

Peñalba, Linda M.; delos Angeles, Marian S.; Francisco, Herminia A.

**Working Paper**

## Impact Evaluation of the Central Visayas Regional Project Phase I (CVRP-I)

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Visayas Regional Project  
Phase I (CVRP-I)

*Linda M. Peñalba, Marian S. delos Angeles  
and Herminia A. Francisco*

DISCUSSION PAPER SERIES NO. 94-22

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December 1994

For comments, suggestions or further inquiries please contact:

**The Research Information Staff**, Philippine Institute for Development Studies  
3rd Floor, NEDA sa Makati Building, 106 Amorsolo Street, Legaspi Village, Makati City, Philippines  
Tel Nos: 8924059 and 8935705; Fax No: 8939589; E-mail: [publications@pidsnet.pids.gov.ph](mailto:publications@pidsnet.pids.gov.ph)  
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**Philippine Institute for Development Studies**

**Impact Evaluation  
of the Central Visayas Regional Project  
Phase I (CVRP-I)**

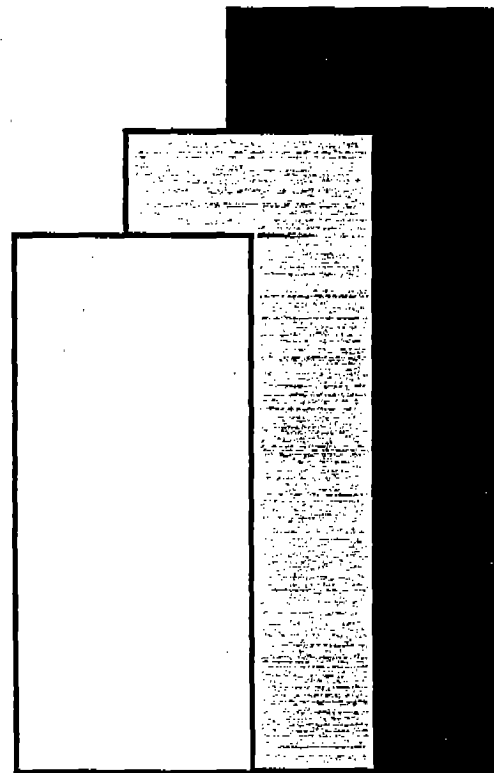
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**For comments, suggestions or further inquiries please contact:**

**Dr. Marian S. delos Angeles, Philippine Institute for Development Studies  
3rd Floor, NEDA sa Makati Building, 106 Amorsolo Street, Legaspi Village, Makati 1229, Metro Manila, Philippines  
Tel No: 8 925746; Fax No: (832) 8925746**

**IMPACT EVALUATION  
of the  
CENTRAL VISAYAS REGIONAL PROJECT - PHASE I  
(CVRP-I)**

**L.M. Peñalba, M.S. delos Angeles and H.A. Francisco**

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**THE CVRP-I  
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# THE CVRP-I IMPACT EVALUATION REPORT\*

L.M. Peñalba, M.S. delos Angeles and H.A. Francisco\*\*

## I. INTRODUCTION

The Central Visayas Regional Project (CVRP-I) is a region-based rural development effort aimed at improving both the resource base and the living standards of small-scale upland farmers, nearshore fishermen and marginal forest dwellers through a community-based resource management. Adapting to the emerging demands of participatory development and changes in the Philippine administrative structure, it has focused on community-based implementation of projects and a devolution from region to local government units for project management (External Review, 1988). It has also recently expanded into additional sites in the region.

CVRP-I has three major components: upland agriculture, nearshore fisheries and social forestry. Each of these components introduced various interventions depending on the nature of the resource involved and the kind of intervention deemed necessary to arrest resource degradation and help the target beneficiaries improve their level of living.

CVRP-I also adopted several approaches for effective project implementation and to facilitate delivery of necessary assistance to the project beneficiaries. These include community or participatory/bottom-up resource management, integration of efforts, plans and programs of local government units (LGUs) and regional line agencies (RLAs), the use of watershed as a natural unit for resource management, institutional strengthening through the creation of task force, cross-visits, and on-the-job experiential learnings, and provision of support services and non-traditional strategies in communications.

Other strategies adopted include decentralization/devolution of project management and operations and the active involvement of the LGUs and RLAs in project implementation and institutions strengthening to ensure that operations will be sustained even after the termination of the project. Moreover, through the active involvement of the LGUs and the beneficiaries, it is hoped that their capability to manage the project by themselves is strengthened and the awareness of the benefits of proper resource management is improved.

Given that CVRP-I is the country's first development effort which tries decentralized approaches to project implementation through the regional administrative machinery, it is important that impact evaluation studies be conducted that would consider the project's peculiar

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\* Final report presented at PIDS roundtable discussion on CVRP-I, June 28, 1993.

\*\* Director, Institute of Agrarian Studies, UPLB; Fellow II, Philippine Institute for Development Studies; Associate Professor, College of Economics and Management, UPLB, respectively.



characteristics. Lessons learned from the study would provide better understanding of resource-based management at both the target beneficiary and CVRP-management levels. Beyond CVRP, lessons for area-based, local rural development may likewise be derived.

After six years of CVRP-I, has the goals set been attained? Has there been a significant change in the socio-economic condition of the beneficiaries of CVRP-I? Do the people have better access to local resources? Are their capabilities to manage these resources enhanced by the project? Have they learned and adopted resource conservation/management measures? If not, what constrains them to do so? Have the communities developed their capabilities to manage local resources on their own? Have the programs introduced been effective in promoting conservation and rehabilitation of local resources and improvement of the welfare of the beneficiaries? What is the impact of CVRP-I on forest and aquatic resources utilization?

A related set of questions involves investments in forest and nearshore lands that have been made by residents, whether CVRP adoptors or not, in the form of agro-forestry, reforestation and fisheries development. The attractiveness of such investments is expected to have been enhanced not only by the inputs provided by CVRP but by changes in land tenure and water rights through the granting of stewardship contracts by the government. Very likely, the most important input to such investments from the households has been in the form of labor; this implies changing patterns in labor utilization as a result of involvement in CVRP. This, in turn, is expected to result in shifts from previously destructive activities such as slash and burn farming and use of illegal fishing methods towards more improvements in resource use. Involvement in group organizations is likewise expected to have contributed to improvements in marketing arrangements, as well as local policing by residents against resource encroachers.

## II. OBJECTIVES OF THE EVALUATION, LIMITATIONS AND CONSTRAINTS

The impact assessment was done to evaluate CVRP-I relative to its objectives of improving welfare of target beneficiaries; strengthening regional, local government and communities' management capabilities, and promoting sustained use of the region's natural resources.

Specifically, the following objectives were pursued in the conduct of the impact assessment:

1. to assess the impact of CVRP-I on the welfare of the project's beneficiaries;
2. to determine how conditions of the region's natural resources have been improved by the project;
3. to assess the efficiency and effectiveness of the approaches used and various management operational models adopted by CVRP-I;

4. to assess the strength of the community-level institutions formed and their potentials to sustain the development efforts of CVRP-I;
5. to determine the impact of CVRP-I on the local government units and their capability to manage development programs;
6. to assess the cost effectiveness of CVRP; and
7. to assess the sustainability of the desirable effects of CVRP and identify conditions that will make these effects last.

#### A. *Limitations and Constraints*

Evaluation of various aspects of CVRP-I was undertaken by a number of Institutions. PIDS conducted the overall assessment while some other institutions evaluated specific aspects of CVRP-I. Results of these special studies were supposed to be inputted to the PIDS assessment. However, because of some problems on the validity of the findings of some of the studies, the results of their evaluations were not incorporated in the PIDS report.

The impact evaluation report, therefore, focuses only on the socio-economic, environmental and management aspects of CVRP-I. The institutional and socio-political aspects like those relating to the linkages between and among the regional line agencies (RLAs) and local government units (LGUs) and how these would affect project sustainability, which were addressed by special studies were finally excluded from this report.

### III. THE RESOURCE CONSERVATION COMPONENTS

#### A. *The Upland Agriculture Component*

##### 1. Assessment of Approaches

The upland agriculture (UA) component aimed to benefit upland farmers through their participation in several resource conservation and improvement technologies which include: soil improvement measures, e.g., green manuring, planting of leguminous crops; soil conservation practices, e.g., contouring, use of hedgerows; tree farming and agroforestry; and reforestation activities. Free tree (fruit and non-fruit) seedlings with minimal distribution of fertilizers are given as incentives for participation in those tree planting activities.

The most widely adopted practices are those associated with on-farm soil conservation and microwatershed projects. These practices include the use of A-frame and the construction of hedgerows which were done by 78% of the respondents. Widely participated in by sample respondents were practices generally associated with microwatershed development such as the construction of contour ditches (45%); terraces (36%); rockwalling (40%); and making of

checkdams/diversion canals (39%). Soil fertility improvement measures like green manuring was done by 35% of the respondents (Table 1).

In terms of technology transfer, data showing the degree of adoption of the different upland agriculture technologies indicate that there exists a high level of adoption with 89% of the households in the project site practicing on-farm soil conservation, 72% engaged in agroforestry development, 17% in reforestation activities, and 28% in microwatershed planning and development. The upland fishpond project was participated in by only 10% of the household population (Table 2).

With respect to the distribution of livestock and the awarding of certificate of stewardship contracts, the largest number of recipients were recorded in 1989-1990. These periods coincided with the increased participation in soil conservation activities of CVRP participants. This was primarily because the distribution of livestock is associated with adoption of certain minimum level of soil conservation practice.

To a large extent, greater participation in the upland agriculture component was achieved because of the incentives provided in the form of livestock (availed at through the livestock dispersal and redispersal projects); seedlings; and some material inputs like fertilizers and construction materials for feedlots (Fig. 1). The practice of giving away said incentives was considered necessary since returns to resource improvement projects such as that of CVRP are realizable only at some future time.

Trail construction, road maintenance and water supply sourcing/improvements were also implemented. Participation in these projects reached their peaks in 1990 while participation in road construction was highest in 1989. Highest participation was recorded for trail construction and road maintenance since these projects entail comparatively small investments (Fig. 2).

The level of adoption of UA technologies was measured by the number of technologies being practiced by the respondents. The different variables which are hypothesized to influence level of adoption are shown in Table 3. Considering the respondents for all the CVRP provinces, the multiple regression model was found significant with 99% level of confidence and 20% coefficient of determination ( $R^2$ ). The factors found to significantly influence level of technology adoption are age of the household head, the attendance to community meetings and the quantity of seeds received from the project.

## 2. Assessment of Socio-Economic Effects

Projected incremental returns from resource-conservation activities in the upland agriculture sites through a twenty-five year period indicate that at 12 percent interest rate, the annualized value of incremental net income is P 5.7 million and the benefit-cost ratio is 1.46. These indicators imply that the CVRP-UA component may be considered an efficient project, since it is able to pay for itself as well as generate a surplus. This result also proves that there need not be conflict between economic efficiency and environmental protection.

**Table 1**  
**CONSERVATION PRACTICES ADOPTED IN CVRP UPLAND AGRICULTURE PROJECT SITES**  
**1992**

Technology	Adopter		Non-Adopter		Probability
	No.	%	No.	%	
1. A-Frame adoption	174	78	48	22	0.000
2. Construction of hedgerows	174	78	48	22	0.000
3. Contour ditches	104	47	118	53	0.005
4. Terraces	79	36	143	64	0.005
5. Rockwall	88	40	134	60	0.005
6. Checkdams/diversion canal	87	39	135	61	0.001
7. Composting	118	53	104	47	0.000
8. Green manure	77	35	145	65	0.021
9. Fallowing	37	17	185	83	0.409
10. Crop rotation	66	30	156	70	0.007

Source: PIDS 1992 Survey

**Table 2**  
**ADOPTION OF CONSERVATION TECHNOLOGIES,**  
**CVRP UPLAND AGRICULTURE PROJECT SITES, 1991**

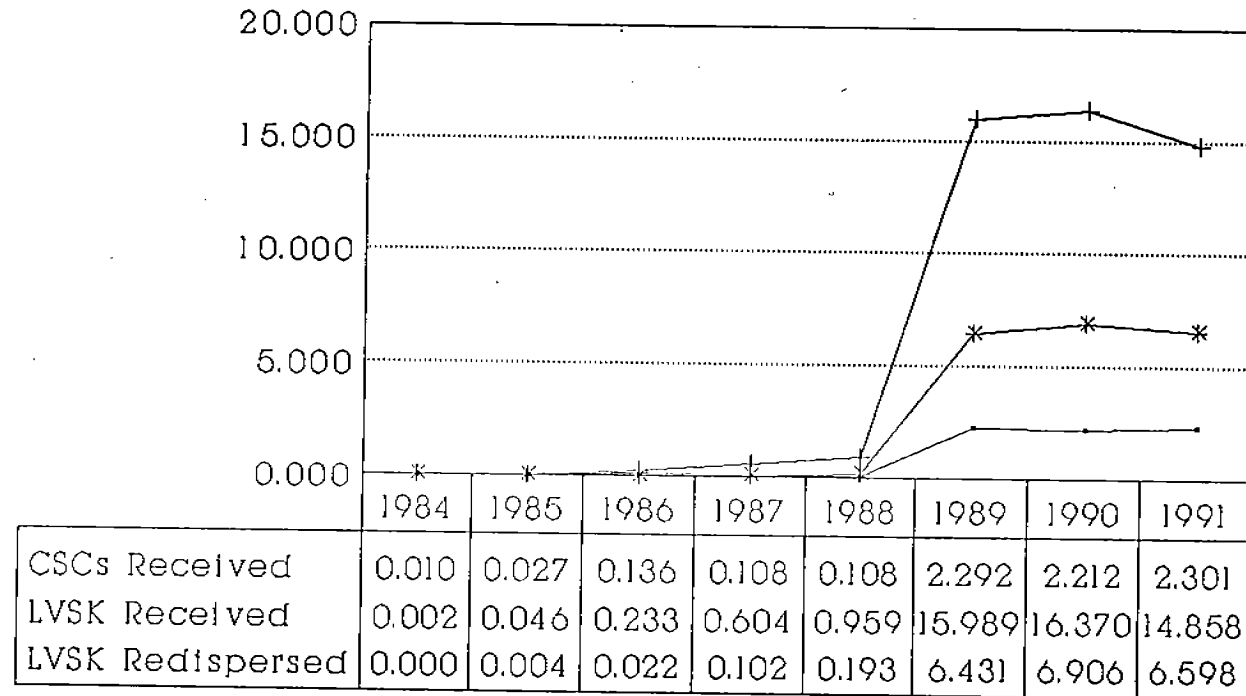
Technology	Adopter		Non-Adopter	
	No.	%	No.	%
1. On-farm Soil Conservation	6626	89	820	11
2. Agroforestry Development	5336	72	2110	28
3. Off-farm Reforestation	1274	17	6172	83
4. Upland Fishpond	725	10	6721	90
5. Micro Watershed Planning and Implementation	2110	28	5336	72

Source: CVRPO Reports

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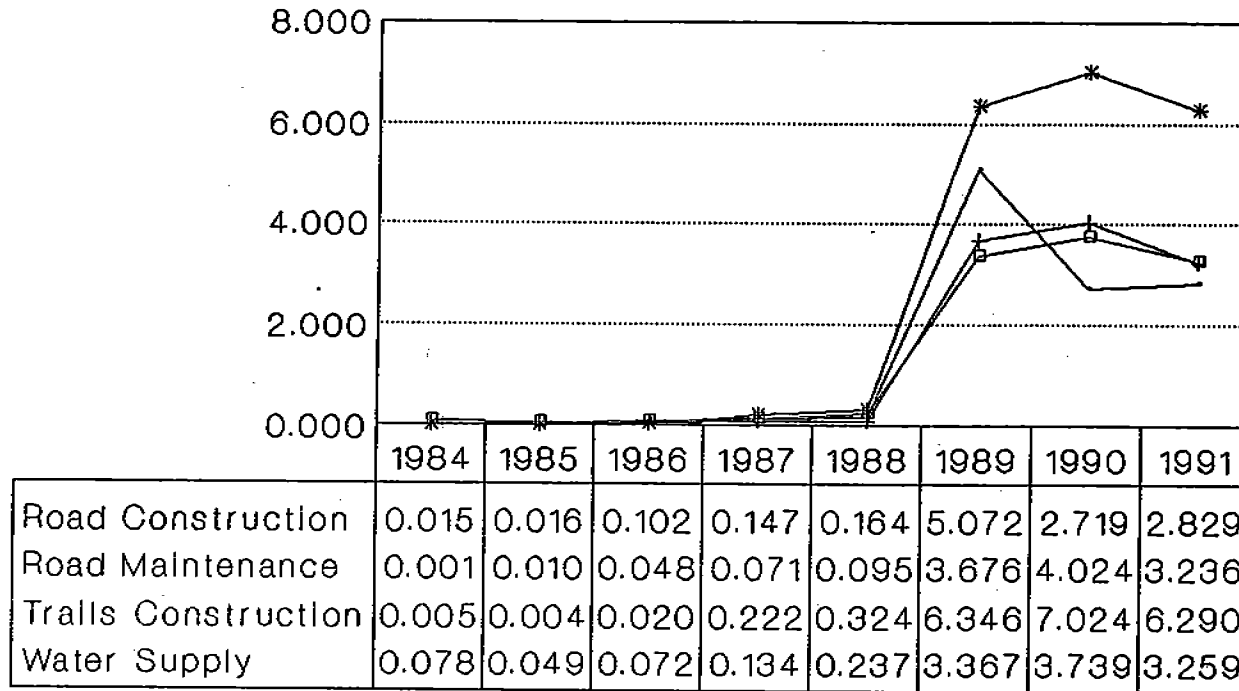
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**Figure 1**  
**RECIPIENTS OF LIVESTOCK DISPERSAL/REDISPERSAL PROJECTS**  
**AND CERTIFICATES OF STEWARDSHIP CONTRACT (1984-1991)**



—•— CSCs Received                      —+— LVSK Received  
 —\*— LVSK Redispersed

**Figure 2**  
**PARTICIPATION IN INFRASTRUCTURE ACTIVITIES**  
**IN CVRP PROJECT SITES (1984-1991)**



— Road Construction      + Road Maintenance  
 \* Tralls Construction      - Water Supply

**Table 3**  
**DETERMINANTS OF ADOPTION IN CVRP UPLAND AGRICULTURE PROJECT AREAS**  
**1992**

VARIABLES	SIQUIJOR	BOHOL	CEBU	NEGROS OR.	ALL PROVINCES
INTERCEPT	0.583379 (0.342)	-0.276073 (0.164)	0.496100 (0.384)	0.960830 (0.897)	0.859754 (1.330)
Age of HH head	0.015995 (0.843)	0.006526 (0.425)	0.006290 (0.358)	0.021910 (1.382)	0.018354 ** (2.274)
Highest educ. in the HH	0.063375 (0.705)	0.062173 (0.592)	0.115880 (0.106)	0.036650 (0.388)	0.064285 (1.340)
Household size	0.084894 (0.784)	0.075230 (0.694)	0.026945 (0.234)	-0.133855 (1.032)	-0.014215 (0.239)
Total farm area	-0.200479 * (0.993)	0.035644 (0.400)	-0.398020 * (1.612)	0.000669 (0.012)	-0.043521 (1.026)
Gross income	-0.000014 (0.779)	0.000001 (0.105)	0.000028 (0.763)	0.000011 (1.537)	0.000003 (0.681)
Dist. in time to nearest town center by vehicle	0.049709 *** (0.700)	-0.007270 (0.528)	-0.005241 (0.356)	0.009270 (1.121)	0.003910 (0.676)
Number of crops cultivated	-0.004134 (0.626)	-0.054770 (0.527)	0.124583 (0.874)	0.136880 (1.110)	0.116907 (1.932)
Attendance in community meetings	1.094269 * (1.910)	2.519100 * (1803)	1.552900 ** (2.307)	-0.691690 (1.154)	0.544810 ** (1.923)
Number of livestock dispersal	-0.004134 (0.626)	-0.064571 (0.108)	0.004217 (0.258)	0.653751 (2.011)	0.008717 (1.222)
No. of seeds distributed	0.001984 ** (2.083)	0.001210 (0.498)	0.000866 ** (2.428)	0.000461 *** (2.466)	0.000537 *** (3.489)
R <sup>2</sup>	61.45	26.31	45	45	20
F value	4.303 ***	0.785	2.524 **	2.524 **	3.650 ***

\* Significant at 10%

\*\* Significant at 5%

\*\*\* Significant at 1%

( ) T-values

Source of basic data: PIDS 1992 Survey

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In general, there is a positive assessment of the project's impact on the socio-economic life of the people. Some 60% of the respondents claimed being better off after participation to CVRP activities. Only 2% who claimed otherwise while around 27% said that they did not notice any change in their level of living in spite of CVRP's presence in the community. The positive response of CVRP holds true for all the study sites.

The most important contributions of CVRP to its beneficiaries as seen by the respondents themselves is the transfer of technical know-how on hillyland farming (28%), e.g., soil conservation and improvement practices and tree farming (Table 4). Material incentives that were highly appreciated include free livestock, seedlings and other planting materials, as well as limited amount of fertilizers.

It should also be noted that some 16% of the informants mentioned in particular the improvement of the land resource base as the most important contribution of the project. The other causes/reasons for the improved socio-economic status of those who claimed themselves to be better-off are the observed increase in production, increased cropping intensity, direct employment in CVRP activities, and prospect of higher income from yield of tree crops in the next few years.

### 3. Assessment of Problems and Constraints Vis-a-Vis Sustainability and Project Management

Favoritism is on top of the list of complaints mentioned by the respondents which relates to the inequitable distribution of seedlings and livestock (Table 5). While it is true that charges of favoritism may be considered as inherent in any program, especially that being managed by the people themselves in the context of Filipino tradition where strong family kinship exists, this does not mean that nothing should be done about this.

Planners of similar programs in the future should devise some mechanisms wherein the welfare of a bigger proportion of any group or the most disadvantaged members of the community may be enhanced. In the process, the decentralization and autonomy principles that the program wants to promote should not be sacrificed.

Inadequate or insufficient visits by technicians were also reported. This could be due to the big number of participants being assisted by the project which made more intensive interaction between technicians and the farmers difficult. Furthermore, there is seemingly an over-emphasis by the project on quantity or numbers of participants regardless of the quality of learnings transferred to the clientele.

Whether adoptors do in fact practice the technologies, sustainability is also another matter. It would appear that a farmer would be considered as adoptor once the technology gets adapted in his farm. What happens after that appears to be no longer of concern to project implementors.



