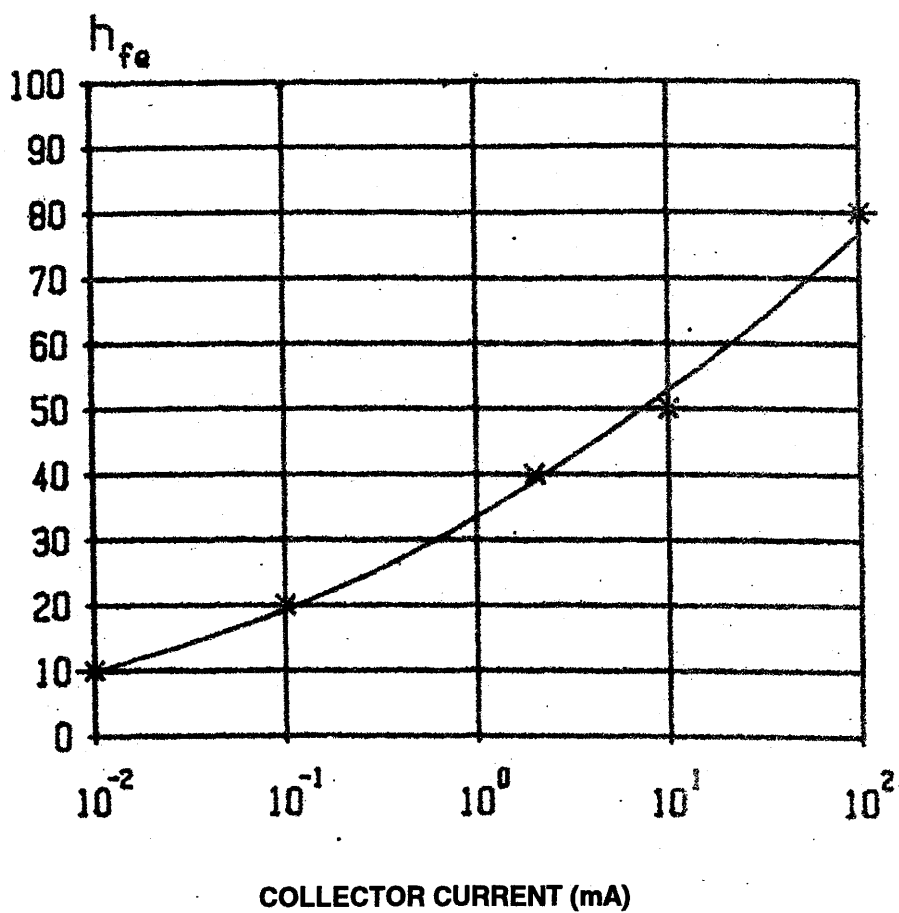


Figure 11: ( $h_{fe}$ ,  $I_C$ ) characteristic of the transistor

**Ga<sub>0.6</sub>Al<sub>0.4</sub>As(n)/GaAs(p<sup>+</sup>)  
HETEROJUNCTION  
BIPOLAR TRANSISTOR  
CHARACTERIZATION**

The (I<sub>c</sub>, V<sub>CE</sub>) characteristic of the transistor is shown in Figure 10. An emitter-collector breakdown voltage V<sub>CEO</sub> of 100 Volts was reached. Current gains h<sub>FE</sub> are ranging from 20 to 80. Figure 11 shows the (h<sub>FE</sub>, I<sub>c</sub>) characteristic for current range from 10  $\mu$ A to 100 mA. The maximum collector current of the transistor is about 100 mA, together with the high breakdown voltage V<sub>CEO</sub> about 100 Volts, we obtain the maximum power around 1 watt.

**CONCLUSION**

We have succeeded in mastering the technical know-how of multilayer structure growth of GaAs and Ga<sub>1-x</sub>Al<sub>x</sub>As compound semiconductors by choosing liquid phase epitaxy as the principal technology. Two types of devices, GaAs/Ga<sub>1-x</sub>Al<sub>x</sub>As light emitting diode and Ga<sub>0.6</sub>Al<sub>0.4</sub>As(n)/GaAs(p<sup>+</sup>) heterojunction bipolar transistor, have been experimentally realized and studied. The performances obtained from both devices provided us a clear path for further research and development. In the case of light emitting diodes, it seems natural to aim towards the

semiconductor laser diode realization whereas the heterojunction bipolar transistor could be used as an optical switch. Subsequently, a laser integration with the transistor will lead to integrated optoelectronics.

**REFERENCE**

- Kroemer H., Apr. - June 1983. Heterostructure bipolar transistor: what should we build?. J. Vac Sci. Technol. B 1(2), 126-130.
- Rey G., J.P. Bailbe, A. Marty, C. Antarasena, A. Cazarre and J. Tasseli, 1984. Bipolar structures on GaAs for integrated circuits. Inst. Phys. Conf. Ser. No. 74: Chapter 8, Paper presented at Int. Symp. GaAs and Related Compounds, Biarritz, France, 671-676.
- Sual R.H., Tien Pai Lee and C.A. Burrus, 1985. Light emitting diode device design. Semiconductors and Semimetals, Vol. 22, Part C, 193-237.
- Yariv A., 1985 Optical electronics. Third edition, Holt, Rinehart and Window, Holt-Saunders, Japan.

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