**Table 4**  
**REASONS CITED FOR IMPROVING SOCIO-ECONOMIC CONDITIONS**  
**AFTER PARTICIPATION IN CVRP UPLAND AGRICULTURE ACTIVITIES, 1992**

REASONS	% RESPONDING
Due to material inputs (livestock, seedlings, fertilizer) given by CVRP	24
There is now better knowledge/technical know-how in hillyland farming	28
There was an observed increase crop in production and subsequent improvement in income	15
The resource base (soil fertility and environment) has improved	16
Cropping intensity has increased	5
Trees planted will be turned into cash in a few years time	5
CVRP provides direct employment	2
No answer given	5

Source: PIDS 1992 Survey

**Table 5**  
**CRITICISMS ON CVRP UPLAND AGRICULTURE ACTIVITIES**  
**1992**

CRITICISMS	TIMES MENTIONED
Favoritism	30
Slowing down of activities	11
Some crops/project (fishpond) not suited to the area	7
Insufficient materials being distributed	4
Inadequate/insufficient visits	4
Strict in policies	3
Inadequate technical support to tree farming	3
Delayed payments for services	2
Non-compliance with agreements	2
Very expensive project	1
Insufficient meeting	1
CVRP sites are too far from center	1
Converting some activities to foundation concern	1
Slow livestock redispersal	1

Source: PIDS 1992 Survey

This implicit bias for quantity over quality should be corrected. The more important aspect in technology adoption is not that the technology gets adopted per se but that it be practiced sustainably once adopted. Project implementors should therefore spend additional time to monitor the sustainability of its most significant technologies. By making sustainability of technology adoption (whenever appropriate) as a goal, quality of technology transfer activities will somehow be automatically improved.

The services of the barefoot technicians and/or the livestock chairman is one aspect of CVRP worth replicating. These local people who are at least high school graduates are given training to be able to teach and transfer the technologies to the farmers. Their being from the place facilitated the technology diffusion process but a higher quality of teachings could still be improved since they are reportedly still covering a big number of participants than what could effectively be monitored. This calls for increasing the number of barefoot technicians to be involved in succeeding CVRP activities.

Another important aspect is the need to give equal importance to production activities, side by side with soil improvement and conservation practices. Soil conservation measures and soil fertility improvement activities could have been better appreciated if productivity of the crops will be improved simultaneously through improved cultural practices and use of modern cultivars.

A need to improve the working relationship of CVRP with the Department of Agriculture was also seen. There appears to be a prevailing atmosphere of "competition" instead of "complementation" and this points to the need to devote some time repairing some of these misconceptions.

#### 4. Expected Income Effects

A comparison of gross and farm income among the different types of technology adoptors revealed a significant difference in income between non-adoptors and the medium and high adoptors. Gross income in real terms is furthermore improving over the years. While farm income accounts for the biggest proportion of income, non-farm income sources are also playing a significant role in some provinces (Table 6; Figure 3). As a result, high adoptors are beginning to spend higher levels on non-food items (Table 7).

Benefit-cost analysis of the different UA interventions was done at the farm and project levels using the "with" and "without" project analysis. The farm-level analysis showed positive net present value (NPV) and greater than one benefit-cost ratio. The highest NPV is realized from farms which adopted on-farm soil conservation measures and followed by agroforestry farms. The least returns were realized from the upland fishponds reported by some as being inappropriate to the conditions in the project sites.

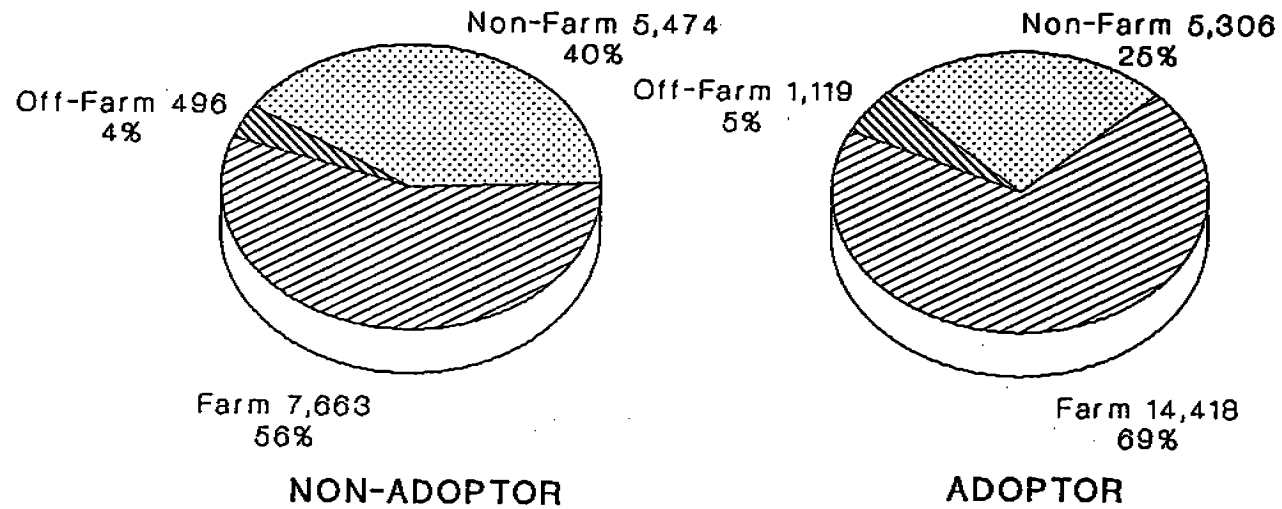
**Table 6**  
**INCOME SURVEY OF RESPONDENTS IN CVRP UPLAND AGRICULTURE PROJECT SITES**  
**BY PROVINCE AND ADOPTION OF CONSERVATION TECHNOLOGIES, 1991**

Province/Source of Income	Non-Adaptor		Adaptor	
	Mean	Std. Dev.	Mean	Std. Dev.
<b>Siquijor</b>				
farm income	1,726	1,802	6,198	5,289
non-farm income	18,465	16,768	14,371	5,743
off-farm	—	—	2,062	4,796
gross income	20,191	18,408	21,556	45,613
<b>Bohol</b>				
farm income	9,502	6,571	17,925	28,225
non-farm income	1,553	1,355	2,365	5,743
off-farm	—	—	579	2,674
gross income	11,055	5,537	20,869	29,919
<b>Cebu</b>				
farm income	5,557	2,779	9,220	7,018
non-farm income	2,318	4,120	2,410	3,495
off-farm	280	656	546	1,222
gross income	8,154	4,422	12,127	7,078
<b>Negros Or.</b>				
farm income	12,264	14,830	22,929	40,169
non-farm income	4,863	5,070	4,306	7,936
off-farm	1,146	1,328	1,601	3,496
gross income	18,274	13,729	28,836	40,395
<b>All Provinces</b>				
farm income	7,663	9,453	14,418	25,948
non-farm income	5,474	8,893	5,306	22,628
off-farm	496	970	1,119	3,239
gross income	13,633	11,597	20,843	33,638

Source: PIDS 1992 Survey

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**Figure 3**  
**INCOME DATA OF FARMER RESPONDENTS**  
**IN CVRP PROJECT SITES, BY LEVEL OF ADOPTION**  
**OF UA TECHNOLOGIES, 1992**



**Table 7**  
**HOUSEHOLD EXPENDITURE ON MAJOR ITEMS, BY LEVEL OF ADOPTION OF**  
**UPLAND AGRICULTURE TECHNOLOGIES, 1992**

Nature of Expenditures	NON-ADOPTOR	ADOPTOR			
		Low	Medium	High	All Adoptors
<b>Food</b>					
mean	9,364	6,109	4,760	10,106	8,175
sd	8,334	4,333	3,358	8,751	7,434
n	21	17	90	76	183
%	79	64	78	76	73
<b>Cloth</b>					
mean	1,350	980	723	1,294	1,147
sd	1,393	822	719	1,657	1,413
n	21	17	90	76	183
%	11	10	12	10	11
<b>Medicine</b>					
mean	405	1,402	168	744	821
sd	558	2,924	192	1,463	1,891
n	21	17	90	76	183
%	3	15	3	6	8
<b>Recreation</b>					
mean	194	258	407	233	337
sd	445	409	683	515	1,089
n	21	17	90	76	183
%	2	3	7	2	4
<b>Others</b>					
mean	533	726	7	952	794
sd	1,214	1,410	23	2,663	2,197
%	4	8	0	0	3
<b>TOTAL EXPENDITURE</b>	<b>11,846</b>	<b>9,475</b>	<b>6,065</b>	<b>13,329</b>	<b>11,274</b>
	<b>10,672</b>	<b>7,244</b>	<b>4,055</b>	<b>11,674</b>	<b>10,506</b>

Source: PIDS 1992 Survey

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The positive net returns from the UA interventions and the UA component as a whole strongly suggest that investment in resource conserving projects can be justified not only on ecological grounds as they also stand up to economic test of acceptability. This is to be expected since in the end, sustainable income is only possible with an improved resource base.

## 5. Contribution to Forest Policy Reform

Early signs of benefits accruing from the upland agriculture component were among the inputs to reforms on access of small-scale users to forest land management. The extension of the previous two-year tenure for upland cultivators in forest lands to a twenty-five year stewardship certificate was a benefit derived from discussions held on the CVRP upland agriculture component.

### B. *The Social Forestry Component*

The social forestry (SF) component was pursued primarily to enhance the rehabilitation and regeneration of forest resources and improve the welfare of the forest occupants. Social forestry program interventions were introduced in 1984 on a 17,363-hectare logged-over area located in the municipalities of Ayungon and Bindoy in Negros Oriental.

The interventions aimed to undertake the development and management of forest lands, improvement of timber stand, and reforestation of cogon lands. Issuance of resource access instruments to forest occupants in the form of Community Timber Utilization Permits (CTUP) and Stewardship Contracts also formed part of the SF program.

Reforestation activities were the major concern of the project in its early years of implementation. Other reforestation approaches were however introduced in 1989, such as assisted natural regeneration (ANR) and on-farm reforestation.

#### 1. Assessment of Socio-economic Impact on Recipients

The assessment of the CVRP-SF program points to several salient findings. Results of the survey show that about 40 percent of the respondents are not natives of the area. More than half of the migrant-respondents moved into the area within the 1971-1990 period. Majority (60%) of them were short-distance migrants (Table 8).

The most common reason for moving into the project area is their search for a better life. Almost all of the respondents do not have any plans to move out. Of those who have plans to move out, majority (84%) are cooperators. This could be indicative of the characteristics of cooperators that made them actively participate in CVRP -- their continuing quest for ways to improve their lives.

**Table 8**  
**SELECTED MIGRATION INDICATORS, CVRP--SOCIAL FORESTRY SITE**  
**1992**

ITEM	Cooperators		Non-Cooperators		Total	
	f	%	f	%	f	%
<b>A. Migrants/Non-migrants</b>	<b>(n=97)</b>		<b>(n=70)</b>		<b>(n=167)</b>	
Migrants	15	15	15	21	30	18
Non-migrants	82	85	55	79	137	82
<b>B. Year most of the respondents moved in</b>	<b>(n=15)</b>		<b>(n=15)</b>		<b>(n=30)</b>	
1971-1990	8	54	9	61	17	57
<b>C. Place of origin</b>	<b>(n=15)</b>		<b>(n=15)</b>		<b>(n=30)</b>	
Another barangay within the municipality	9	60	9	60	18	60
Another region	5	33	1	7	6	20
<b>D. Plans to move out</b>	<b>(n=97)</b>		<b>(n=70)</b>		<b>(n=167)</b>	
Yes	3	3	-	-	3	2
No	81	84	67	96	148	89

Source: PIDS 1992 Survey

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There is a perceived improvement in terms of type of housing, health and nutrition. They said that CVRP helped and facilitated their access to health facilities and medical services through the primary health care program of CVRP-SF and the improvement in roads and trails.

Almost all of the respondents have positive ideas about CVRP. Majority of them have positive initial reactions to CVRP, which they perceived as a program both for the improvement of their livelihood and environmental conservation. The perceived benefits from CVRP are increased income through employment and new production-enhancing technology.

The average farm size of cooperators (2.63 hectares) is relatively smaller than the non-cooperators (3.53 hectares), as indicated in Table 9. There was a slight expansion in cultivation between the periods before and after CVRP. The total area cultivated in 1991 was 51 hectares larger than in 1984. The farms of the cooperators expanded by only 13 percent while that of the non-cooperators expanded by 24 percent.

The crops planted are mostly for subsistence: irrigated rice in the lowlands and corn, rootcrops, vegetables and fruit trees on the slopes.

Kaingin farming is still practiced despite the efforts of the Forest Occupants Stewardship Associations (FOSAs) to control forest destruction; burning and cutting of trees are still going on. Large/mature trees are gradually destroyed through girdling and burning.

There are some reported changes in cropping system in the area after CVRP, although the observed changes are mostly in terms of increased density of fruit trees and border crops. There are no major changes in species mix or in farming system adopted.

The major factors that caused the farmers to change their cropping system were the new agroforestry farming technologies they learned from CVRP. This implies that the technology dissemination efforts of CVRP was successful in convincing about 59 percent of the respondents to change into more conservative cropping systems.

## 2. Income Effects

The average incomes of respondents at various points of CVRP implementation (1985, 1988, and 1991) were compared (Table 10). Results show that income (current) increased consistently from 1985 to 1991. The increase in income is greater from 1985 to 1988 than from 1988 to 1991.

The increase in income is greater for cooperators than for the non-cooperators (₱6,470 and ₱4,706 from 1985 to 1988; and ₱420 and ₱101 from 1988 to 1991; respectively) (Table 11). The relatively high increase in income from 1985 to 1988 may be attributed to the access that farmers have to forest resources. About 15 percent of the 1988 real income of both the cooperators and non-cooperators were obtained from sale of forest products. Community Tree Utilization Permits (CTUPs) were still in force during this period. The much smaller increase



**Table 9**  
**DISTRIBUTION OF RESPONDENTS BY FARM SIZE AND STATUS,**  
**SOCIAL FORESTRY SITE, 1992**

Farm Size	Cooperator		Non-Cooperator		Total	
	Farmed	Claimed	Farmed	Claimed	Farmed	Claimed
less than 1	24	22	16	11	46	33
1 - 1.9	24	24	24	26	48	50
2 - 2.9	15	17	13	10	28	27
3 - 3.9	9	9	2	5	11	14
4 - 4.9	8	9	4	5	12	14
5 - 5.9	5	6	2	2	7	8
6 - 6.9	2	1	4	3	6	4
more than 7	4	9	4	7	8	16

Source: PIDS 1992 Survey

**Table 10**  
**AVERAGE ANNUAL INCOME OF RESPONDENTS AT VARIOUS POINTS OF**  
**CVRP-SOCIAL FORESTRY IMPLEMENTATION (1985, 1988, 1991)**  
**(in constant 1985 pesos)**

Year	Cooperator	Non-Cooperator
1985	4,879	3,811
1988	11,348	8,517
1991	11,905	9,040

Source: 1985 and 1988 data. delos Angeles, M.S. 1989  
 1991 data - 1992 CVRP Social Forestry Survey

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**Table 11**  
**AVERAGE INCOME OF RESPONDENTS BEFORE AND AFTER CVRP,**  
**BY PARTICIPATION IN SOCIAL FORESTRY ACTIVITIES**

Intervention	Cooperator		Non-Cooperator		Total	
	No.	Ave.	No.	Ave.	No.	Ave.
<b>BEFORE</b>						
1	1	1000	2	5250	3	3833
2	2	1000	8	6531	10	5423
3	23	8333	17	6297	42	7392
12	3	5667	4	5307	7	5461
13	3	6267	4	3375	7	4614
14			1	19250	1	19250
23	9	5167	13	5069	23	4974
24	2	3670	1		3	2447
34	23	3424	-		23	2898
123	7	11714	9	1555	10	13950
124	1	1000			1	1000
134	2	5000	1	5000	3	5000
234	13	3915	1	5000	14	3904
1234	6	10713	1	3750	8	9660
<b>AFTER</b>						
1	1	6000	2	10000	3	8667
2	1	1000	8	2375	10	2100
3	23	17586	17	13191	42	15398
12	3	9167	4	6069	7	7396
13	3	9733	4	6125	7	7671
14			1	25200	1	25200
23	9	5844	13	6508	23	6052
24	2	7700	1		3	5133
34	23	3187	9	2639	32	3033
123	7	13500	3	14667	10	13850
124	1	1000			1	1000
134	2	10150	1	4000	3	8100
234	13	9554	1	3750	14	9139
1234	6	56400	2	10200	8	44850

Codes for Interventions: 1-Production Enhancing; 2-Off-Farm Conservation; 3-CTUP; 4-Employment/Income Generating

**Hypothesis Tests for Means (Mean Difference is = or > 0)**

1. One activity vs Four activities: Reject the hypothesis: Income of those who participated in four activities is significantly greater than those who participated in only one activity at 2.5% tests of significance.
2. One activity vs two activities: Reject the hypothesis at 20% tests of significance.
3. One & two activities vs Three & Four Activities: Reject the hypothesis at 40% test of significance.
4. Mean difference between interventions;
  - a. 1 & 2: Reject the hypothesis at 20% tests of significance
  - b. 12 vs 13: Reject the hypothesis at 20% tests of significance
  - c. 23 vs 24: Reject the hypothesis at 10% tests of significance
  - d. 123 vs 124: Reject the hypothesis at 20% tests of significance

Source: PIDS 1992 Survey

in income from 1988 to 1991 can be explained by the limited availability of income-generating opportunities in the area. CTUPs were canceled after fund management issues and abuse in the use of CTUPs by some of the FOSAs were reported. The cancellation of CTUPs in 1988 (third quarter) closed the people's access to one of their major income sources.

There are indications supporting the hypothesis that differences in income can also be explained by the type of intervention adopted. Among the cooperators, the income of those who adopted "production enhancing" interventions increased by 149 percent (from an average of ₦9,168 before CVRP to ₦22,847 in 1991), while those who adopted both "on-farm" and "off-farm" conservation interventions had an increase of 89 percent.

The non-cooperators who adopted "production enhancing technologies" also reported an increase in their income by about 73 percent, while those who adopted both on-farm and off-farm conservation interventions increased their income by 100 percent.

Farm income of the "on-farm improvement" adoptors is expected to increase further as benefits from agroforestry farm development are realized. This component of social forestry was not introduced until 1988 since the project focused on reforestation during the early stages of the project (1984-87).

It is also hypothesized that the increase in income of those who adopted on-farm conservation and production-enhancing technologies will probably be sustained, while those whose involvement in CVRP was only through employment and contract reforestation may not. This is because the stream of benefits from the increased farm production shall continue to be realized in the future, whereas employment in reforestation activities may not be continued after CVRP has withdrawn from the area.

Encroachment into the area and parcelization of farms continue to this day. About 10 percent of the respondents reportedly gained actual possession of the lands they are tilling only last year either through inheritance or tenancy.

Data also show that most (90%) of those who entered the area in the early 1900 did not actively participate in CVRP-introduced activities. The proportion of cooperators is highest among those who gained possession of their lands in the 1970s and 1980s.

Many of those who came in after 1990 were not able to participate in many community-based resource management (CBRM) activities because most of the program components have already been terminated or activities have considerably declined when they came.

The respondents were grouped according to the year they joined or participated in CVRP/CBRM activities to determine if this variable affects income of both cooperators and non-cooperators. Results of the analysis show that those who joined CVRP in 1984 had the lowest income level in 1991 but their income actually increased by 184 per cent. This is because they had very low income before they joined CVRP.

In general, the cooperators reported higher income increases compared to the non-cooperators. The increase in the cooperators' income ranges from 35 percent for those who joined in 1985 to 215 percent for those who joined in 1987. The cooperators who joined in 1986, 1987 and 1988 may have taken part in the CTUP operations and other income-generating activities. They may have benefitted much as a result of the full-swing operations of CVRP during these years.

The tenurial status of the respondents reflects the complexity of landownership claims in the area (Table 12). While the area is largely classified as timberland and formerly covered by Timber Lease Agreement (TLA), some of the flat portions (valleys) planted to irrigated rice were covered by Operation Land Transfer (PD 27 agrarian reform) and distributed to farmer-beneficiaries. There are also existing claims on both the lowlands and the hilly/forest lands mostly by absentee-claimants who hire tenants/overseers to manage the lands or maintain their "presence" in the area.

Mixed tenure was also reported to be practiced in the area. There are cases where a farmer is a claimant-cultivator in one parcel and, at the same time, either a claimant-non-cultivator (with tenants) or a share-tenant, leaseholder, hired worker or Certificate of Stewardship Contract (CSC) holder in another.

To determine if tenure has any effect on income, the respondents were grouped according to their tenurial status. The highest income (₱116,800) was reported by an amortizing owner who cultivates 8.5 hectares of land. He is actually claiming ownership of 14 hectares but cultivates only 8.5 hectares. In this case, the high income may be due more to the big farm size than to the tenure.

Among the other tenure groups, however, it was found out that the share-tenants obtained the lowest income (₱4,888) while the CSC holders got (₱12,000). This is because part of the plot covered by the respondent's CSC still has some standing trees, which somehow provides him with extra source of income. These findings suggest that those who have better access to resources, whether land or forest resources that can be used for production or sold, would have better income than those who have limited access to and control of any kind of productive resource.

Farmers in the area are engaged mostly in subsistence farming. Very little proportion of the produce is therefore marketed. They recognize the significant contributions of improved infrastructure (roads and trails) in marketing but they have so far not produced enough for the market.

On the whole, people's participation in the SF program is evident as shown by the involvement of a large number of marginalized upland farmers in the area. The people are generally organized and able to confront issues affecting their lives, and show potentials in harnessing their combined energies toward systematic, constructive, and collective action.

**Table 12**  
**TENURIAL STATUS OF SOCIAL FORESTRY COOPERATORS AND NON-COOPERATORS**  
**1992**

Tenure	Cooperator		Non-Cooperator		Total	
	No.	%	No.	%	No.	%
Number of respondents	97		70		167	
Claimant cultivator	44	45	20	28	64	38
Claimant non-cultivator	2	2	9	13	11	7
Share tenant	24	25	8	11	32	19
Leaseholder	2	2	2	3	4	2
ISF (CSC holder)	6	6	10	14	16	10
Amortizing owner	2	2	2	3	4	2
Others	17	18	19	28	36	22

Source: PIDS 1992 Survey

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### 3. Social Forestry Benefits

Almost all (94%) respondents reported a high level of satisfaction with CVRP (Table 13). The reasons cited for this positive feedback on CVRP are: (1) it introduced income-generating activities and employment opportunities from which villagers obtained additional income; (2) it provided free seedlings and introduced new technologies which eventually led to improvement in the forest resource base; (3) it provided them with some hope for a better life; and (4) the project components and the management of CVRP were good. Those who expressed dissatisfaction with CVRP, particularly the non-cooperators cited mismanagement as the reason.

The respondents said that the greatest contributions of CVRP to themselves and their families are employment and the new farming techniques that they learned through the program. Social consciousness, awareness and understanding of conservation concepts, better community participation and mobilization of the community for forest conservation, construction or improvement of roads and trails and better access to health facilities and medical services are among the benefits that the community obtained from CVRP.

Many of the respondents believe that they are still poor even after CVRP (Table 14). To them, those who are earning about ₱25,000 in 1992 can be considered "not poor" while those earning ₱8,000 to ₱14,000 are still "poor." On the other hand, their perceived "poverty level" in 1984 was ₱3,200 to ₱5,000 while an income level of ₱14,000 to ₱17,000 was considered good enough. Those earning this much can be considered "not poor." Their assessment of their poverty level is validated by the income data that they reported. Majority of them have incomes below ₱25,000, so majority of them are still poor.

### 4. Effect on the Forest Land Resource Base

There are visible indications that the project has contributed to the enhancement of the natural resource base in the project area. This can be attributed to the preservation of the remaining virgin forest; the protection of brushlands and logged-over areas from further kaingin making and illegal logging; the increase in area with adequate forest cover; and the adoption of more conservative upland farming methods.

Culled trees left by previous logging operations have grown as a result of their liberation from competing vegetation. The incremental growth attained by healthy residuals in the secondary forest have increased forest biomass. The enhancement of growth of liberated broadleaved species and the augmentation plantings conducted through ANR have generally increased the areas with forest cover.

The growth of some of the tree species planted on the reforestation sites is not good. *Gmelina* and *S. macrophylla* appear to be poor choices as reforestation species for the area. The improvement in vegetation and in the natural resource base could have been much better if more appropriate forest tree species were used for reforestation.

**Table 13**  
**SUMMARY OF RESPONDENTS' REACTION TO/ASSESSMENT OF CVRP**  
**SOCIAL FORESTRY COMPONENT**

Reaction/Assessment	Cooperators		Non-Cooperators		Total	
	No.	%	No.	%	No.	%
<b>A. Reaction to program</b>	(n=97)		(n=70)		(n=167)	
<b>Satisfied</b>	94	97	63	90	157	94
<b>B. Reasons for satisfaction</b>	(n=94)		(n=63)		(n=167)	
<b>Provided income/employment</b>	39	42	34	56	73	46
<b>Introduced new/conservation technology</b>	42	45	34	54	73	46
<b>C. Strengths</b>	(n=97)		(n=70)		(n=167)	
<b>Effective in providing livelihood sources</b>	26	37	45	46	71	42
<b>Taught people new conservation practices</b>	34	49	51	52	85	51
<b>D. Weaknesses</b>	(n=97)		(n=70)		(n=167)	
<b>Problems in management</b>	13	16	18	19	31	18

Source: PIDS 1992 Survey

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**Table 14**  
**PERCEPTION OF THE SOCIOECONOMIC STATUS BEFORE AND AFTER CVRP**  
**AND ESTIMATED INCOMES IN SOCIAL FORESTRY PROJECT SITE**

Perceived Socio-Economic Status	Cooperator			Non-Cooperator		
	No.	%	Perceived Income (P)	No.	%	Perceived Income (P)
<b>Before CVRP (1984)</b>						
Poor	69	71	5,248	36	51	3,287
Not poor	25	26	14,840	33	47	16,939
<b>After CVRP (1992)</b>						
Poor	64	66	9,622	28	40	7,743
Not poor	31	32	25,806	41	58	25,878

Source: PIDS 1992 Survey

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There are, however, sites wherein reforestation is successful. In at least 27 plots that are managed by 6 FOSAs, survival rate is high (averaging 70%) and growth of plantings is very good such that these can qualify for Forestlot Management Agreement (FLMA).

Community-Based Contract Nurserying (CBCN) is a good strategy that contributed to the attainment of both the social and technical objectives of the project. Aside from being the focal point of organization and community mobilization, the nurseries provided learning laboratories which enhanced farmers' ability in nurserying.

Most of the nurseries show much dependence on inorganic fertilizer. Soil ameliorating practices which could reduce dependence on inorganic fertilizer should be given attention.

The introduction of perennials as a component of the agroforestry farm development not only provides farmers with greater assurance of improvement in farm income but also ensures stability and sustainability of farm productivity.

The occurrence of pests and diseases before and after the farmers adopted the various interventions may be indicative of the need to come up with the right crop combinations other than those that are currently being used. Otherwise, the incidence of pests and diseases can seriously undermine the stability of the farming systems currently being practiced in the area.

The environmental benefits of resource conservation practices introduced by CVRP cannot be quantified at this point, given the time constraint. It is also still early in the project life for these benefits to be manifested. However, there are already some signs of improvement in streamflow (quality and volume) and reduction in soil erosion.

Almost all of the respondents said that they are now practicing conservation measures. Where before only as much as 43 percent were using conservation practices, now almost all of them adopt at least two types of conservation strategy. Such practices include terracing, contour farming, rockwalling, planting of hedgerows, composting, green manuring and fallowing. Understandably, the proportion of cooperators adopting conservation practices is higher than that of non-cooperators.

The people think that the rate of forest destruction has decreased as a result of CVRP/CBRM. The perception of reduction in forest destruction is higher among the non-cooperators than the cooperators. This could be indicative of the greater desire among the cooperators to further reduce the rate of destruction.

Knowledge of forest conservation and reforestation technologies and the presence of forest guards were cited as the major reasons for the decrease in forest destruction, while kaingin farming was identified as the major cause of increase in destruction. Other identified causes of increased destruction were: (a) alleged connivance of CVRP employees in illegal logging activities; (b) lack of proper supervision and maintenance, and (c) lack of enough people to secure the area.

Sustainability of CBRM was assessed based on data compiled in the Regional Project Office (RPO) household profile and key informant interviews. It was observed that participation in CBRM is largely in implementation only. Despite efforts to involve as many farmers in planning, implementation and maintenance, participation in planning and maintenance is quite low. To be able to sustain the CBRM efforts, greater involvement of the masses and general membership of the FOSAs should be ensured.

The feeling of many FOSAs that they are not yet very strong and that they do not yet have the capability to repel pressures both from the inside and outside indicate their felt need for CVRP to continue providing them with moral support. They have already learned reforestation, conservation and agroforestry farm development technology, but their organizations and the community itself are not yet that strong to be able to stand on its own against political pressures and armed threats.

People feel that CVRP should continue. More than half of the respondents said that CVRP and the community organizing activities should be pursued. Moreover, about 16 percent wants CVRP to continue because it helps develop the barangays.

#### 5. Assessment of Project Management and Operation

In general, the CVRP-SFP efforts in participatory forest management has shown beneficial effects to the sites covered by the project. The organization of FOSAs through which the SF program was implemented is the right direction in the articulation of the approach.

Moreover, the involvement of local government units (LGUs) from the barangay to the provincial levels in forest management has anticipated the need to develop major roles for LGUs in resource management which is now provided under the Local Government Code (LGC).

Early lessons were learned on the importance of building organizations through which common-property rules for forest access would be drawn and implemented. Thus, the current shift to community-based management of residual forests benefitted from CVRP's pioneering efforts.

Nevertheless, there are a number of concerns that need to be looked at if the gains of CVRP-SF program is to be sustained beyond the project period. For one thing, some of the 26 organized and registered FOSAs still need assistance particularly in further enhancing their organizational capabilities to pursue collective activities on their own. Perceived needs are skills in developing and implementing economic/livelihood enterprises and financial assistance to initiate these endeavors.

The implementing structures and mechanisms have been laid down with emphasis on the role of local government units. However, further refinement of these is needed. The capability of the local government units and the corresponding line agencies to continue the project may be doubtful if no further assistance would be extended to them.

Also, the proposed CVRP-II which intends to focus on upland agriculture should incorporate not only its expansion to other communities and municipalities but also the continuing provision of technical assistance to those that it has served.

Proposals to continue the institutional build-up of communities in the project sites should be encouraged. One of these is the proposal to continue the SF activities in 11 FOSAs in three barangays of the project sites with heavy emphasis on institutional strengthening of the FOSAs.

### *C. The Nearshore Fisheries Component*

As with the CVRP-I Upland Agriculture (UA) and Social Forestry (SF) Components, the strategies to achieve the objectives of the Nearshore Fisheries (NSF) Component consisted of the following: (1) introduction of various technology and resource management interventions or activities; (2) community organization efforts; (3) infrastructure development; (4) training; and (5) institutional development. Site Management Units (SMUs) were established for each of the five NSF project sites in Bohol, Cebu, Negros Oriental (Bindoy and Bayawan), and Siquijor, to assist the fishermen-cooperators in carrying out the programs under a co-management scheme.

The NSF Component initiated various resource conservation and income-generating activities. Of the seven interventions implemented, four were designed to conserve, rehabilitate and enhance the fishery resources: establishment of artificial reefs (AR), fish aggregating devices (FAD), mangrove reforestation, and establishment of fish sanctuaries. These were expected to increase coastal resource productivities, fish catch and household incomes of the fishermen-participants in the designated areas.

Artificial reefs are known to renew fish abundance in damaged coral reef areas. The establishment of fish sanctuaries in coral reefs where no fishing is permitted allows fish stocks to replenish themselves. FADs, which like the ARs and coral reefs attract fish in search of food and shelter, serve as fishing aids and thereby help increase fishing income. Mangrove reforestation also enhances the fishery resources by serving as feeding, nursery and breeding grounds for many commercial species.

The expected benefits from these activities have empirical basis from similar interventions elsewhere, and if fishing is properly regulated such positive results may be sustained in the long run.

Management of nearshore resources was done through the building of community organizations in the form of fishermen's associations (FAs). The Aquafarming Development Foundation, Inc. (ADFI) reports that a total of 114 FAs have been organized in all the project sites as of August 1992. These associations became the entry points for the SMUs to implement the various interventions, including the guarding of fish sanctuaries against violators, information dissemination and training on fish conservation and management. Over a period of seven years (1984-1991), 182 barangays participated in the various project activities which benefitted 8,086 families.

The role of the SMUs was crucial in organizing the fishermen and sustaining their interest and involvement in the project. Material inputs for the different activities were shouldered by the project, while labor was provided by the participating fishermen. The project thus emphasized the participatory approach to project implementation and resource management, with the SMUs acting simply as facilitators and the fishermen themselves as project implementors and resource managers. CVRP-I is evidently the first attempt of a government machinery to undertake a community-based resource management in municipal fisheries on a regional basis.

The project achieved by end of 1991 nearly all the targets, even exceeding some of them, set for the period 1984-1990. In total, the physical accomplishments in all the project sites were as follows: management of fish sanctuaries covering 4,130 ha of coral reef areas, installation of 1,074 clusters of artificial reefs and 244 units of fish aggregating devices, reforestation of 974 ha of mangrove areas, issuance of 1,490 mangrove stewardship contracts, introduction of mariculture in 90 ha of farm sites, and dispersal/redispersal of 132 heads of livestock.

#### 1. Extent of Adoption of NSF

CVRP-I's strategy of community-based resource management (CBRM) is aimed at ensuring sustainability of management efforts from the barangay to the regional level, in addition to enhancing equity in the potential benefits of such management. The incidence of involvement of target beneficiaries in various community organization (CO) and nearshore fisheries (NF) activities accelerated during the late eighties and peaked during 1988-89, the pre-planned final years of the project. On the other hand, infrastructure (IN) building shows late start-ups, as a general rule, with continuous increases until 1991.

There are expected differences in CO, NF and IN implementation across the project sites. Such differences are evident in the distribution of household participation in the various NSF activities (Table 15, Figure 4); this was caused by variations in management capabilities, biophysical site conditions, and phased expansion of the project. Fishermen's receptiveness to the interventions, also determined the project's level of impact on their individual and community welfare.

Based on the CVRPO 1991 Household Profile Survey, more than fifty percent of household cooperators participated in artificial reef management (AR) in all sites except Cebu. In terms of coral reef (CR) management, Bohol, Siquijor and Cebu had high participation rates. At least a quarter of household beneficiaries conducted the recently-introduced mariculture (MC) activities in two sites (Siquijor and Negros-Bindoy), while the use of fish aggregating devices (FAD) was prevalent in only the two Negros Oriental sites.

The same Household Profile indicates that 47 percent of the total number of household cooperators conducted mangrove reforestation and management (MR) activities, with high prevalence in three of the five sites, i.e., Negros-Bindoy, Bohol and Siquijor. However, only 41 percent of these reforesting households had been issued mangrove stewardship contracts (SC),

**Table 15**  
**NUMBER OF HOUSEHOLD PARTICIPANTS IN NEARSHORE FISHERY TECHNOLOGY INTERVENTIONS**

NSF ACTIVITY/ INTERVENTION	ALL SITES	BOHOL	CEBU	NEGROS OR. (BIDOY)	NEGROS OR. (BAYAWAN)	SIQUIJOR
1. Artificial Reef Management Activities	2,964 (55)	714 (53)	585 (44)	613 (66)	319 (52)	733 (61)
2. Mangrove Reforestation & Management	2,539 (47)	769 (57)	484 (36)	559 (60)	119 (20)	608 (51)
3. Coral Reef Area Management Activities	2,385 (44)	678 (50)	711 (13)	283 (30)	12 (2)	701 (58)
4. Mariculture Activities	843 (16)	47 (3)	171 (13)	246 (26)	51 (8)	328 (27)
5. Livestock Redisperal	103 (2)	37 (3)	25 (2)	24 (3)	0 (0)	17 (1)
6. Stewardship Contract(s) Received	1,047 (19)	522 (39)	126 (9)	74 (8)	31 (5)	294 (24)
7. Fish Attracting Device Activities	1,323 (24)	37 (3)	349 (26)	527 (57)	304 (50)	106 (9)
Total No. of Household Participants	5,419 (100)	1,346 (100)	1,331 (100)	931 (100)	608 (100)	1,203 (100)

Note: ( ) means % to total

Source: CVRPO, 1991. Barangay Household/Adoption Profiles:  
Nearshore Fisheries, as of December 1991.

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Figure 4. NO. OF HH PARTICIPANTS BY NSF INTERVENTION, BY SITE

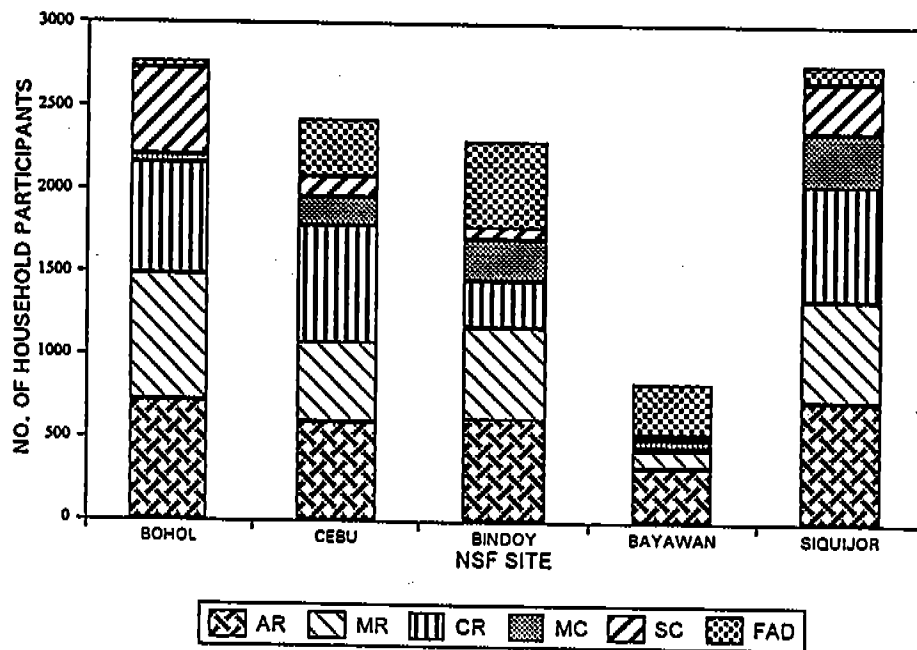
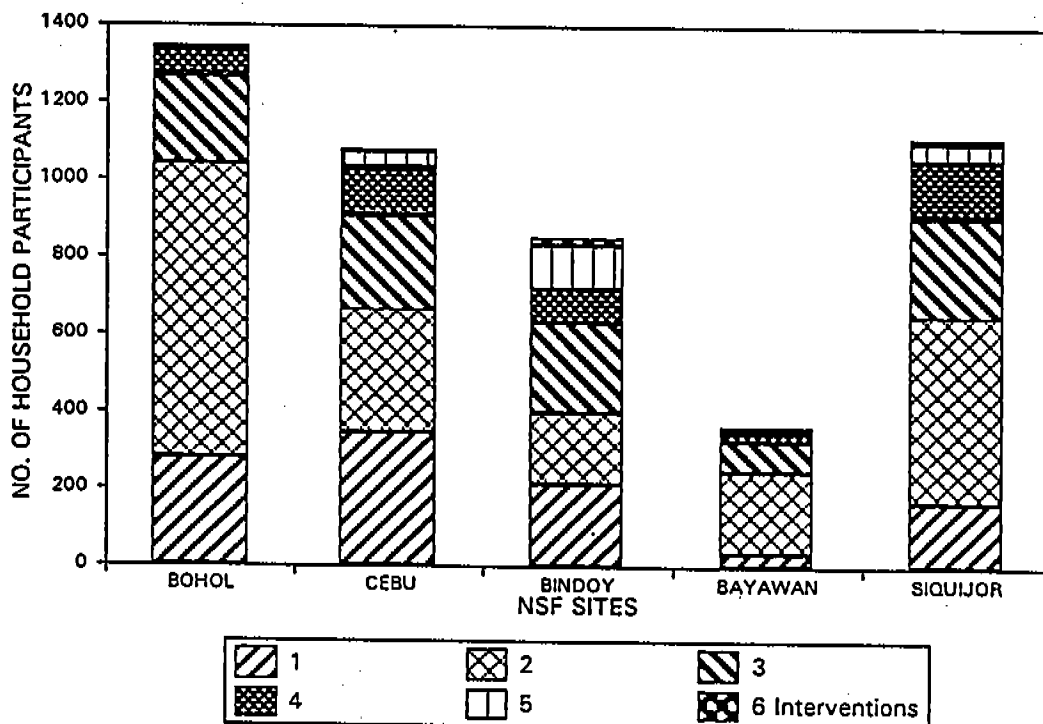


Figure 5. DISTRIBUTION OF HOUSEHOLDS BY NO. OF INTERVENTIONS, BY SITE



with the following variations across sites: Bohol, 68 percent; Siquijor, 48 percent; Cebu and Negros-Bayawan at 26 percent, and Negros-Bindoy at only 13 percent.

Particularly noteworthy is the case in Bohol where 100% of the participants in mangrove reforestation in 8 barangays had been issued stewardship contracts, indicating the relative efficiency of the SMU there in facilitating the awarding of contracts. Most of these barangays were not involved in any other NSF activities, and in fact some beneficiaries were found to be non-fishing households, or at most part-time fishermen, during the field survey undertaken by this study.

The CVRPO Household Profile also sorted the household participants according to the number of NSF technologies or interventions in which they were involved. Majority of the households participated in one to three activities in all sites (Figure 5). Bohol, Siquijor and Cebu had the most number of households participating in two activities, likely a combination of mangrove reforestation-stewardship contracts received or artificial reef-mangrove reforestation. The Bindoy site exhibited a wider spread in the number of activities of the participants. Again, this household distribution indicates the variations in the suitability of the sites to specific interventions and perhaps in the fishermen's attitudes and SMU efficacy.

Other data sources confirm such variations in the practice of introduced resource conservation efforts. For example, the differences in adoption of CVRP-initiated activities noted in the 1989 CVRP Benefit Monitoring Study (delos Angeles and Rodriguez, 1989) continue to be detected in the 1992 PIDS Household Survey of NSF Sites. High participation rates in artificial reef construction (78 percent), mangrove reforestation (73 percent), barangay association meetings (57 percent) and law enforcement (55 percent) were reported by 40 cooperators .

There are also spread effects in such practices among the non-targeted households. In particular, for the 35 respondent non-cooperators, artificial reef activities and mangrove reforestation are notable.

## 2. Impacts of NSF on Fish Catch

A survey conducted by the ADFI (1992) on 260 fishermen indicates increases in fish catch in the project sites where artificial reefs were installed. Gill net fishing in AR areas yielded 65 percent increase in fish catch over the pre-CVRP levels while handline fishing rose by 107 percent. The highest absolute increases of 174 percent for gill nets and 141 percent for handlines were recorded in Bohol and Negros Oriental, respectively (Table 16). Similar findings were reported by Guerrero (1990) in an earlier survey in Cebu where 90 percent of the respondents experienced increased catches after the introduction of ARs.

However, Delmendo (1990) cautions against indiscriminate fishing in ARs since these devices mainly attract fish juveniles, and therefore recommends controlled fishing with the use of selective fishing gears that will not hasten the withdrawal of young stocks from the fish

**Table 16**  
**AVERAGE FISH CATCH PER DAY OF FISHERMEN BEFORE AND AFTER THE INTRODUCTION**  
**OF ARTIFICIAL REEFS, NEARSHORE FISHERY SITES**  
(in kg/day)

Project Sites	Fishing Gears						Total No. of Respondents
	Gill Net			Handline			
	Before	After	% Increase	Before	After	% Increase	
Bohol	3.21	8.79	173.83	1.95	4.46	128.71	47
Cebu	6.90	8.36	21.15	2.13	4.08	91.54	77
Negros Oriental	4.09	8.81	115.40	1.55	3.73	140.64	40
Siquijor	3.49	5.71	63.61	1.30	2.51	93.07	96
Average catch/day for all sites	4.54	7.52	65.60	1.70	3.52	107.06	260

Note: Average number of fishing days = 15/month

Source: ADFI (1992), Table 30, P.20.

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population. Apparently some fishermen's associations were aware of this danger and had imposed fishing restrictions by permitting only handlines and spearguns to be used in AR areas. But these groups allowed even non-members to fish there provided they observed the same gear restrictions. While such policy may make for good community relations, the level of individual catch rates may not be sustained over time if more fishermen partake of the resource. An alternative approach may be to designate a certain area of AR clusters as fish sanctuary like in coral reef management to serve as protected areas for rehabilitating the fish population in the adjacent fishing areas.

In another community, a group of non-participants set up their own AR out of resentment for not being invited to join the association. There were also reports of FADs installed by CVRP cooperators drifting out to sea or lost after their anchor lines were cut surreptitiously at night by unknown persons. Such cases although isolated reflect the sensitivity of the problems in law enforcement and allocation in a regulated or managed fishery.

Both the ADFI and PIDS surveys have noted several accounts of ARs, either bamboo or concrete, being damaged, destroyed or lost in only a few months after installation. Questions have been raised about their design and durability. AR cooperators are expected to share the cost of restoring or replacing their reefs as envisioned in the project, but this did not happen probably because their incomes remained below the poverty line, despite the benefit of increased catches from ARs (ADFI, 1992).

There are indications of an increasing trend in the catch rates as a result of coral reef management, based on the ADFI analysis of the CVRP catch monitoring data and their own field survey of August 1992. On average, the 36 fishermen's associations sampled from all the sites reported an increase of over 80 percent in daily catch rates after management measures were introduced. The respondent-associations attributed this benefit to the minimized illegal fishing activities and the established fish sanctuaries. Notably, both members and non-members experienced increases in their catches in reef areas adjacent to the sanctuaries.

High catch rates were obtained in FADs or "payaos" but more data are needed to assess this technology. The non-CVRP FADs yielded the highest fish catch compared to other types of fishing areas monitored by CVRPO in 1989-1991 (ADFI, 1992). The effect of mangrove reforestation on fish abundance would be difficult to quantify, but some fishermen have attributed increases in their catch to the rehabilitated mangrove areas near their fishing ground.

In the PIDS survey, the respondents gave mixed observations regarding changes in the resource base. Among those CVRP fishermen cooperators and non-cooperators who observed increases in fish abundance and catch, the most frequently cited factors are minimized illegal fishing due to improved law enforcement activities, presence of artificial reefs, installation of fish aggregating devices, and mangrove reforestation. On the other hand, fishermen who noted decreases or no change in fish catch put the blame on the increased total fishing effort brought about by more fishermen, more kinds of fishing gear, encroachment by commercial fishing operations and other illegal fishing methods.

Ironically, the positive effects of the management interventions may have encouraged new entries into the fisheries. Some respondents, in fact, reported changing their gear to more efficient types (e.g., from single hook-and-line to gill net or fish pot); part-time fishermen with no gear were constructing their own beach seines and gill nets during the field visits.

### 3. Resource Productivity

The above changes in fish catch are merely indicative of the effects attributable to the various interventions. Inadequacies in the available fish catch and effort data, as the ADFI report noted, precluded a more reliable quantitative evaluation. A resource assessment program should be an integral part of similar management projects in fisheries where changes in fish abundance over time are not readily visible nor measurable. Local expertise in assessing multi-species, multi-gear fisheries may be tapped in planning and implementing such a program. The data to be generated will help determine the biological status of the resources, the current level of exploitation, the maximum economic yield and the corresponding fishing effort level. Such information can provide the scientific basis for user rights allocation and other fishery regulations.

The project's accomplishments in terms of hectares covered, units installed, and number of household participants vis-a-vis the targets do not give the total picture of how the project has achieved its objectives. Field interviews revealed that several of the ARs, FADs and mangrove plantations were no longer extant, either destroyed by typhoons or lost due to other causes. Data on such losses or mortalities may have been documented in some SMU reports but these are not available in summarized form that could help in assessing the success of the interventions as well as in re-designing future projects.

*Much of these unexpected effects arises from the pilot nature of CVRP-I: the project to a certain extent experimented with various nearshore conservation technologies under previously untried conditions.*

### 4. Determinants of Impact

To explore further the mechanism through which community-based resource management activities impact on CVRP adoptors' quality of life, various regression analyses on different data sets were conducted.

Catch, effort and project duration relationships per fishing area and by fishing gear were estimated for all fishermen monitored during 1988-91 by CVRPO with the results presented in Table 17. For fishing in artificial reef either through fish corral or gill nets, and in coral reefs with the use of gill nets, increase in fishing effort raises fish catch. On the other hand, higher fishing effort through the use of fish corral in coral reefs and gill nets in the open sea tends to decrease fish catch.

**Table 17**  
**REGRESSION OF FISH CATCH ON SELECTED VARIABLES, BY FISHING AREA AND FISHING GEAR**  
**ALL NEARSHORE FISHERY SITES**

Fishing Area/ Gear	n	Intercept	Independent Variables			F	R <sup>2</sup>
			Effort (man-days)	Year	Season		
Artificial Reef/ Fish Corral	287	0.133	0.093 **	0.895 ***	-0.024	13.205 ***	0.113
Artificial Reef/ Gill Net	3,775	1.377 ***	0.186 ***	0.147 ***	-0.174 ***	41.076 ***	0.031
Coral Reef/ Fish Corral	331	-0.288	-0.098 ***	1.063 ***	0.353 ***	16.174 ***	0.121
Coral Reef/ Gill Net	801	1.216 ***	0.414 ***	0.067	0.108	27.492 ***	0.090
Open Sea/ Gill Net	1,396	0.594 ***	-0.219 ***	0.456 ***	0.341 ***	55.912 ***	0.106
Payao	293	1.119 ***	0.233	1.504 ***	-0.767 ***	5.907 ***	0.048
Sea Grass/ Gill Net	413	0.985 ***	0.000	0.637 ***	-0.370 ***	9.879 ***	0.061

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Notes: a. Equation estimated is:

$$\log \text{ Fish Catch (in kg)} = a + b \log \text{ Fishing Effort (person-days)} + c \log \text{ Time (t = 1, 1988, 2, 1989, 3, 1990, 4, 1991)} + d \log \text{ Season (2=Jan-June, 1=Jul-Dec)}$$

b. \*\*\* Significant at 5 per cent level  
 \*\* Significant at 10 per cent level  
 \* Significant at 15 per cent level

c. Effort per trip, in person-days = (No of Hours / 8 hours) X (Crew)

Source of basic data: CVRPO, NSF Fish Catch Monitoring Data, 1988-1991

This difference appears to signal varying degrees of depletion and productivity and, possibly, efficiency (and resource destruction) between fish corral and gill net technologies in the coral reefs. Fishing season's impact likewise varies across fishing area and gears. This may be attributed to differences in exposure to monsoon winds and other weather conditions across the fishing areas.

In all areas and regardless of fishing gear, the passage of time appears to enhance fish catch for all sites, as indicated by the statistically significant positive coefficients for "year." This may be indicative of increased resource enhancement through time as a result of CVRP technology and management interventions.

While the relationships so derived were statistically significant, the model was not able to fully capture all the determinants of fish catch. Thus, the model's low predictive capability deters its use for deriving projections on future fishing productivities.

When the regressions are estimated by fishing area and site, regardless of fishing gear, the results appear to be more consistent: higher fishing effort increases fish catch. The passage of time has more ambiguous results however: more years into CVRP reduced fish catch in Bohol, and otherwise for the other sites (Table 18). A more thorough biological stock assessment over time may provide the explanation for such variations in the state of the resources and possibly determine the amount of fishing effort the fisheries can sustain.

A major emphasis of CVRP-I is the control of fishing effort, in terms of shifting from destructive technologies towards safe ones, as well as providing respite for resource renewal by designating areas for fishing and for sanctuaries. While this may be observed from the cooperators of CVRP, it may not necessarily be the case among the non-cooperators. Access to improved resource productivity conditions has virtually been non-exclusive. This arises partly from the fugitive nature of fishery resources and the failure in general policy-making in implementing tools to regulate access to common property resources. With the open-access fishery near or just outside the established fish sanctuaries, and under conditions of high population pressure, it appears that the early gains from fishery conservation activities may not be sustainable in the long term.

The project's contribution in regulating fishing effort is investigated through the relationship presented in Table 19. The hypothesis pursued in the regression equation is: more intensive involvement in CVRP-I reduces fishing effort. The results for the community organization index (CO) and number of years passed with CVRP do prove this hypothesis. However, this is not true for nearshore fisheries technology (NF) and infrastructure development (INF) indices. It appears that the attractiveness of the potential gains from nearshore fishery activities and the enhanced access into the fishing areas due to better roads result in higher fishing effort. These empirical results signal the urgent need for regulating access to the coastal fisheries to maintain the gains from enhancing fish productivity.

**Table 18**  
**REGRESSION OF FISH CATCH ON EFFORT AND TIME**  
**BY FISHING AREA AND PROVINCE, NEARSHORE FISHERY SITES**

Fishing Area/ Province	n	Intercept	Independent Variables		F	R <sup>2</sup>
			Effort (person-hrs)	Year		
<b>ARTIFICIAL REEF</b>						
Bohol	4,552	4.0723 ***	0.3125 ***	-0.3506 ***	47.01 ***	0.02
Siquijor	2,551	-2.0050 *	0.0484 *	2.1513 ***	15.19 ***	0.01
Cebu	2,241	-2.5835	0.2706 ***	4.1530 ***	47.33 ***	0.04
Bayawan, Neg.Or.	615	4.0512 ***	0.0626	0.0511	0.52	0.00
Bindoy, Neg.Or.	2,391	-0.8008	0.3093 ***	2.2423 **	57.74 ***	0.04
<b>CORAL REEF</b>						
Bohol	4,063	3.9360 ***	0.4453 ***	-1.0264 ***	226.97 ***	0.10
Cebu	909	-1.6172	0.0235	2.1135 ***	17.10 ***	0.03
Bindoy, Neg.Or.	630	-1.4044	0.6082 ***	0.7389	54.42 ***	0.14
<b>OPEN SEA</b>						
Bohol	744	1.0843	0.0443	2.3689 ***	11.00 ***	0.03
Siquijor	110	-8.0573 ***	1.6264 ***	2.7238 ***	23.46 ***	0.29
Cebu	654	-16.2406	2.4624 ***	5.9151	97.97 ***	0.23
Bindoy, Neg.Or.	3,032	-6.4017 ***	0.0339 ***	4.4826 ***	199.83 ***	0.12
<b>FAD/Payao</b>						
Bohol (non-CVRP)	95	40.1397 **	3.5948 ***	-18.5800 ***	24.98 ***	0.34
Cebu (CVRP)	440	15.7540 **	0.9337 ***	-0.5152	36.16 ***	0.14
Cebu (non-CVRP)	919	22.7112 *	1.0601 ***	0.2114	89.25 ***	0.16
Bayawan (non-CVRP)	358	-2.0855	2.0704 ***	-0.3745	84.03 ***	0.32
Bindoy (CVRP)	60	-7.2183 ***	-0.0136	3.0515 ***	9.75 ***	0.23
Bindoy (non-CVRP)	1,034	-1.9189	-0.5346 **	4.3088 **	3.26 ***	0.00
<b>SEA GRASS</b>						
Bohol	582	7.6390 ***	-0.1474 ***	-1.0784 ***	33.69 ***	0.10
Bindoy, Neg.Or.	484	-10.4178 **	0.2867 ***	5.3564 ***	11.43 ***	0.04
<b>FISH SANCTUARY</b>						
Bindoy, Neg.Or.	719	-9.3492	0.1499 ***	7.4748	15.73 ***	0.04

Notes:

a. Equation estimated is:

$$\text{Fish Catch (in kgs)} = a + b \left( \frac{\text{Fishing Effort}}{\text{person-hrs}} \right) + c \left( \frac{\text{Time}}{t} \right)$$

(t = 1, 1988,  
= 2, 1989,  
= 3, 1990,  
= 4, 1991)

b. \*\*\* significant at 5 per cent level  
\*\* significant at 10 per cent level  
\* significant at 15 per cent level

c. Effort per trip (in person-hrs) = (Fishing Time, in hrs) X Crew

Source of basic data: CVRPO, NSF Fish Catch Monitoring Data, 1988-1991

**Table 19**  
**REGRESSION OF FISHING EFFORT ON NEARSHORE FISHERY PROJECT ACTIVITIES**  
**AND TIME, SELECTED CASES FROM CVRPO FISH CATCH MONITORING DATA**  
**1988-1991**

Independent Variable	Mean Values	Coefficient	T-value
Intercept		0.403	
Community Organization Index (CO)	426.6	-1.471	-1.907 **
Nearshore Fisheries Technology Index (NSF)	613.3	0.614	3.155 ***
Infrastructure Index (INF)	94.4	1.176	1.734 **
Time (t)		-0.528	-2.290 ***
Adjusted R <sup>2</sup> = 0.1134 F = 3.142 ***			

**Notes:**

a. Equation estimated:

$$\log (\text{Effort, in man-hours per fishing trip}) \\ = a + b \log (\text{CO}) + c \log (\text{INF}) + d \log (\text{NSF}) + e \log (t)$$

b. Based on data on 35 fishermen with daily observations greater than 100 cases per year, and observed for at least two years. ( Source: CVRPO Fish Catch Monitoring Data).

c. CO, NSF & INF data from relevant scores in Table 2 of delos Angeles and Pelayo (1992) based on fisherman's residence, as observed from the CVRPO 1991 Household Profile.

## 5. Income Effects

In terms of impact on income, in all sites but Bindoy, Negros Oriental, mean incomes of the non-adoptors were higher than those of the adoptors in 1991 (Table 20). In fact, while both groups appear to have comparable incomes in 1988, adoptors' income rose by 9.9 percent during 1988-1991 while the income of non-adoptors increased by a higher 22.6 percent during the same period. It appears that the problem of non-exclusion has resulted in the larger portion of the gains from CVRP to have been captured by the non-CVRP participants.

While these results are disconcerting with respect to fairness in the distribution of private costs and benefits of CVRP, there is more reason to be optimistic in terms of alleviating poverty. Table 21 indicates that all those surveyed, whether cooperators or non-cooperators, were way below the poverty thresholds for Region 7 in 1985. Increases in their incomes brought both groups closer to the poverty thresholds in 1988. Thus, as a project that is designed to uplift the rural poor, CVRP has achieved considerable initial gains.

However, since both groups are still below the poverty thresholds, changes in the quality of life have not yet occurred. This is reflected in the various indicators; for example, some fishermen do not own fishing craft or gear, which could explain their low fishing incomes since they either borrow their equipment as part-time fishermen or serve as fishermen-crew to some owner-operator who give them a limited share of the income.

A potential significant contributor to future income increases is mangrove reforestation. Here increased supply of wood and non-timber products, particularly gathered aquatic products on the site, would enhance the livelihood of the adoptor communities. In addition, where stewardship contracts do limit the use of the resources in mangrove reforested areas, the benefits are expected to accrue to CVRP participants more directly. Measurements of such potential benefits were not feasible, however, because of poor data on the areas effectively reforested and the absence of growth and yield models on reforested mangroves. The high mortality rates in some sites result from poor growing conditions and weather patterns and the experimental nature of CVRP. There is also undermeasurement of the early impacts of mangrove rehabilitation in terms of non-coverage/non-reporting of household consumption of gathered products (such as crustaceans and bivalves).

Data on production and income from mariculture and livestock dispersal activities were not obtained. Respondents in Siquijor reported favorable results in CVRP-introduced seaweed farming activities which was seasonal in the area. Apparently one such farm was operated by a fishermen's association, the earnings from which served as revolving fund for the organization. A worthy suggestion came from Bohol respondents: conduct a livelihood program for fishermen's wives. Such undertaking would not only increase family incomes but could also serve as incentive for participation in CBRM activities.

**Table 20**  
**TESTS FOR DIFFERENCES IN GROSS FISHING INCOME**  
**NEARSHORE FISHERY PARTICIPANTS VS. NON-PARTICIPANTS, 1991**

	n	MEAN INCOME (s.d.), in current pesos		t values	Conclusion
		Cooperators	vs. Non-Cooperators		
All Sites	75	20,946 (18,338)	< 28,235 (20,961)	(16)	significant at $\alpha = .10$
Cebu	18	24,589 (12,179)	< 25,641 (9,306)	(0.2015)	n.s.
Negros Or.	16	28,642 (27,510)	> 23,442 (22,413)	0.4145	n.s.
Siquijor	15	16,188 (14,778)	< 43,060 (31,366)	(2.2519)	significant at $\alpha = .05$
Bohol	26	16,703 (17,541)	< 25,939 (18,867)	(1.2929)	significant at $\alpha = .10$

Source of basic data: PIDS 1992 Survey

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**Table 21**  
**FAMILY INCOME, VARIOUS YEARS**  
**In 1985 pesos**

Year	Level		Gross Income, 1985 pesos	Data Source
<b>1. Gross income from all sources</b>				
1985	Region 7	P	20,756.00	Phil. Statistical Yearbook
	Region 6	P	24,807.00	Phil. Statistical Yearbook
1988	Region 7	P	25,581.00	Phil. Statistical Yearbook
	Region 6	P	28,799.00	Phil. Statistical Yearbook
Annual growth rate				
	Region 7		7.2%	Computed from figures above
	Region 6		5.1%	Computed from figures above
<b>2. Gross income from fishing</b>				
1988	CVRP Adoptors	P	9,496.00	1989 Benefit Monitoring Study
	CVRP Non-Adoptors	P	9,219.00	1989 Benefit Monitoring Study
1991	CVRP Adoptors	P	12,618.00	1992 Impact Evaluation Study
	CVRP Non-Adoptors	P	17,009.00	1992 Impact Evaluation Study
Annual growth rate				
	CVRP Adoptors		9.9%	Computed from figures above
	CVRP Non-Adoptors		22.6%	Computed from figures above
<b>3. Poverty Threshold level (annual)</b>				
1985	Region 7	P	23,844.00	NSO, FIES Data
	Region 6	P	29,436.00	NSO, FIES Data
1988	Region 7	P	24,847.71	NSO, FIES Data
	Region 6	P	30,451.38	NSO, FIES Data

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## 6. Perceptions on the Quality of Life

Despite the persistent poverty among them, the respondents' perception on their quality of life tends to be more optimistic, perhaps reflective of the general increase in their fishing incomes. There is a dominant perception of improvements in socio-economic conditions. A most often cited form of improvement expressed by the cooperators during the interview is the increased availability of fish for home consumption.

When asked to compare their present socio-economic condition to that prior to CVRP intervention or 5 years ago, more cooperators believed they were better off now (43-48%) than the non-cooperators did (17-23%). About the same proportion of the two groups thought their socio-economic status did not change. A fairly good number (35%) of the cooperators attributed their improved conditions to their participation in CVRP.

The most frequently mentioned factors that brought about this change were increased catch, minimized illegal fishing and the CVRP activities such as AR, FAD, fish sanctuary establishment, and mangrove reforestation. Those who perceived there was no change in their status mainly cited the increase in the number of fishermen and fishing methods. The CVRP may also be credited for introducing activities and developing conservation-awareness among the fishermen that would benefit them and the resource they depend on in the long run.

The same positive self-assessment was evident among the cooperators when comparing their status with other members of the community: 40 per cent of them perceived themselves as better off, while only 17 per cent of the non-cooperators believed the same. The economically better-off members attained such status because they have other sources of income, such as fish buy-and-sell, sari-sari store and farming. If a trend of shifting their livelihood from fishing to other activities is established over time, and new entries to the fishery are limited, such developments will certainly relieve the pressure on the resource, improve their household incomes, and ensure sustained yields for those who remain in the fishery.

## 7. Perceptions on the CVRP

The opinions expressed by the respondents on the most important contribution and weaknesses of the CVRP are instructive for planners and implementors of similar projects. Both the cooperator and non-cooperator groups cited as CVRP's most important contributions the mangrove reforestation and artificial reefs project activities. This perception could have resulted from their actual experience of better catches in AR areas and increase in fish abundance attributed to mangrove reforestation, as well as the promise of greater income from mangrove resources as these grow in time.

The responses regarding the weaknesses of CVRP do not pinpoint a singularly common attribute. It is worth noting, nevertheless, that there is dissatisfaction on the effectiveness and durability of the ARs and disappointment on some aspects of CVRP management like inadequate information dissemination and lack of follow-up. This last comment was encountered quite

frequently in informal interviews, indicating that CVRP management abandoned some areas or some projects after the initial activities, or failed to sustain the crucial aspect of community organizing work.

The ADFI survey also cited several shortcomings that raise doubts about the sustainability of the interventions and the capabilities of the institutions to pursue the community-based resource management program beyond the lifetime of the project. These include weak leadership and management capabilities of loosely-organized fishermen's associations, inadequate technical assistance from the SMUs at the project sites, lack of support from local government units (LGUs) and police agencies in imposing penalties on apprehended violators of fishery regulations, and most significantly the absence of a national policy on allocation of fishery rights.

The project's experience in coral reef management is illustrative. After the SMUs and the Department of Agriculture/Bureau of Fisheries and Aquatic Resources staffs helped organize a fishermen's association, a municipal ordinance or resolution was prepared with SMU assistance for establishing a fish sanctuary. The area was marked off by buoys and anchor warps provided by the SMU; visits to coral reef sanctuaries elsewhere by fishermen leaders were sponsored by CVRP. The sanctuary declaration embodied in the ordinance, however, has to be endorsed first by a higher body, the Sangguniang Bayan, and finally approved by the Department of Agriculture. The process has been slow and no application has reportedly been approved. With no authority over the area, the association could only persuade other fishermen not to fish in the sanctuary, while assistance from local law enforcers has been unreliable. In areas with strong local government support, illegal fishing activities were minimized. But some LGUs are constrained by lack of equipment like patrol boats and radios.

Present weaknesses and inadequacies can serve as valuable lessons for future refinements and directions. Membership in the associations needs to be expanded to at least the majority of the local fishermen to guarantee a wider cooperation in implementing management measures. (The 5,000 to 8,000 participants in the NSF component represent less than half of the 20,000 fishermen recorded by the 1980 census in the NSF project sites.) The fishermen's associations may evolve or transform into formally organized cooperatives, as ADFI suggests, to enjoy such benefits as loans for AR construction and better fishing gear for offshore fishing, and to serve as partners of LGUs and regional line agencies for implementing an appropriate management program.

The role of LGUs and the extent of their authority in resource management should be examined. For example, the present licensing system for municipal fishermen may be used as a coercive tool for ensuring compliance with fishery regulations and even membership in fishermen's organizations. The proposed Fishery Code in a pending bill may provide the national policy for aquatic reform where local communities are given the right and responsibility to manage the resources under their jurisdiction. The criteria for allocating user rights may be decided upon through consultations among organizations and institutions concerned, and may

include such considerations as dependence on fishing for livelihood, other sources of income, record of violation or observance of fishery laws, age and educational attainment, among others.

#### 8. Future Directions for Nearshore Fisheries Projects

The CVRP-I has laid the groundwork for a community-based resource management regime in the region. Fishermen's associations have been organized and enlightened on the value of fish conservation and management. The positive contribution of CVRP in increasing catch and incomes of the poor fishing household warrant continued efforts in its resource management schemes into the future. There is a need, however, to guarantee exclusion in access to the project's gains through a well-defined system of property rights for the cooperators, and a system of payments by the non-cooperators who also benefit from the project activities.

Differences in the marine environment, natural endowments (coral reefs, shoreline configuration, area, water depth, topography, etc.), and climatic conditions among the project sites obviously determine the appropriate type and extent of interventions that could be introduced, which in turn limit the number of target beneficiaries for each site. For the artificial reef and mangrove reforestation activities, the allocation scheme, as originally planned, was supposed to confer user rights only to full-time fishermen without motorized bancas. Deviations from this plan were evident, however, during field interviews with the beneficiaries.

While the maintenance of fish sanctuaries and rehabilitation of mangroves benefit the fishermen non-cooperators as well, given the mobility of the fishery resources and the open access to them, the other project interventions bestow upon the individual participants certain exclusivity to the benefits. The issuance of Stewardship Contracts (SC) or Mangrove Stewardship Agreements (MSA) gives the designated cooperators in mangrove reforestation the right to gather timber, shellfish, fry and other resources in the replanted areas under their care. Mariculture projects, such as seaweed farming, livestock dispersal and redispersal activities likewise augment the household incomes of only a few selected participants. These interventions represent another approach to alleviating poverty among small fishermen, that is, by generating income from activities other than fishing.

The issue of allocation will become more pressing in the face of dwindling resources and persistent poverty in coastal areas. Since any management measure has income-distribution effects, this is a sensitive aspect that requires serious consideration. A well-established, community-based resource management system may provide, through consensus, the acceptable and equitable scheme to meet this problem.

In the event that some competition would arise in fishing grounds common to several communities, such as in straits between Cebu and Negros Oriental, it is important for a regional body to provide the role of arbiter. By such time, the CVRP shall have to evolve into a truly nationwide project and would have to provide the conditions for voluntary solutions to common resources allocation to occur.

Legal instruments have to be promulgated and enforced to provide the policy framework and define the responsibilities of fishing community organizations, governmental institutions, non-governmental organizations (NGOs), and regional political units under a joint management arrangement. Fishermen's organizations, with the help of local NGOs, should be encouraged to form federations at the provincial and regional levels to share information and experience, exchange visits and expertise, and develop a regionwide commitment to a common purpose.

#### IV. THE CVRP MANAGEMENT OPERATIONAL MODELS

The models compared were the Negros Oriental Resource Management Office (NEGORMO), Cebu Resource Management Office (CRMO) or Cebu Development Outreach Program (CDOP), Site Management Unit (SMU), Central Cebu Hillyland Development Project (CCHDP) or Cebu City Hillyland Resource Management Development Commission (CCHRMDC), Provincial Resource Management Committees (PRMCs) and Bayawan Nearshore Fisheries (NSF). It shall be noted, however, that the original Bayawan NSF model has been changed and the SMU model has been adopted. This is reflective of the thinking that the SMU model is more superior in terms of efficiency and effectiveness over the original Bayawan NSF management model.

The analysis looked at the effectiveness and the efficiency of the various models from both the administrative/management and financial perspectives. One general finding concerning financial management is that provincial and municipal treasurers should be provided with broader and deeper orientation in handling funds and liquidations. Most of them are highly trained in tax collection and management of government spending but not in resource generation and management of others' funds. As a result, more than 50 percent of the funds provided to PRMCs and Municipal Resource Management Committees (MRMCs) were reportedly unliquidated.

The Provincial Resource Management arm of Bohol and Siquijor remains to be at the committee level while those of Negros Oriental and Cebu have evolved into distinct offices. The latter two project a firmer semblance of permanency and smooth transition for the integration of Provincial Resource Management Offices (PRMOs) with the provincial government.

The committees are associated more with temporal/ad-hoc organizational stage and its links with the provincial government were rather arbitrary. There are possibilities that these committees can be dissolved once CVRP folds up unless concrete steps to integrate these committees with the provincial government structure are done.

The organizational charts of NEGORMO and Bohol Provincial Resource Management Committee (BRMC) were compared to assess the administrative/management implications and determine the extent of interaction and coordination with other provincial government (PG) offices, the Municipal Resource Management Office (MRMO), and the beneficiaries.

The NEGORMO organizational chart shows a clear linkage between the PRMO and the MRMO, between the MRMO and the beneficiaries, and between PRMO and the other PG offices. The infrastructure, technical assistance and training services together with the Negros Oriental Bantay Dagat (NOBAD) group are integrated at the provincial level and posted directly under the PRMO manager to provide sustained and timely support to the MRMOs. A technical group is also clearly visible at the MRMO level to provide sustained support to the various beneficiary groups in the communities.

The NEGORMO organizational structure is a model which other PRMCs can adopt because it streamlines support services (such as finance and administration and other related services from the provincial to the municipal and down to the beneficiary levels. It also shows that the PRMO Manager has direct authority over the MRMO managers. This is needed to ensure unity of command, swiftness in deployment of project resources and efficiency in communication flow, and readiness to respond to field conditions.

The Cebu Resource Management Office (CRMO) has reportedly been renamed as Cebu Development Outreach Program (CDOP). Changes in scope of work goes with the change in the name. It aims to expand its concern beyond resource management to include social welfare, education and other services that will have to be assumed by the LGU in line with the local government code. As a result there was a decline in the momentum of resource management project implementation activities at the Cebu PRMC level.

The SMU approach to project implementation is most desirable compared to the others. However, its adoption should only be in the short run. Eventually, and if the people themselves are expected to carry out the projects initiated by the SMU, the local government units, the local associations and the people themselves shall have to assume the responsibility to be able to sustain the project and the gains that accrue to it. They therefore have to be trained and prepared for such eventuality.

CCHDP (also renamed to CCHRMDC), pursues a program that gives emphasis to both resource conservation, and livelihood for the hillyland dwellers in 35 barangays of Cebu City. One observation was that it may not be very effective in accomplishing pure resource management activities but it is more effective in addressing issues related to income generation. As a consequence, funds were spent on enterprise development activities and marketing support rather than purely on conservation. A proper mix of enterprise and conservation is desirable.

Fund management by CCHRMDC was found to be as efficient as that of the SMUs even if the funds were channeled to the local (city) government. The efficiency of the city government to administer, utilize, and liquidate funds it has received from CVRP may be attributed to the very strong support of the local officials; the capability of the city treasurer and staff to handle project funds; the proximity of the project sites and the efficiency of the project staff.

The NEGORMO and CCHRMDC schemes are working and efficient because the present political leadership is very supportive of the program, but like in other provinces, the support can change with the change in administration. This could greatly hamper continuity of resource conservation efforts, the sustainability of project gains and the support of the project beneficiaries/cooperators.

The success of Phase 2 and the sustainability of resource conservation efforts started in Phase 1 largely depend on the patronage and support of the local officials at various levels (barangay, municipal and mostly, provincial). This and the reality of Philippine politics call for a need to look at an alternative set-up which ensures greater participation of the LGUs but minimizes possibilities for great political influence.

Under this proposed set-up the local government officials sit as members of the board and play a major role in planning and policy making but an independent project manager runs the project. The CVRP/Regional Project Office (RPO)/SMU scheme is similar to those adopted in other countries to ensure greater efficiency and effectiveness in attaining specific goals of resource conservation. The creation of an independent institution with a clear mandate to pursue specific tasks can also prevent the dissipation of resources and efforts.

## V. CONCLUSIONS

CVRP-I has resulted in considerable impacts, in terms of the development of resource conservation strategies, evolving participatory approaches to natural resource management, national policy formulation, increasing the potential resource productivity, and improving the socio-economic conditions of depressed areas in the Central Visayas Region.

Project processes also reveal the importance of building community-based organizations and clarifying the rules of access to resources as the key to sustaining conservation activities and maximizing income gains, even the short-term. Continued support to the project is important to realize the long-term gains from those activities that have long gestation periods, such as obtaining harvest from agroforestry products, sustaining timber harvests from both forest land rehabilitation, mangrove reforestation, and residual forest management areas.

The microwatershed approach to natural resource management is important for maximizing synergy of project activities and the overall impact from conservation-oriented technologies. Intensifying activities in those sites where local communities are well-organized will be important in assuring project benefits in the long run.

Where the short-run gains appear to be unsustainable due to population pressure, the political conditions are unfavorable, and the rules of distributing the costs and benefits from project activities are still unclear, it is best to discontinue project activities. In particular, it will be important to focus the nearshore fishery activities only on specific areas where site management units have good indications of project benefits and built-up local resource management skills.

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*Part II*

**IMPACT EVALUATION OF THE CENTRAL VISAYAS  
REGIONAL PROJECT: THE UPLAND AGRICULTURE  
COMPONENT**

**Herminia Arocena-Francisco**

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## EXECUTIVE SUMMARY

This report forms part of an impact assessment of the Central Visayas Regional Project (CVRP) launched in 1984 covering the provinces of Cebu, Bohol, Negros Oriental and Siquijor. The analysis was concentrated on the Upland Agriculture component of CVRP which made use of survey data. The 222 sample respondents were broken down to non-adoptors and low, medium, and high adoptors. The data were analyzed using test of significance among means, regression analysis and benefit-cost analysis.

The results showed the positive assessment of the project by the upland communities in Central Visayas. It was also shown that gross and farm income of non-adoptors are significantly lower than incomes of medium and high adoptors. Real income levels for both types of adoptors have been improving over the years.

The benefit-cost analysis showed positive net present values and greater than 1 benefit-cost ratio for the different interventions made by the program. This shows that resource improvement projects such as CVRP can yield positive net income while providing environmental protection.

Suggestions for Phase II implementation includes the establishment of benchmark data on the bio-physical conditions of the project sites. Since CVRP is primarily a resource improvement project, then efforts to assess how far it has gone along this line can only be measured through the use of appropriate benchmark information. Greater involvement of local people in technology transfer is recommended on the grounds of both economic efficiency and social acceptability. More attention given to monitor sustainability of the adoption of UA technologies is also recommended. There is also a need to ensure greater justice in the distribution of its materials.

# IMPACT EVALUATION OF THE CENTRAL VISAYAS REGIONAL PROJECT: THE UPLAND AQUACULTURE COMPONENT\*

Herminia Arocena-Francisco\*\*

## I. INTRODUCTION

The fragile ecosystem that the uplands has become makes it the subject of various development efforts in the country. The overriding concern of these programs is the enhancement and/or protection of the upland resources. This is achieved either directly (i.e., through soil conservation, enhancement or protection strategies) or indirectly (i.e., by providing upland dwellers with sufficient income through resource-friendly production technologies or non-resource base employment alternatives).

The Central Visayas Regional Project-I (CVRP) which was launched in 1984 falls in this category of development programs. Central Visayas is one of the most hilly regions in the country with only 15% of its total land area considered as lowland (Technopack, 1987). This physiographic condition makes the area highly susceptible to soil erosion. The largely degraded soil resource base, which translates to lower crop productivity prior to project implementation, attests to the seriousness of the situation. With 60% of the farming populace dependent on the hillylands for their primary source of income, the support given to the region has indeed been well justified.

The huge social cost associated with the loss of soil from the uplands to the low lying downstream communities, furthermore, justifies support to the development of the Central Visayas hillylands. The cost to society takes the form of loss of production on crop fields covered by sediments and/or reduced crop productivity due to unregulated water flows in the river or irrigation system. At times, loss of property and even human lives can occur with flooding which may have been hastened by inadequate and probably even inappropriate choice of vegetation in the uplands.

The economic and ecological functions of a stable and productive hillyland ecosystem has always been thought of to be conflicting. Man, in his effort to survive or eke out a living from the uplands has the tendency to act in such a way that may have maximized short-run returns but which can not be sustained. This means that natural resources are being extracted to the point of depletion or degradation. Implicit in this behavior is the perception that renewable resources are available infinitely and, hence, can be exploited indefinitely. The absence of

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\*\* Associate Professor, College of Economics and Management, University of the Philippines at Los Baños (UPLB).

well-defined property rights further hasten resource degradation. In the short-run, therefore, and given the myopic perspective of man as well as the absence of well-defined social institutions such as property rights structure, there is indeed a conflict between the economic and ecological functions of the uplands. In the long run, however, this conflict does not exist since sustainable income flows can only result from a stable and well-protected upland ecosystem.

Any development program focused on the uplands should therefore bring about sustained flow of net benefits to its beneficiaries and to society in general as its ultimate impact. This objective is not only economically acceptable but is consistent with resource conservation and protection in upland communities where the resource base is the main source of livelihood. After all, sustainable income from the use of natural resources can only take place in a well-protected resource base.

It is against this background that the impact of the CVRP Upland Agriculture Component will be evaluated. In particular, this study will assess how the socioeconomic life of the people has changed or will be changed with their participation in different interventions of the program. The impact on the resource base will also be assessed via some physical measures such as areas with conservation practices or adoption of sustainable agricultural practices.

## **II. THE CENTRAL VISAYAS REGIONAL PROJECT, UPLAND AGRICULTURE COMPONENT: AN OVERVIEW**

The CVRP-I has as its primary objective the rehabilitation and improvement of the upland and coastal resources of four provinces in Central Visayas. This concern for the state of natural resources mirrors the poor status of these resources at the time that the project was conceptualized. In particular, it was observed that the soil erosion problem in the project sites has been deteriorating. This endangers not only the communities dependent on these resources for their livelihood (i.e., the on-site effects) but also threatens the lives and economy of the low-lying communities (i.e., the off-site effects). Projects designed for the upland conditions have this greater social concern as the major justification for their implementation.

The provinces covered by CVRP-I include Cebu, Bohol, Siquijor and Negros Oriental. A brief summary of the bio-physical and socioeconomic characterization of selected CVRP study sites in these four provinces is presented in Appendix Table 1. The project has three main components consisting of upland agriculture, social forestry and nearshore fisheries.

The upland agriculture component sets out to benefit about 5,700 families through their participation in several resource-conserving and improvement technologies. These include soil improvement measures such as green manuring and planting of leguminous crops; soil-conserving practices like contouring and use of hedgerows; tree farming and agroforestry land use; as well as reforestation activities. Free tree (fruit and non-fruit) seedlings with minimal distribution of fertilizers are given as incentives for participation in these tree planting activities spearheaded by CVRP.



Recognizing that these activities will bring about benefits realizable only at some future time, and that farmers' participation into any project can be facilitated through incentives which bring about concrete economic returns at the shortest time possible, CVRP has also packaged this type of intervention. In particular, the project provided livestock and gave financial and technical support for the construction of upland fishponds to complement its other long-term projects. It is noteworthy to note that the avilment of these incentives is anchored on the adoption of certain minimum (1,500-2,000 meters contour strips) requirements which contribute to the soil conservation objective of the project. Although there are complaints of favoritism, it can be generalized that the scheme has contributed to the widespread adoption of CVRP technologies in the project sites.

The project document of CVRP stressed that the project was designed to be process-oriented instead of being technology-oriented. Hence, while other projects may be evaluated on the basis of certain impact indicators which are then compared to the cost of its implementation, CVRP is focused more on building up capacity of the local community for resource management. This process takes time and calls for large investment on human development and community organizing without necessarily resulting to increased productivity in the short run. Since this is the case, there was a concern over the project's being judged as inefficient even if it succeeded in developing community-based resource management capability.

This paper contends that even if the project is designed primarily to improve the resource base through community-based activities, it can still be evaluated in terms of efficiency (i.e., benefit-cost analysis) criterion. This is accomplished by considering the longest economic life of the intervention (e.g., trees). At which time, it is expected that the benefits from the interventions are already realized. Whatever impact the project has may then be measured and evaluated on the basis of efficiency considerations. It is the task of this project to do a benefit-cost analysis of the Upland Agriculture Component of CVRP.

### III. THE STUDY SITES AND THE RESPONDENTS

A total of 222 sample respondents were picked up randomly from the list of CVRP participants and from the names of non-participants identified by key informants. In almost all of the study sites, majority of the households are participants to CVRP. This may be because of the observed relative ease in which one can qualify as participant to CVRP. In particular, it was observed that being in the list simply entails adoption of any one of its six upland agriculture technologies and/or involvement in any of its other activities like trainings, infrastructure projects, group or "alayon" efforts, or by being a recipient of any of its intervention or material inputs distribution scheme. Since there are many adoptors than non-adoptors in the chosen study areas, the number of sample adoptor-respondents is also higher than the sample size taken from the group of non-adoptors. Note that non-adoptors can be participant or non-participant to CVRP. The participant-non-adoptors are those whose names are included in the household profiles maintained by CVRP who had 'zero' response under the number of technologies practiced. Non-participant, non-adoptors are those who do not belong to the list

but were identified based on the names of non-participants given by key informants in the study areas.

The adoptors were randomly selected only from the list of CVRP participants. Adoptors were further grouped into high, medium, and low technology adoptors. The rating was based on the number of upland agriculture (UA) technologies practiced by the farmer-respondents. The six UA technologies include: on-farm soil conservation practices; agroforestry; contract reforestation; microwatershed planning and implementation; soil fertility enhancement practices; and upland fishpond culture. Note that these technologies are not mutually exclusive or distinct from each other. This means that other than the upland fishpond, one may find a combination of the different technologies or practices in any one of these different technologies. The microwatershed farms, for example, will have soil conservation, soil fertility improvement and agroforestry practices all combined in one farm. In addition, however, microwatershed structures such as diversion canals, checkdams or rockwalls are constructed, largely through the "alayan" practice (i.e, labor sharing in community undertakings). These structures are used to manage run-off by diverting or distributing them in the watershed. The technology also entails the planting of forest species on top of the watershed to ensure sustained flow of water. Hence, it must be kept in mind that the results of the economic analysis to be shown later do not intend to treat these six technologies as mutually exclusive.

The high technology adoptors are those practicing at least four (4) of the CVRP's six UA technologies. If about 2-3 technologies are practiced, then the respondent is classified as medium adoptors. Low adoptors are those who have practiced only one (1) of the six UA technologies. The distribution of the respondents into these categories of adoptors is given in Table 1.

Tables 2a-2d provides a brief characterization of the sample respondents. It will be noted that there are no significant differences among the various types of adoptors in terms of the selected socioeconomic variables. In particular, the typical Central Visayas hillyland farmer has a household size of 5-6 which are of a young composition having more than a third of the members in the youth (<15 years old) and adult categories (15-39 years old) each. There is a high dependency ratio among adoptors (69%) than non-adoptors (52%) but the difference is not statistically significant.

The educational attainment of Central Visayas farmers is generally low as is also the case in most of the areas elsewhere in the country. The household head had primary level of schooling having spent 5-6 years in school. It can nevertheless be said that the value of education in the family/household is improving as may be inferred from the higher educational achievement of some members of the household. The average highest educational attainment among the household members is 8-9 years compared to the 5-6 years of their parents.

In terms of ownership of real properties such as the houselot and the house itself and that of the farmlands, there are only few non-home owners among them with the size of the house and the lot, estimated at around 112-160 and 196-600 sq ft, respectively. The house is made

Table 1  
SUMMARY OF RESPONDENTS, BY PROVINCE AND LEVEL OF ADOPTION  
OF UA TECHNOLOGIES, 1992

PROVINCE	NON-ADOPTOR	ADOPTOR			All Adoptor	ALL
		Low	Medium	High		
Siquijor	4	1	11	30	42	46
Bohol	3	1	46	10	57	60
Cebu	11	10	25	14	49	60
Negros Oriental	9	6	14	27	47	56
<b>TOTAL</b>	<b>27</b>	<b>18</b>	<b>96</b>	<b>81</b>	<b>195</b>	<b>222</b>

Table 2a  
HOUSEHOLDS' INFORMATION ON SIZE, COMPOSITION, DEPENDENCY RATIO  
AND EDUCATION, BY LEVEL OF ADOPTION OF UA TECHNOLOGIES, 1992

Socioeconomic Indicator	NON-ADOPTOR %	ADOPTOR			All Adoptors
		Low	Medium	High	
Household Size					
mean	5	6	6	5	6
sd	2	2	2	2	2
n	27	17	97	81	195
Household Composition (by age)					
> 60	4	32	8	6	6
40 - 59	19	12	15	17	16
15 - 39	43	25	36	36	36
< 15	35	31	42	41	41
Dependency Ratio					
%	52	70	73	70	69
sd	60	87	70	70	74
n	27	17	97	80	194
Education					
Ave. yrs. in school	6	6	5	5	5
sd	2	2	2	2	2
n	27	17	97	81	195
Highest educ. attainment					
mean	9	8	8	9	8
sd	3	3	3	6	5
n	27	17	97	81	195

Table 2b  
HOUSE CHARACTERISTICS AND SOURCE OF WATER BY LEVEL OF ADOPTION  
OF UA TECHNOLOGIES, 1992

SOCIOECONOMIC INDICATOR	NON-ADOPTOR %	ADOPTOR			ALL ADOPTORS
		Low	Medium	High	
Ave. size of house (sq.f.)					
mean	112	161	122	148	431
sd	122	105	150	180	159
n	27	16	96	78	190
House ownership					
n	27	16	96	78	190
Owned					
frequency	23	15	88	73	176
percent	85.0	94.0	92.0	94.0	93.0
Rented					
frequency	2	0	2	1	3
percent	7.5		2.0	1.0	2.0
Sharing					
frequency	2	1	3	3	7
percent	7.5	6.0	3.0	4.0	3.6
Others					
frequency	0	0	3	1	4
percent			3.0	1.0	2.0
House classification (by materials used)					
Light					
frequency	18	9	53	44	106
percent	65.0	59.0	55.5	56.0	56.0
Mixed					
frequency	7	6	37	27	70
percent	27.0	35.0	39.0	35.0	37.0
Concrete					
frequency	2	1	6	7	14
percent	8.0	6.0	6.0	9.0	7.0
Ave. size of house lot (sq.f.)					
mean	530	604	196	258	256
sd	1,496	1,276	193	263	314
n	24	15	88	75	178
Tenure on house lots					
n	25	17	93	78	188
Owned					
frequency	12	11	58	56	125
percent	48.0	65.0	62.0	72.0	67.0
Leased/Rented					
frequency	4	0	5	7	12
percent	16.0		5.0	9.0	6.0
Squatter					
frequency	2	0	9	3	12
percent	8.0		10.0	4.0	6.0
Others					
frequency	7	6	21	12	39
percent	28.0	35.0	33.0	15.0	21.0

**Table 2c**  
**SOURCE OF WATER BY LEVEL OF ADOPTION OF UA TECHNOLOGIES, 1992**

SOCIOECONOMIC INDICATOR	NON-ADOPTOR %	ADOPTOR			ALL ADOPTORS
		Low	Medium	High	
<b>Main Source of Water</b>					
Artesian wells					
frequency	4	0	14	7	21
percent	15	94	15	9	11
Deep well					
frequency	3	4	23	8	35
percent	12	25	24	10	18
Creek/springs					
frequency	10	7	40	51	98
percent	38	44	42	65	52
Local water facilities					
frequency	9	5	18	18	41
percent	35	31	19	23	22
Others					
frequency	0	0	2	0	2
percent			2		1

**Table 2d**  
**FARM CHARACTERISTICS OF CVRP SAMPLE RESPONDENTS**  
**BY LEVEL OF ADOPTION OF UA TECHNOLOGIES, 1992**

SOCIOECONOMIC INDICATOR	NON-ADOPTOR	ADOPTOR			ALL ADOPTORS
		Low	Medium	High	
<b>Total farm area</b>					
mean	2.48	1.49	2.27	2.62	2.35
sd	5.30	1.28	3.05	3.98	3.37
n	25	17	97	80	194
<b>Tenure on farm lots</b>					
Owned					
frequency	19	13	75	86	174
percent *	49	68	52	59	56
Leased					
frequency	3	0	9	3	12
percent	8		6	2	4
Tenant					
frequency	14	4	44	46	108
percent	36	24	31	31	35
Public land					
frequency	4	0	11	11	26
percent	10		8	7	8
Stewardship					
frequency	0	2	2	1	5
percent		11	11	1	2
Total No. of Parcels	39	19	143	147	309
Ave. No. of Parcels	1.56	1.12	1.47	1.84	1.59

\* % to Total No. of Parcels

up mostly of light materials such as wood, bamboo and "sawali" with about a third of them who made use of mixed light and concrete materials.

Land tenure which defines control over the natural resource is also an important indicator of socioeconomic status. Average farm holdings of both adoptors and non-adoptors are generally big with non-adoptors having a relatively bigger farm area (2.48 ha) than the adoptors (2.35 ha). This was consistent with the answers given by some of the non-adoptors for not participating in the project. Specifically, it was mentioned that involvement in CVRP activities takes so much time which they cannot afford to spare as they are already very busy working in their own farms. Among the adoptors, it was noted that the low adoptors had the least farmholdings of 1.49 ha while the high adoptors had the highest with 2.62 ha.

Control over these farmland was largely by (private) ownership for 56% of the total number of parcels controlled by adoptors and 49% of the total parcels of land belonging to the non-adoptors. Almost the same proportion (35%) of the total parcels of land are under tenancy for adoptors and non-adoptors. Among the adoptors, some 2% of the number of parcels are claimed to be under stewardship contract with the government. The remaining parcels of land for both type of farmers are either under leasehold or are in public lands. Note that by slope category almost all of their lands may be considered as public lands. The figures reported in this section are thus based only on what the respondents perceived to be their claim over the lands.

The 1980 survey distinguished between full and part owners; absolute tenant and settler (Appendix Table 1). It is thus difficult to make a comparison with the data just recently collected since different categories were used in the 1992 survey. A closer look at the figures would reveal that there seems to be no significant difference in the proportion of owners and tenants since 1980. The awarding of stewardship contracts to settlers appear only in the 1992 survey.

A comparison of some of the above-mentioned socioeconomic variables with the data generated from the same sites in 1980 and 1988 (Table 3) reveals that access/control over farmland has improved since 1981. This is inferred from the increase in the average farmholdings from 1.32 hectares to 2.48 hectares for non-adoptors and 2.35 ha for adoptors. The access to water has also improved with more households now being served by the public facility as compared to those in the past. There still remains so much to be desired, however, in improving access to water source since majority of the households still rely on springs/creeks and deep well for their water. The area being hillyland explains to a great extent why improved access to water can not be easily achieved.

There are very few areas in the study sites which are served by electricity (Table 4). Around 10% of the adoptor-respondents have electricity in their homes with majority relying only on gas-operated kerosene lamps for their lighting source. Appliances owned consist largely of radio which was owned by 63% of the non-adoptors and 73% of the adoptors. A few (18%) adoptors owned a sala set while no one among the non-adoptors has this household item.

**Table 3**  
**SELECTED SOCIOECONOMIC VARIABLES IN CVRP PROJECT SITES**  
**(PRE-PROJECT IMPLEMENTATION), 1980**

SOCIOECONOMIC VARIABLES	MEAN
Ave. household (HH) size	6
Dependency ratio	50
Ave. no. of parcels/farm	2
Farm size (ha.)	
median	0.86
mean	1.32
Farm ownership (%)	
household-owned	55
gov't-owned	4
owned by other HH	42
Housing materials (%)	
Hollow blocks	1
Wood	34
Bamboo, sawali	62
Others	2
Source of water (%)	
Spring, river	78
Wells	33
Public facility	8

**Table 4**  
**SOURCE OF POWER AND OWNERSHIP OF APPLIANCES IN CVRP**  
**PROJECT SITES BY LEVEL OF ADOPTION OF UA TECHNOLOGIES, 1992**

ITEM	NON-ADOPTOR %	ADOPTOR			ALL ADOPTORS
		Low	Medium	High	
Source of Power					
Electricity					
n	0	1	10	11	22
%	0	6	10	14	11
Kerosene Lamps					
n	25	16	87	69	172
%	93	94	88	85	87
Battery					
n	0	0	2	0	3
%			2		2
<b>TOTAL</b>	<b>27</b>	<b>17</b>	<b>99</b>	<b>80</b>	<b>197</b>
Appliances Owned					
Radio					
n	17	12	66	55	133
%	63	71	77	69	73
T. V.					
n	0	0	1	3	4
%			1	4	2
Sala set					
n	0	3	14	16	33
%	0	18	16	20	18
Refrigerator					
n	0	0	2	3	5
%			2	4	3
Moving vehicles					
n	0	0	3	3	6
%			3	4	3
<b>TOTAL</b>	<b>17</b>	<b>15</b>	<b>86</b>	<b>80</b>	<b>181</b>

Some 2-3% of the high and medium adoptors own television sets, refrigerators and even vehicles. On the basis of these indicators, it would appear that those who can afford modern facilities in life are generally those belonging to the high adoptor category.

#### **IV. THE UPLAND AGRICULTURE TECHNOLOGIES AND OTHER INTERVENTIONS**

The impact evaluation survey of 1992 obtained the number of sample respondents who have done the different practices and/or technologies promoted by CVRP under the Upland Agriculture (UA) component (Table 5a). Except for fallowing (i.e., a practice wherein a piece of land was left uncultivated for sometime to give it sufficient time to restore its fertility), there is a significantly higher number of practitioners of UA technologies than non-practitioners.

The information revealed that the most widely adopted practices are those associated with on-farm soil conservation and microwatershed projects. These practices include the use of A-frame and the construction of hedgerows which were done by 78% of the respondents. Practices generally associated with microwatershed development such as the construction of contour ditches (45%); terracing (36%); rockwalling (40%); and making of checkdams/diversion canals (39%); have been widely participated on by the sample respondents. Soil fertility improvement measures like green manuring was done by 35% of the respondents.

The degree of adoption of the different UA technologies based on records of CVRPO (1991) are shown in Table 5b. There exists a high level of adoption of the different UA technologies with 89% of the households in the project sites practicing on-farm soil conservation, 72% are engaged in agroforestry development, 17% in reforestation activities, and 28% in microwatershed planning and development. The upland fishpond project was participated in by only 10% of the household population.

Figures 1 to 3 show the frequency counts of participation to UA activities; recipients of livestock and awardees of certificates of stewardship contract (CSC); and involvement in infrastructure activities as per records of CVRPO. The graphs reflect the concentration of activities of CVRP-UA on social preparation and community organizing in the first four years (1984-1988) where very little accomplishments in terms of focused interventions (e.g., soil conservation measures, fishpond development, etc.) were reflected. Participation in activities directed at promoting the different specific technologies took off the ground only in mid-1988 to mid-1990, after which a decline was observed. At this period, CVRP was already preparing for the termination of the project. Of the different UA activities, the greatest participation was recorded in soil conservation, followed by agroforestry development. Participation in microwatershed planning and development, reforestation, and fishpond development followed in that order.

In terms of distribution of livestock and awarding of certificates of stewardship contracts, the biggest number of recipients were recorded in 1989-1990. These periods coincided with the increased participation in soil conservation activities of CVRP participants. This was primarily



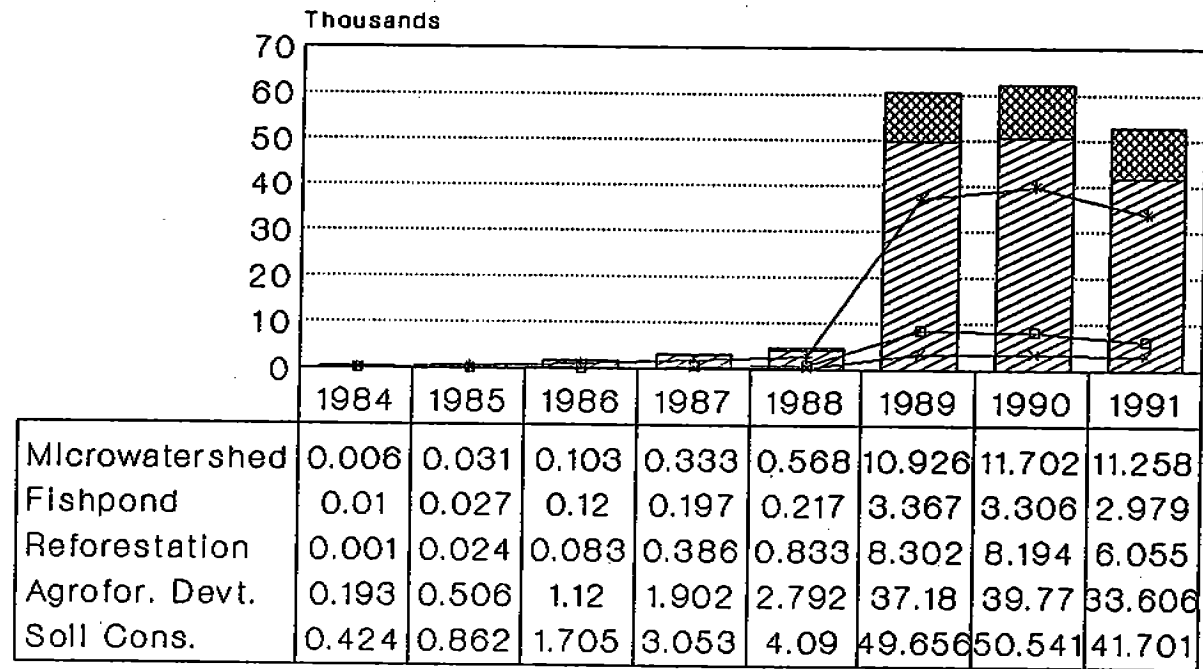
Table 5a  
**UPLAND AGRICULTURAL PRACTICES ADOPTED BASED ON  
 1992 SURVEY DATA, CVRP-UA PROJECT SITES**

	TECHNOLOGY	ADOPTOR		NON-ADOPTOR		PROBABILITY
		No.	%	No.	%	
1.	A-frame adoption	174	78	48	22	0.000
2.	Construction of hedgerows	174	78	48	22	0.000
3.	Contour ditches	104	47	118	53	0.005
4.	Terraces	79	36	143	64	0.005
5.	Rockwall	88	40	134	60	0.005
6.	Checkdams/diversion canal	87	39	135	61	0.001
7.	Composting	118	53	104	47	0.000
8.	Green manure	77	35	145	65	0.021
9.	Fallowing	37	17	185	83	0.409
10.	Crop rotation	66	30	156	70	0.007

Table 5b  
**SURVEY OF ADOPTORS OF UPLAND AGRICULTURAL TECHNOLOGIES  
 CVRP-UA PROJECT SITES (CVRPO REPORTS), 1991**

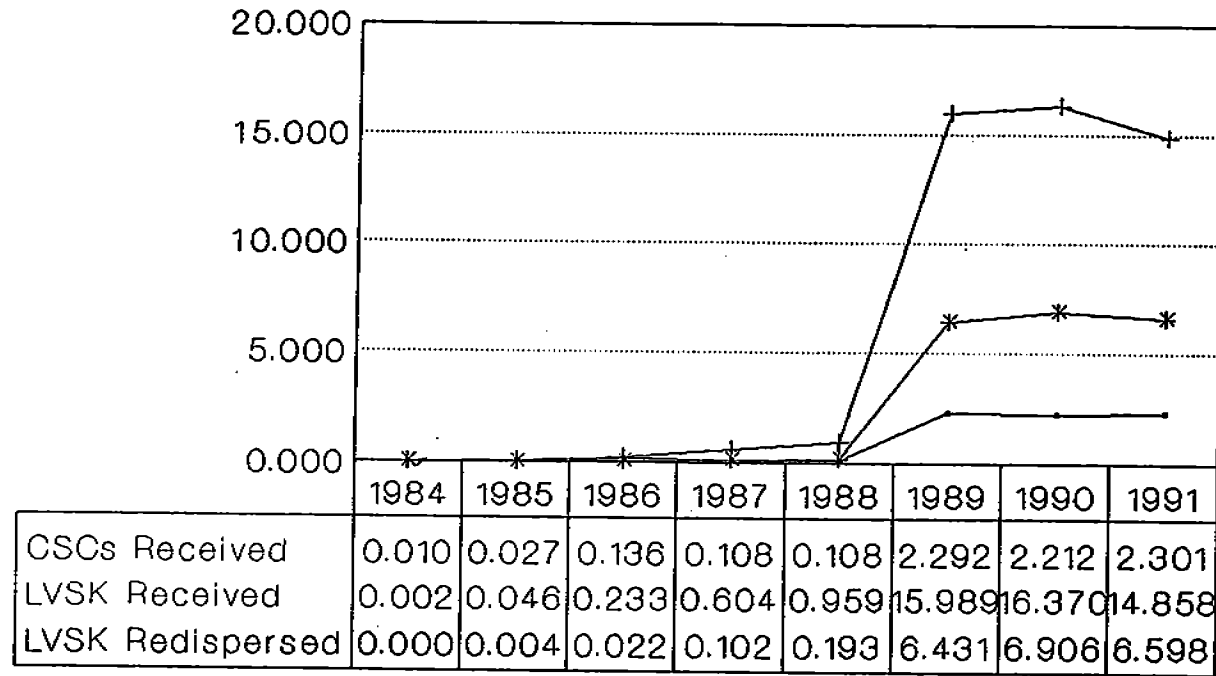
	TECHNOLOGY	ADOPTOR		NON-ADOPTOR	
		No.	%	No.	%
1.	On-farm Soil Conservation	6,626	89	820	11
2.	Agroforestry Development	5,336	72	2,110	28
3.	Off-farm Reforestation	1,274	17	6,172	83
4.	Upland Fishpond	725	10	6,721	90
5.	Microwatershed Planning and Implementation	2,110	28	5,336	72

Figure 1  
 PARTICIPATION IN UPLAND AGRICULTURE  
 ACTIVITIES IN CVRP PROVINCES (1984-1991)



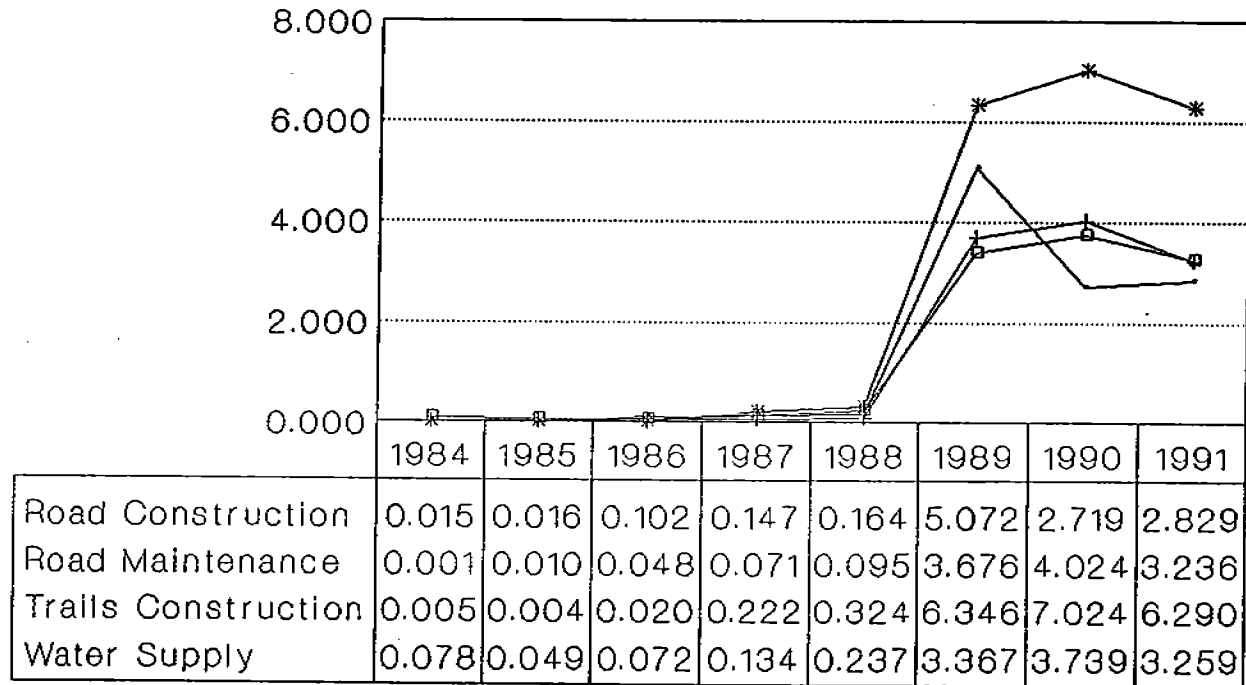
Soil Cons.     
  Agrofor. Devt.     
  Reforestation  
 Fishpond     
  Microwatershed

Figure 2  
 RECIPIENTS OF LIVESTOCK DISPERSAL/REDISPERSAL PROJECTS  
 AND CERTIFICATES OF STEWARDSHIP CONTRACT (1984-1991)



—•— CSCs Received      —+— LVSK Received  
 —\*— LVSK Redispersed

Figure 3  
 PARTICIPATION IN INFRASTRUCTURE ACTIVITIES  
 IN CVRP PROJECT SITES (1984-1991)



— Road Construction      + Road Maintenance  
 \* Trails Construction      - Water Supply

because the distribution of livestock was associated with adoption of certain minimum level of soil conservation practice. To a large extent, it can be said that greater participation in the project was achieved because of the incentives provided by the program. These incentives were in the form of livestock (availed at through the livestock dispersal and redispersal projects); seedlings; and some material inputs like fertilizers and construction materials for feedlots.

The practice of giving away said incentives was considered necessary since returns to resource improvement projects such as that of CVRP is realizable only at some future time. In a subsistence economy, the delay in project benefits are expected to deter greater participation in the project. To hasten greater project participation, the use of incentives was therefore seen as justified. There may still be room for improvement though in the distribution scheme for these inputs, as reports of favoritism were also mentioned a number of times. There was not much success achieved though in facilitating the release of CSCs. This was primarily because this decision was not really within the power of CVRP. At most, what the project has done is to act as intermediary in facilitating release of this access instruments to selected upland dwellers.

Participation in infrastructure activities is shown in Figure 3. Trail construction, road maintenance and water supply sourcing/improvements were at their peaks in 1990 while participation in road construction was highest in 1989. The biggest participation was recorded for trail construction and road maintenance since these do not really involve huge investments as the others.

#### **V. REGRESSION ANALYSIS: DETERMINANTS OF LEVEL OF ADOPTION AND LEVEL OF BENEFITS (QUANTITY OF LIVESTOCK AND SEEDLINGS) RECEIVED FROM CVRP**

The preceding discussions have shown that there is a widespread adoption of CVRP-UA technologies and practices in the project sites. This is a positive indicator of potential impact of the project but has to be further assessed as will be done in the succeeding discussions. Before going into impact measurement, however, it may be informative also to look into the factors that affect level of technology adoption.

Level of adoption of UA technologies was measured by the number of technologies being practiced by the respondents. The different variables which are hypothesized to influence level of technology adoption are shown in Table 6. Considering the respondents for all the CVRP provinces, the multiple linear regression model was found significant with 99% level of confidence and 20% coefficient of determination ( $R^2$ ).

The factors found to significantly influence level of technology adoption are age of the household head, the attendance to community meetings and the quantity of seeds received from the project. An increase in the value of all these variables are positively contributing to technology adoption, with attendance to barangay meetings, a dummy variable, being a

**Table 6**  
**DETERMINANTS OF LEVEL OF ADOPTION IN CVRP PROJECT AREAS, 1992**

VARIABLES	SIQUIJOR	BOHOL	CEBU	NEGROS OR.	ALL PROVINCES
INTERCEPT	0.583379 (0.342)	-0.276073 (0.164)	0.496100 (0.384)	0.960830 (0.897)	0.859754 (1.330)
Age of HH head	0.015995 (0.843)	0.006526 (0.425)	0.006290 (0.358)	0.021910 (1.382)	0.018354 ** (2.274)
Highest educ in the HH	0.063375 (0.705)	0.062173 (0.592)	0.115880 (0.106)	0.036650 (0.388)	0.064285 (1.340)
Household size	0.084894 (0.784)	0.075230 (0.694)	0.026945 (0.234)	-0.133855 (1.032)	-0.014215 (0.239)
Total farm area	-0.200479 * (0.993)	0.035644 (0.400)	-0.398020 * (1.612)	0.000669 (0.012)	-0.043521 (1.026)
Gross income	-0.000014 (0.779)	0.000001 (0.105)	0.000028 (0.763)	0.000011 (1.537)	0.000003 (0.681)
Distance in time to nearest town center by vehicle	0.049709 *** (0.700)	-0.007270 (0.528)	-0.005241 (0.356)	0.009270 (1.121)	0.003910 (0.676)
Number of crops cultivated	0.032433 (0.203)	-0.054770 (0.527)	0.124583 (0.874)	0.136880 (1.110)	0.116907 (1.932)
Attendance in community meetings	1.094269 * (1.910)	2.519100 * (1.803)	1.552900 ** (2.307)	-0.691690 (1.154)	0.544810 ** (1.923)
Number of livestock dispersed	-0.004134 (0.626)	-0.064571 (0.108)	0.004217 (0.258)	0.653751 (2.011)	0.008717 (1.222)
No of seeds distributed	0.001984 ** (2.083)	0.001210 (0.498)	0.000866 ** (2.428)	0.000461 *** (2.466)	0.000537 *** (3.489)
R2	61.45	26.31	45	45	20
F value	4.303 ***	0.785	2.512 **	2.524 **	3.650 ***

\* Significant at 10%

\*\* Significant at 5%

\*\*\* Significant at 1%

( ) T values

ua-16  
12.94

technology shifter. The attendance to barangay meetings was taken as an indicator of the active involvement of the respondents to community activities. The hypothesis that those active in barangay affairs tend to be high adoptors is supported by the regression results. The quantity of seedlings received from CVRP is seen to be both an incentive and a product to/of adoption since free seedlings will be distributed only if the farmers participate in CVRP activities. Furthermore, adoption of many UA technologies are anchored on tree planting activities.

The results of the regression analyses in the different provinces revealed that the level of adoption model was significant also for the three provinces, except in Bohol. A high  $R^2$  was obtained for Siquijor at 61.45% with quantity of seedlings received, attendance to meetings, and distance in travel time to nearest town center as the significant explanatory variables. In Cebu, total farm area turned out to be negatively and significantly affecting technology adoption along with attendance to meetings and quantity of seeds. This finding disproves the general hypothesis that farmers with bigger farmholdings tend to be high adoptors.

The negative coefficient has a very valid explanation, however, which was also observed by the researchers during the field data collection. In particular, it was noted that many non-adoptors, when asked why they are not adoptors, have replied that they are busy working in their farms. Through key informant research it was found that many of them had bigger farmholdings. As such, they do not have time to attend CVRP meetings and trainings which are mandatory for participation in CVRP. They are not against CVRP activities but simply know that they can not comply with the required attendance in meetings and seminars. They do acknowledged learning about CVRP technologies through the other farmers but full adoption is, as expected, slower than those actively collaborating with CVRP technicians. For Cebu, a relatively high  $R^2$  of 45% was obtained. In the case of Negros Oriental, only the quantity of seedlings received turned out to be significantly affecting the level of technology adoption with an  $R^2$  of 45%.

To determine the factors significantly affecting the quantity of seedlings received by project beneficiaries, a regression analysis was also done (Table 7). The regression model for all provinces, except Cebu was not significant. This means that quantity of seedlings received is generally not affected by the variables included in the model or that there are more important variables influencing seedlings distribution which are not captured in the model. In Cebu, the only significant variable affecting adoption is distance to nearest town center which has a positive regression coefficient. This would mean that the farther one's farm is from the town center, where usually the CVRP office is located, the greater the quantity of seedlings that he will take. This seems to be logical since one who has to travel a long distance to get the seedlings should aim to bring as much as he can to bring down the per unit cost of transporting the seedlings.

With regards to the determinants of livestock received from CVRP, the regression model is again not significant, except in Bohol (Table 8). The only significant explanatory variable for the Bohol model is gross income which has a very low but significant regression coefficient. The negative coefficient obtained indicates that those with high gross income, in general, are

Table 7  
DETERMINANTS OF NUMBER OF LIVESTOCK RECEIVED FROM CVRP, 1992

VARIABLES	SIQUIJOR	BOHOL	CEBU	NEGROS OR.	ALL PROVINCES
INTERCEPT	-16.205150 (0.338)	-0.663610 (1.193)	6.022700 (0.441)	-0.085883 (0.143)	1.644200 (0.022)
Age of HH head	0.220547 (0.414)	0.003540 (0.683)	0.015300 (0.083)	0.000743 (0.084)	0.058574 ** (0.628)
Highest educ in the HH	0.138725 (0.056)	0.063835 ** (1.942)	-0.625344 (0.536)	0.081130 (1.629)	-0.154820 (0.278)
Household size	-0.865340 (0.284)	-0.058639 * (1.680)	1.096817 (0.902)	-0.000760 (0.011)	-0.474480 (0.693)
Total farm area	-3.466840 (0.636)	0.030072 (1.005)	-1.228600 (2.481)	-0.012078 (0.397)	-0.283590 (0.577)
Gross income	-0.000210 (0.413)	-0.000004 ** (2.003)	-0.000011 (0.030)	0.000000 (0.042)	-0.000012 (0.203)
Distance in time to nearest town center by vehicle	0.262421 (0.508)	-0.004577 (1.017)	-0.075734 (0.535)	0.000357 (0.078)	0.033980 (0.511)
Number of crops cultivated	3.432400 (0.788)	0.059266 * (1.772)	-1.016640 (0.684)	0.052131 (0.760)	0.405243 (0.580)
Attendance in community meetings	0.722496 (0.045)	0.475275 (1.036)	1.396500 (0.208)	0.230083 (0.723)	0.079262 (0.024)
R2	10.11	43.00	8.39	13.12	1.50
F value	4.08	2.26 **	0.38	0.62	2.86

\* Significant at 10%

\*\* Significant at 5%

\*\*\* Significant at 1%

( ) T--values

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Table 8  
DETERMINANTS OF NUMBER OF SEEDLINGS RECEIVED FOR CVRP, 1992

VARIABLES	SIQUIJOR	BOHOL	CEBU	NEGROS OR.	ALL PROVINCES
INTERCEPT	-58.017747 (0.018)	-102.904680 (0.749)	-457.791488 (0.733)	95.470895 (0.091)	-172.068902 (0.496)
Age of HH head	0.220379 (0.061)	-0.576166 (0.450)	-9.160414 (1.086)	-8.126942 (0.529)	-3.229861 (0.747)
Highest educ in the HH	18.264098 (1.084)	9.736084 (1.199)	-24.734358 (0.463)	-92.584610 (1.083)	-4.436296 (0.172)
Household size	-1.246444 (0.060)	-6.296137 (0.730)	-1.131886 (0.020)	189.356989 (1.556)	35.049883 (1.104)
Total farm area	56.499059 (1.529)	-0.477380 (0.065)	-162.415600 (1.390)	-33.473583 (0.634)	9.184824 (0.403)
Gross income	-0.003639 (1.099)	-0.000437 (0.812)	0.005236 (0.298)	-0.001311 (0.190)	0.000215 (0.081)
Distance in time to nearest town center by vehicle	-0.165682 (0.047)	1.391372 (1.251)	17.649564 *** (2.725)	-5.820929 (0.728)	4.212840 (1.365)
Number of crops cultivated	33.335570 (1.128)	4.115679 (0.499)	70.197869 (1.032)	4.849574 (0.041)	31.508150 (0.973)
Attendance in community meetings	-41.110081 (0.376)	126.424851 (1.115)	673.695456 ** (2.195)	1081.950615 ** (1.956)	169.637795 (1.118)
R2	30.43	17.12	36.64	19.04	6.44
F value	1.59	0.62	2.39 **	0.97	1.26

\* Significant at 10%

\*\* Significant at 5%

\*\*\* Significant at 1%

( ) T-values

benefitting less from the livestock dispersal program. This finding, however, is not supported by the findings from other study areas and, hence, is not conclusive.

## VI. SOCIOECONOMIC IMPACT OF CVRP: A QUALITATIVE ASSESSMENT

The next task is to assess the impact of CVRP-UA on the socioeconomic life of the people in the project sites. This will be done at two levels. At the first level, the respondents' own assessment of the project's impact is presented. Specifically, they were asked how their socioeconomic status has changed with their participation to CVRP activities and how they would compare their status from that of five years ago and with other members of the community. Before discussing their perceptions, it will be interesting to note the criteria used by the respondents in making this ranking.

Table 9 presents the basis of socioeconomic ranking by the sample respondents. For the Cebu and Bohol farmers, a commonality of criteria was noted while Negros Oriental and Siquijor farmers put more weight on other criteria. The household's involvement in business and other non-farm income sources is seen as an indicator of an improved economic status in Cebu and Bohol. In addition, richer farmers in these two provinces are identified as those who can afford to use chemical fertilizers in their farm, are land owners and have bigger farmlands, or are industrious. Some also mentioned the household's capacity to send children to school, particularly, in the college level as an indicator of being well-to-do.

For the Negros Oriental farmers, ownership of a number of livestock and/or working animals speaks of an economically well-off household. The ability to buy modern inputs of production with a special mention to chemical fertilizers is also an important indicator of improved economic status in the community. The other important criteria are the ownership of bigger farmlands and the industriousness of the household unit which are also mentioned by Cebu and Bohol farmers. For Siquijor, 88% of the respondents from this province cited having overseas worker in the household unit or being pensionados as an indicator of who are the better-off households in the community. In addition, some 12% cited having a business or non-farm income sources as being associated with the economically well-off members of the community.

Given these background, the perceived impact of CVRP on the socioeconomic life of the sample respondents can already be presented.

### A. *Perceived Change in Socioeconomic Status After Participation in CVRP*

In general, there exists a positive assessment of the project's impact on the socioeconomic life of the people (Figure 4). Some 60% of the respondents claimed being better off after participation in CVRP activities. There are only 2% who claimed otherwise while around 27% said that they did not notice any change in their level of living in spite of CVRP's presence in the community. The positive response to CVRP holds true for all the study sites.

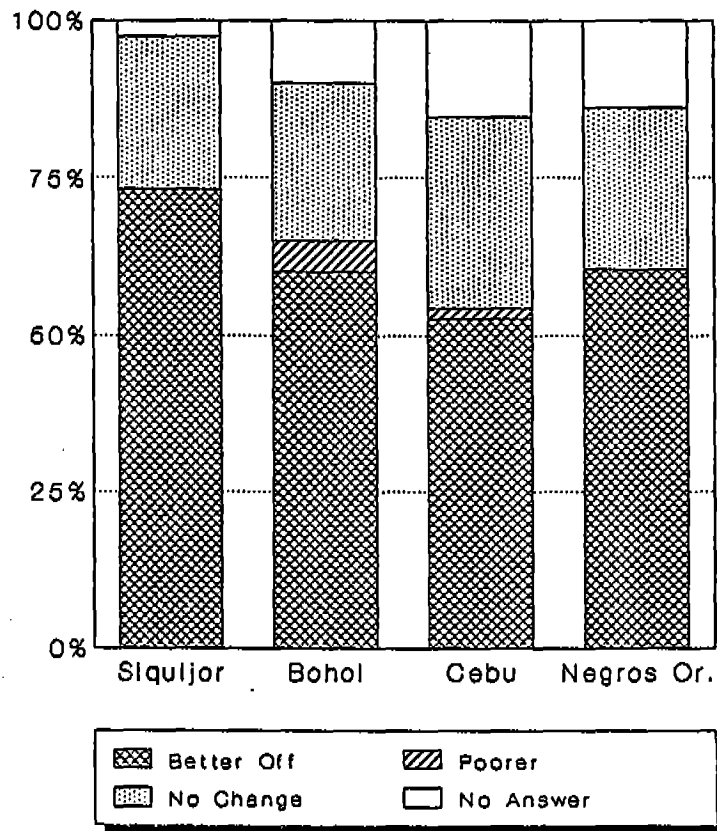
**Table 9**  
**BASIS OF SOCIOECONOMIC RANKING IN THE CVRP-UA**  
**PROJECT SITES COMMUNITIES, 1992**

BASIS FOR WEALTH RANK	CEBU		BOHOL		NEGROS OR.		SIQUIJOR		ALL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Ownership of more livestock/ working animals	3	5	3	5	18	31	0	0	24	11
With business/non-farm income source	12	20	15	25	2	2	5	12	34	16
Can buy fertilizer and other inputs/have capital	8	14	13	22	18	31	0	0	39	18
Have bigger farm lands	8	14	6	10	15	25	2	5	31	14
Are industrious	3	5	8	13	9	15	2	5	22	10
Owner of lands	10	17	5	8	6	10	0	0	21	10
Send children to school	5	8	0	0	5	8	0	0	10	5
Have children working abroad/ Pensionado	1	2	0	0	1	2	36	88	38	17
Have plenty of coconut trees	4	7	0	0	1	2	0	0	5	2
Have ricelands	0	0	2	3	0	0	1	2	3	1

**Table 10**  
**REASONS FOR IMPROVEMENT IN THE SOCIECONOMIC CONDITIONS**  
**AFTER PARTICIPATION IN CVRP-UA ACTIVITIES, 1992**

REASONS	% RESPONDING
Due to material inputs (livestock, seedlings, fertilizer) given by CVRP	24
There is now better knowledge/technical know-how in hillyland farming	28
There was an observed increase in crop production and subsequent improvement in income	15
The resource base (soil fertility and environment) has improved	16
Cropping intensity has increased	5
Trees planted will be turned into cash in a few years time	5
CVRP provides direct employment	2
No answer given	5

**Figure 4**  
**PERCEIVED CHANGE IN SOCIOECONOMIC CONDITIONS**  
**AFTER PARTICIPATION IN CVRP ACTIVITIES,**  
**BY PROVINCE, 1992**



The most important contributions of CVRP to its beneficiaries as seen by the respondents themselves are summarized in Table 10. The transfer of technical know-how in hillyland farming was mentioned by 28% of the respondents. This technical knowledge pertains to soil conservation and improvement practices and that of tree farming. There are 51% and 27% of the respondents, respectively (Appendix Table 2), who claimed to have learned of these practices only from CVRP. The distribution of material incentives, particularly the livestock, the seedlings and other planting materials, and limited amount of fertilizers was also highly appreciated by the beneficiaries. It should also be noted that some 16% mentioned in particular the improvement of the land resource base as the most important contribution of the project. Though this number is not that large, it is noteworthy to note that they were able to identify this contribution of the project even if its impact may not be that visible at this time yet.

The other causes/reasons for the improved socioeconomic status of those who claimed themselves to be better off are the observed increase in production, increased cropping intensity, direct employment in CVRP activities, and prospect of higher incomes from yield of tree crops in the next few years. Note that these answers were given by the respondents themselves instead of them selecting from the list of possible answers. This means that the list is not designed to be exhaustive but should have captured fairly enough what the respondents themselves think as the most important contribution of CVRP to their socioeconomic life.

#### B. *Comparison with Socioeconomic Status Five Years Ago*

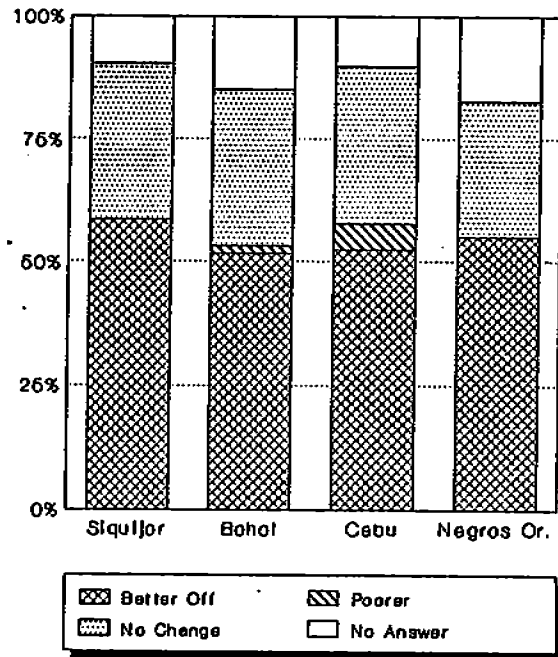
Figure 5 presents the respondents perception of the change in their socioeconomic status since five years back. More than half (54%) claimed to have a better economic status now, 30% said that their status did not change, 2% said that they are poorer now and the rest did not answer this question. There is therefore a general feeling that things are better off today than five years ago. The same patterns of responses were noted in all the four study sites.

#### C. *Comparison of Socioeconomic Status With Other Members of the Community*

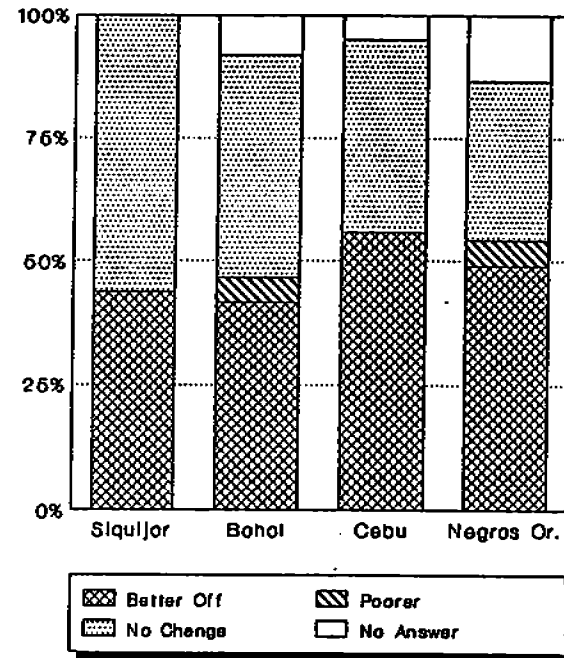
The respondents were then asked to rate themselves relative to the other members of their immediate community. The following responses were obtained: 48% think that they are better off than others, 42% said that they are just like the rest; 3% claimed themselves as poorer; and the remaining 7% chose not to answer this particular question (Figure 6). These answers seem to support the generally optimistic feeling of the people in the study sites where most have answered that they are either better off or at least as well off as the others. There are only very few who seems to think that their conditions are deteriorating and could therefore be taken as insignificant.

The kind of optimism which pervades among the sample respondents speaks of a positive frame of mind awaiting Phase II project implementors in case intensification of activities in Phase I sites will be done. In case other sites will be chosen, the positive response of the people to the project is likely to spread also in the other sites.

**Figure 5**  
**COMPARISON OF RESPONDENTS' SOCIOECONOMIC STATUS**  
**WITH THAT OF FIVE YEARS AGO,**  
**BY PROVINCE, 1992**



**Figure 6**  
**COMPARISON OF RESPONDENTS' SOCIOECONOMIC STATUS**  
**VIS-A-VIS OTHER MEMBERS OF THE COMMUNITY,**  
**BY PROVINCE**



## VII. ASSESSMENT OF CVRP'S WEAKNESSES

It is important to consider the weaknesses of the project for better planning and implementation of similar projects in the future. Table 11 mentioned some of these with favoritism on top of the list. This specific complaint relates to the inequitable distribution of seedlings and livestock. It was noted that barangay/farmer association officials who have control over the distribution of these items tend to favor those who are close to them, mostly their relatives and friends, some of whom have already big landholdings and are thus well-off. The big share of benefits going to CVRP workers is also cited by some respondents.

Though not a majority complained about this, the fact that 30 of the 219 respondents came out in the open to make this allegation somehow speaks of its significance. This is particularly so if one interprets that the silence of the majority of the respondents could actually mean something else. In particular, no comment/no answer given could mean either they are satisfied or even if dissatisfied would rather not talk about this sensitive issue. While it is true that charges of favoritism may be considered as inherent in any program, especially one being managed by the people themselves in the context of Filipino tradition where strong family kinship exists, this does not mean that nothing should be done about this. Planners of similar programs in the future should devise some mechanisms wherein the welfare of a bigger proportion of any group or the most disadvantaged members of the community may be enhanced. In the process, the decentralization and autonomy principles that the program wants to promote should not be sacrificed.

The slowing down of CVRP activities as a result of the upcoming termination of the project was also criticized by some. These are largely those who felt that they have not yet really been assisted by the project to the fullest for it to withdraw at this point in time. There are also reports of inadequate or insufficient visits made by the technicians. This could be due to the big number of participants being assisted by the project which made more intensive interaction between technicians and the farmers difficult. There is furthermore a seeming over-emphasis by the project on quantity or numbers of participants reached regardless of the quality of learning transferred to the clientele. Whether adoptors do in fact practice the technologies, sustainability is another matter. It would appear that a farmer would be considered as adoptor once the technology gets adopted in his farm. What happens after that appears to be no longer of concern by project implementors.

This implicit bias for quantity over quality should be corrected if a Phase II of the project is forthcoming. For some technologies, the more important aspect in technology adoption is not that the technology gets adopted per se but that it be practiced sustainably once adopted. Phase II project implementors should therefore spend some time to monitor the sustainability of its most significant technologies. By making sustainability of technology adoption (whenever appropriate) a goal, quality of technology transfer activities will somehow be automatically improved.

**Table 11**  
**CRITICISMS MENTIONED ABOUT CVRP OPERATIONS**  
**IN PROJECT AREAS**

CRITICISMS	TIMES MENTIONED
Favoritism	30
Slowing down of activities	11
Some crops/project (fishpond) not suited to the area	7
Insufficient materials being distributed	4
Inadequate/insufficient visits	4
Strict in policies	3
Inadequate technical support to tree farming	3
Delayed payments for services	2
Non-compliance to agreements	2
Very expensive project	1
Insufficient meeting	1
CVRP sites are too far from center	1
Converting some activities to foundation concern	1
Slow livestock redispersal	1

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The services of barefoot technicians and/or livestock chairmen are one aspect of CVRP which is worth replicating in similar projects in the future. These persons are local people who are at least high school graduates. They undergo training courses to be able to teach and transfer the technologies to the farmers. Their being from the place facilitate the technology diffusion process, but a higher quality of teaching could still be attained since they are reportedly covering a big number of participants than what could effectively be monitored. This calls for increasing the number of barefoot technicians to be involved in succeeding CVRP activities.

The opinions of some Department of Agriculture (DA) technicians on how CVRP could improve its operation if a Phase II will be granted were also sought. Foremost in their assessment is the need to give equal importance to production activities in Phase II, side by side with the soil improvement and conservation measures. It was their opinion that soil conservation measures and soil fertility improvement activities could have been better appreciated if productivity of the crops were improved simultaneously through improved cultural practices and use of modern cultivars. This equal focus on conservation and production is currently undertaken in the Central Cebu Hillyland Project which is co-funded by CVRP. A visit to the sites covered by this hillyland project gave the impression that there was indeed some validity to the remarks made by the key informants from DA. It was also gathered from the discussion with them that there is a need to improve the working relationships of CVRP with the Department of Agriculture. There appears to be a prevailing atmosphere of "competition" instead of "complementation" and this signals that Phase II activities should devote some time repairing some of these misconceptions.

#### VIII. INCOME STATUS AND EXPENDITURE PATTERNS OF CVRP-UA ADOPTORS AND NON-ADOPTORS

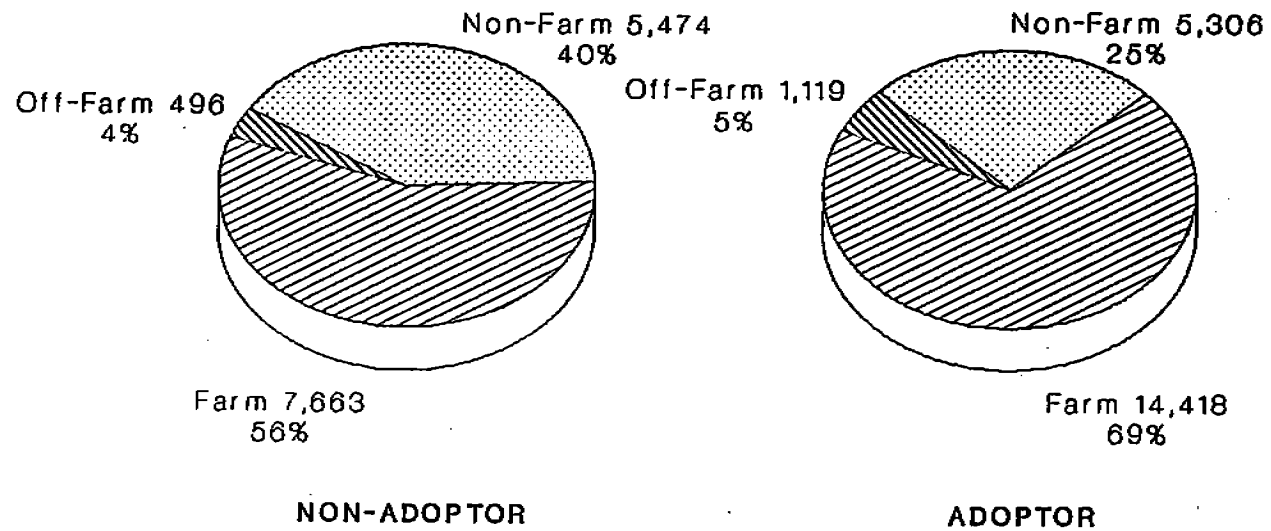
After presenting the qualitative assessment of the project's impact on socioeconomic life of its clientele, there is now a need to come up with some quantitative estimates of these impacts.

Since impact is always measured in terms of income change from the without to the with project situations, there is a need to compare the income status of the different typology of technology adoptors. In addition to this type of analysis, a measurement of the income change over a three year period (1985, 1989, and 1992) for participant/adopter and non-participant/non-adopter was done. Income data were obtained by valuing all production data of the respondents, regardless of whether the crops are for sale or for home consumption. The prices used are the existing prices given by the respondents engaged in crop trading. Off-farm and non-farm income data were obtained directly from the estimates given by the respondents.

##### A. *Income Data by Type of Technology Adoptor*

Figure 7 presents the gross income of the sample respondents during the crop year 1991-1992. The income figures were further broken down into farm, non-farm, and off-farm income sources and are classified by type of technology adoptor.

Figure 7  
INCOME DATA OF FARMER RESPONDENTS IN CVRP PROJECT SITES,  
BY LEVEL OF ADOPTION OF UA TECHNOLOGIES, 1992



The average gross annual income of technology adoptors was estimated to be ₱20,843 compared to the ₱13,633 income of non-adoptors (Appendix Table 3). Note that higher income level is generally associated with high level of technology adoption. The highest income of ₱22,835 was estimated for the high adoptors while the low adoptors had the lowest gross income level of ₱11,683 per annum. On the basis of these gross income figures, therefore, one can say that CVRP has a big impact in improving the income level of the project beneficiaries. When this hypothesis was tested for non-adoptors and adoptors, however, the results were significant only at 22%. This low level of confidence may be explained by the large variance of the observation. The effect of the large variance was minimized through a natural logarithm transformation of the income data. Test of significant difference of the transformed values was then undertaken.

Results of the DMRT and ANOVA analyses show that mean gross income across technology groups was statistically significantly different with 90% level of confidence (Appendix Table 4a and 4b). The difference though was observed to be significant only between high and low technology adoptors.

Since the CVRP-UA is an agricultural development project, it may be more logical to compare level of farm income of the different groups of technology adoptors. The ANOVA results shows highly significant ( $\alpha = 1\%$ ) difference between adoptor and non-adopter. Across all technology adoptor typologies, significant difference was observed only between medium and high adoptors versus the non-adoptors. This means that farm income realized by high and medium adoptors are significantly higher than the farm income realized by non-adoptors. There is no statistically significant difference in the income of non-adopter and low technology adoptors. This observation is valid with 95% level of confidence using DMRT (Appendix Table 4a and 4c). There is no observed significant difference in gross income between adoptors and non-adoptors but the difference in farm income is highly significant at 99% confidence level (Appendix Table 4d).

For all types of adoptors, farm income contributes the biggest proportion to household income. The percent contribution ranges from 56% for the non-adopter to 70% for the low and 72% for high adoptor-households. The contribution of these income sources to gross income varies substantially by province (Table 12).

In Siquijor, non-farm income sources accounted for 91% of the gross household income of non-adoptors and 67% for adoptors. The survey data revealed that a big number of households in Siquijor were receiving income contributions from relatives working abroad or were "pensionados" as US veterans. A visit into the study sites revealed that in spite of the seemingly poor agricultural conditions in the sites, big concrete houses abound. Recall that 78% of the respondents from Siquijor consider having children working abroad or being pensionado as an indicator of being economically well-off in their locality. This is distinctly different from other sites wherein wealth status is measured by such indicators as having the money to buy fertilizers and other modern inputs for farming, having other non-farm business and ownership of bigger farmholdings.

**Table 12**  
**INCOME DATA OF SAMPLE RESPONDENTS IN CVRP PROJECT SITES BY PROVINCE**  
**AND BY ADOPTORS AND NON-ADOPTORS OF UA TECHNOLOGIES, 1992**

PROVINCE/ SOURCE OF INCOME	NON-ADOPTOR		ADOPTOR	
	Mean	Std. Dev.	Mean	Std. Dev.
<b>Siquijor</b>				
farm income	1,726	1,802	6,198	5,289
non-farm income	18,465	16,768	14,371	5,743
off-farm	-	-	2,062	4,796
gross income	20,191	18,408	21,556	45,613
<b>Bohol</b>				
farm income	9,502	6,571	17,925	28,225
non-farm income	1,553	1,355	2,365	5,743
off-farm	-	-	579	2,674
gross income	11,055	5,537	20,869	29,919
<b>Cebu</b>				
farm income	5,557	2,779	9,220	7,018
non-farm income	2,318	4,120	2,410	3,495
off-farm	280	656	546	1,222
gross income	8,154	4,422	12,127	7,078
<b>Negros Oriental</b>				
farm income	12,264	14,830	22,929	40,169
non-farm income	4,863	5,070	4,306	7,936
off-farm	1,146	1,328	1,601	3,496
gross income	18,274	13,729	28,836	40,395
<b>All Provinces</b>				
farm income	7,663	9,453	14,418	25,948
non-farm income	5,474	8,893	5,306	22,628
off-farm	496	970	1,119	3,239
gross income	13,633	11,597	20,843	33,638

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In spite of the apparently relatively better income status of Siquijor respondents, one should note that there is wide variation or inequity in non-farm incomes of the sample respondents. This is seen in the high standard deviation of ₱16,768 which is very close to the non-farm income mean of ₱18,465 for non-adoptors. The standard deviation for adoptors is also big. There is, therefore, a need to identify those who are in most need of development assistance in future development works.

In all the other provinces, farm income also accounts for the biggest portion of the gross income. For Cebu, farm income for non-adoptors is ₱5,557 while adoptors have farm income of ₱9,220. Respectively, these account for 68% and 78% of the gross income. Non-farm income accounts for 20%-25% of gross income while off-farm income is a small 3%-4% only. In Bohol, the average farm income is ₱9,502 for non-adoptors and a high ₱17,925 for adoptors. Non-adoptors had no off-farm income while the adoptors has an average ₱546 off-farm earnings. The farm income of Negros Oriental farmers is highest at ₱12,264 for non-adopter and ₱22,929 for the adoptors. It was observed that of all the CVRP project sites, this province is better endowed with natural agricultural resources.

#### B. *Comparison with Income Data from Previous Surveys*

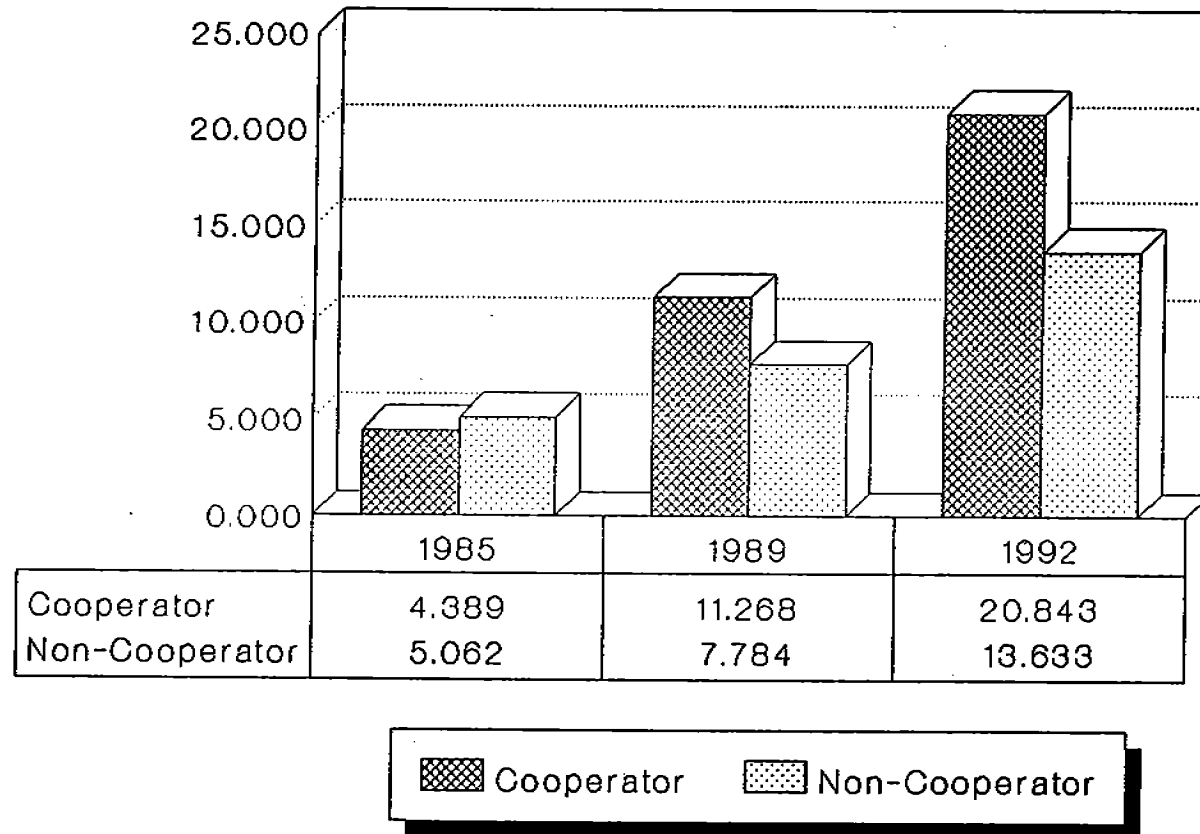
Gross incomes of participant/adopter and non-participant/non-adopter which were obtained in the same study areas in three separate surveys were compared at 1985 constant prices (Figure 8). For the 1985 and 1989 surveys, the same set of respondents (i.e., a panel survey) was taken. The 1992 survey randomly picked up the samples from the household list of CVRP participants maintained by CVRPO. Compared to the two previous surveys, the 1992 survey distinguished between adoptors and non-adoptors while the other surveys distinguished between participants and non-participants.

In 1985, the cooperators' gross income (₱4,389) was a little lower than the non-cooperators (₱5,062). The mid-project 1989 survey by Delos Angeles and Rodriguez (1992) showed that the situation has changed with cooperators' income (₱11,268) being higher than the non-cooperators (₱7,784). Statistical test of difference revealed, however, no significant difference in the income of participants from non-participants. In spite of the increase in the income figures from 1989 to 1992, the mean gross income of the adoptors (₱12,365) is still not statistically significantly different from the mean income of the non-adoptors (₱8,087). The non-significance of the income difference between adoptors and non-adoptors can be explained by the large variability in the income data for each group of farmers. Further statistical analyses done in the 1992 data, however, revealed a significant difference in income data between non-adoptors and the medium and high technology adoptors. Furthermore, there was an observed improvement in income for both types of farmers over the years.

#### C. *Household Expenditure Data*

The household expenditures on different items such as food, clothing, medicine, recreation and others for the different types of technology adoptors are shown in Table 13. A

Figure 8  
 COMPARISON OF GROSS INCOME BETWEEN PARTICIPANT/ADOPTOR  
 AND NON-PARTICIPANT/NON-ADOPTOR, 1985-1992



**Table 13**  
**HOUSEHOLD EXPENDITURE ON MAJOR ITEMS BY LEVEL OF ADOPTION**  
**OF UA TECHNOLOGIES, 1992**

NATURE OF EXPENDITURE	NON-ADOPTOR	ADOPTOR			ALL ADOPTORS
		Low	Medium	High	
<b>Food</b>					
mean	9,364	6,109	4,760	10,106	8,175
sd	8,334	4,333	3,358	8,751	7,434
n	21	17	90	76	183
%	79	64	78	76	73
<b>Clothing</b>					
mean	1,350	980	723	1,294	1,147
sd	1,393	822	719	1,657	1,413
n	21	17	90	76	183
%	11	10	12	10	11
<b>Medicine</b>					
mean	405	1,402	168	744	821
sd	558	2,924	192	1,463	1,891
n	21	17	90	76	183
%	3	15	3	6	8
<b>Recreation</b>					
mean	194	258	407	233	337
sd	445	409	683	515	1,089
n	21	17	90	76	183
%	2	3	7	2	4
<b>Others</b>					
mean	533	726	7	952	794
sd	1,214	1,410	23	2,663	2,197
%	4	8	0	0	3
<b>TOTAL EXPENDITURE</b>					
mean	11,846	9,475	6,065	13,329	11,274
sd	10,672	7,244	4,055	11,674	10,506

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more detailed breakdown of this information by province are presented in Appendix Table 5. The highest mean annual household expenditures of ₱13,329 was recorded among the high adoptors but the low figure (₱6,065) estimated for the medium adoptors pulled down the average for all adoptors to ₱11,274. It was estimated that non-adoptors spent a little more for their household needs with ₱11,846 average figure.

A quick comparison of the income with the expenditure data will show that in spite of the low gross income realized by the households interviewed, the Central Visayas farm households are still able to save part of their income. This can be explained by the observed low cost of living in the study sites compared to that prevailing in most cities and Luzon provinces.

As a whole, it can be said that the CVRP-UA component has a positive contribution to the household income. In general, the higher the level of technology adoption, the bigger this contribution is to one's household income. However, since household income is influenced by non-farm activities as well, it may be more appropriate to look closely into the income coming from the different CVRP-UA technologies. This will be addressed in the next section through a benefit-cost analysis.

## **IX. FARM LEVEL BENEFIT-COST ANALYSIS OF THE CVRP-UA COMPONENT**

There are six technologies considered in the UA sites: on-farm soil conservation measures; soil fertility enhancement activities; practice of agroforestry; involvement in reforestation activities; microwatershed planning and implementation; and upland fishpond technologies. Recall that these technologies are not mutually exclusive in the sense that a combination of these technologies are actually present in some of them. To the extent that an intervention/technology contains a combination of the other interventions/technologies, then the benefit-cost analysis should be interpreted as such as there was no intention to segregate the different technology groups in a mutually exclusive fashion.

A summary report of CVRP's accomplishments under its Upland Agriculture component is shown in Table 14. Note that measures of performance are still in physical units, as in hectareage under on-farm soil conservation measures; area under agroforestry development; reforestation areas; and number of fishpond and microwatershed units established. The access instruments released to the upland farmers through the assistance provided by CVRP are also given. To be able to say that CVRP has accomplished too much or too little, however, entails translating these accomplishments in monetary terms and then comparing the resulting values with the costs of carrying out the project.

This was done in this study by first undertaking a benefit-cost analysis of the different upland agriculture technologies using the "with" and "without" project scenarios. In the case of the cash crops component of the hillyland cropping systems, the "without" project scenario was shown in Appendix Table 6. The information therein was taken from the 1980 baseline



Table 14  
**SUMMARY OF ACCOMPLISHMENTS  
 UPLAND AGRICULTURE COMPONENT**

PARTICULAR	Y E A R							
	1984	1985	1986	1987	1988	1989	1990	1991
<b>UA TECHNOLOGY</b>								
On-farm soil conservation (has.)	135	259	388	757	861	2,044	1,288	1,405
Off-farm reforestation (has.)	-	15	59	109	569	317	364	28
Agro-forestry development (has.)	-	197	155	590	1,028	475	488	885
Livestock dispersed (no.)	-	117	472	602	263	733	640	146
Livestock redispersed (no.)			36	59	251	392	386	534
Fishpond established (no.)	16	119	169	199	189	119	34	43
Microwatershed Planning and Implemented (no.)			43	114	298	239	129	331

ua-114  
 12.94

survey done in the project sites by the San Carlos University researchers. The different crop mix and the proportion to the total cropped area occupied by the different crops as well as the cropping intensity were shown. Corn was the dominant cash crop, this being the staple crop in most areas. This was planted for one to two seasons but the one-season planting was dominant. The rootcrops commonly planted with corn include cassava and sweet potato while the vegetable crops commonly grown by a small proportion of the farmers include snap beans and cabbage. The average cropping intensity in the 1980 upland farms was around 125% with a 1.39 ha average farm size.

What was not reflected in Appendix Table 6 were the perennial crops planted in the area which largely pertain to coconut trees. The 1980 study mentioned that this crop was grown to 1/3 to 1.0 ha of these hilly farms but it was difficult to estimate the exact land size planted to the crop. For the economic analysis, a 0.3 ha land size planted to coconut was assumed.

For the "with" project scenario, the 1992 survey data was utilized. In particular, it was estimated that the cropping intensity has increased to 150% while the average farmholdings was 2.35 ha. The most dominant crops are still corn and rootcrops with some farms growing vegetable crops consisting largely of eggplant and mongo (Appendix Table 7). These two crops were assumed to take the place of snapbeans and cabbage grown in earlier years which were subsequently replaced due to declining crop yield brought about by decreasing soil fertility. The perennial crops (fruit and forest trees) introduced by CVRP are now included in the hillyland farming systems in addition to the coconut trees.

Given the above general set of assumptions, the different technologies were subjected to economic analysis. Each set of economic analysis still has a corresponding set of assumptions which are attached to the tables. The specific technologies in which a benefit-cost analysis was done are the agroforestry scheme, reforestation, on-farm soil conservation, upland fishpond culture, and microwatershed establishment. The value of a livestock dispersed or re-dispersed to the farmers was also estimated. The per hectare/unit annualized returns from these technologies were then computed with a 25-year economic life due to the tree component and a 12 % discount rate. The computed values were subsequently used in translating the physical accomplishments, except the resource access instruments, of the UA component to monetary benefits. The monetary benefits were subsequently compared with the cost of the project over its lifespan. The results of the benefit-cost analysis are presented in Tables 15 to 20.

In the case of on-farm soil conservation measures, a hectare of farm where contouring is done and where hedgerow crops and trees are planted generates a net present value (NPV) of ₱121,919 (Table 15). The annualized equivalent of this sum of money realizable over 25 years was estimated to be ₱15,545 using a discount rate of 12%. This corresponds to a benefit-cost (B/C) ratio of 6.02. Comparing this returns to what would have been the annualized return from the same farm had no intervention from CVRP taken place (Table 16), a discounted annualized incremental net benefit of ₱8,567 could be realized. The B/C ratio has improved also from the 3.86 without project scenario. The discounted annualized incremental net income represents the increase in farm income that can be attributed to the adoption of on-farm soil conservation

**Table 15**  
**BENEFIT-COST ANALYSIS OF ON-FARM SOIL CONSERVATION PROJECT (1992 PRICES)**  
**(Farm Level Analysis)**  
**(Area - 2.35 ha)**

PARTICULAR	WITH PROJECT																								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25
<b>BENEFIT</b>																									
Corn	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550
Sweet potato	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980
Bagulo beans/Mongo	1,430	1,367	1,345	1,305	1,266	1,228	1,191	2,080	2,080	2,080	2,080	2,080	2,080	2,122	2,164	2,207	2,251	2,296	2,342	2,389	2,437	2,486	2,536	2,586	2,638
Cabbage/Eggplant	3,800	3,688	3,575	3,468	3,364	3,263	3,165	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,020	1,040	1,061	1,082	1,104	1,128	1,149	1,172	1,195	1,219	1,243
Medra de cacao	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Banana	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Napier	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131
Mango Fruit								6,300	10,080	15,120	20,160	25,200	25,200	25,200	25,200	25,200	31,500	31,500	31,500	31,500	31,500	31,500	31,500	31,500	31,500
Cacao Fruit					70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
Coconut							798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798
<b>TOTAL BENEFIT</b>	<b>10,181</b>	<b>10,024</b>	<b>9,871</b>	<b>9,724</b>	<b>9,651</b>	<b>9,512</b>	<b>10,175</b>	<b>15,109</b>	<b>18,979</b>	<b>24,019</b>	<b>29,059</b>	<b>34,099</b>	<b>34,099</b>	<b>34,161</b>	<b>34,223</b>	<b>40,567</b>	<b>40,652</b>	<b>40,719</b>	<b>40,787</b>	<b>40,857</b>	<b>40,928</b>	<b>41,000</b>	<b>41,074</b>	<b>41,148</b>	<b>41,225</b>
<b>COST</b>																									
Tools	430					430					430				430					430					
Planting materials	205	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
Fertilizer	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553
Other materials	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Labor	2,090	2,077	2,077	2,077	2,067	2,067	2,067	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142	2,142
<b>TOTAL COST</b>	<b>3,466</b>	<b>2,952</b>	<b>2,952</b>	<b>2,952</b>	<b>2,962</b>	<b>3,392</b>	<b>2,962</b>	<b>3,017</b>	<b>3,017</b>	<b>3,017</b>	<b>3,447</b>	<b>3,017</b>	<b>3,017</b>	<b>3,017</b>	<b>3,017</b>	<b>3,447</b>	<b>3,017</b>	<b>3,017</b>	<b>3,017</b>	<b>3,017</b>	<b>3,017</b>	<b>3,447</b>	<b>3,017</b>	<b>3,017</b>	<b>3,017</b>
<b>TOTAL NET BENEFIT (W/P)</b>	<b>6,715</b>	<b>7,071</b>	<b>6,918</b>	<b>6,771</b>	<b>6,688</b>	<b>6,119</b>	<b>7,213</b>	<b>12,182</b>	<b>15,962</b>	<b>21,002</b>	<b>25,612</b>	<b>31,082</b>	<b>31,082</b>	<b>31,144</b>	<b>31,206</b>	<b>37,140</b>	<b>37,635</b>	<b>37,702</b>	<b>37,770</b>	<b>37,840</b>	<b>37,911</b>	<b>38,000</b>	<b>38,057</b>	<b>38,131</b>	<b>38,208</b>
<b>TOTAL NET BENEFIT (W/O)</b>	<b>9,113</b>	<b>9,317</b>	<b>9,066</b>	<b>8,832</b>	<b>7,941</b>	<b>5,925</b>	<b>6,762</b>	<b>6,371</b>	<b>6,014</b>	<b>5,456</b>	<b>4,909</b>	<b>5,295</b>	<b>5,218</b>	<b>5,144</b>	<b>4,645</b>	<b>4,110</b>	<b>4,507</b>	<b>4,441</b>	<b>4,377</b>	<b>3,931</b>	<b>3,406</b>	<b>3,613</b>	<b>3,756</b>	<b>3,701</b>	<b>3,302</b>
<b>INC. NET BENEFIT</b>	<b>(2,399)</b>	<b>(2,246)</b>	<b>(2,150)</b>	<b>(2,061)</b>	<b>(1,253)</b>	<b>194</b>	<b>451</b>	<b>5,610</b>	<b>9,948</b>	<b>15,545</b>	<b>20,702</b>	<b>25,786</b>	<b>25,869</b>	<b>26,000</b>	<b>26,560</b>	<b>33,030</b>	<b>33,126</b>	<b>33,261</b>	<b>33,393</b>	<b>33,506</b>	<b>34,075</b>	<b>34,170</b>	<b>34,301</b>	<b>34,430</b>	<b>34,905</b>

PER FARM                      PER HECTARE

12.0% 24.0%                      12.0% 24.0%

PRESENT VALUE BENEFIT	146,214	56,824	62,219	24,180
PRESENT VALUE COST	24,295	12,904	10,338	5,491
NET PRESENT VALUE (W/P)	121,919	43,920	51,880	18,689
BENEFIT-COST RATIO	6.02	4.40	6.02	4.40
ANNUALIZED VALUE	15,545	10,590	6,615	4,506
NET PRESENT VALUE (W/O)	54,730	32,600	39,374	23,453
INC. NET PRESENT VALUE	67,189	11,320	48,337	8,144
INC. ANNUALIZED NET BENEFIT	8,567	2,729	6,163	1,964

**Table 15 (continued)**

**ASSUMPTIONS: ON-FARM SOIL CONSERVATION**

Farm area is 2.35 ha, only 85% of which is cultivated.

**Land Use:**

Corn - 0.50 ha  
Sweet potato - 0.12 ha.  
Mango - 0.13 ha.  
Eggplant - 0.12 ha.  
Madre de cacao and napier - 0.40 ha.  
Banana, mango, cacao - 0.50 ha.  
Coconut - 0.30 ha.

**Production Assumptions:**

Corn is planted for two cropping seasons with an average yield per hectare of 637.5 kgs. Price at P4/kg.

Sweet potato is planted for one season only with an estimated average yield per hectare of 5,500 kgs at P3/kg.

Mango is planted for one season only. Yield for 0.13 ha. is valued at P2,080.

Eggplant is planted for one season only after mango. Yield for 0.12 ha is valued at P1,000.

Madre de cacao - total benefit is valued at P200 (Pasaje, 1991).

Mango - total production is assumed at 70% of Luzon's price. Prices at 605 of Luzon's price.

Cacao - estimated benefit of P135 for 13 trees.

Coconut - yield of copra of 665.4 kg/ha at P4/kg.

Tools - estimated life span of 5 years, repurchase every five years.

Digging bar - P75/pc  
Pick mattock - P190/pc  
Bolo - P90 (45 each - 2 pieces)  
Shovel - P75/pc

**Planting Materials:**

Corn - P10/kg  
Sweet potato - P20/sack of seedling  
Eggplant - P20/pack  
Perennials - P0.50/seedling  
Madre de cacao - P0.10/pc

**Fertilizer Prices:**

14-14-14 - P350/bag  
Urea - P400/bag  
21-0-0 - P250/kg  
Chicken dung - P21/bag

Other materials - based on Pasaje's study on other used values at P187.88/ha

Labor cost - P40 per manday

**Table 10**  
**BENEFIT-COST ANALYSIS OF HILLYLAND FARMS IN CVRP PROJECT AREAS**  
 (Without Project Condition)  
 (Area - 1.39 ha)

PARTICULAR	WITH PROJECT																								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25
<b>BENEFIT</b>																									
Annual crops																									
Corn	2,550	2,550	2,550	2,550	2,295	2,295	2,295	2,295	2,295	2,066	2,066	2,066	2,066	2,066	1,859	1,859	1,859	1,859	1,859	1,673	1,673	1,673	1,673	1,673	1,506
Sweet potato	4,125	4,125	4,125	4,125	3,713	3,341	3,007	2,706	2,436	2,192	2,192	2,192	2,192	2,192	1,973	1,973	1,973	1,973	1,973	1,776	1,776	1,776	1,776	1,776	1,598
Bagulo beans/Mongo	1,430	1,359	1,291	1,226	1,165	2,080	2,016	1,957	1,898	1,841	1,786	1,733	1,681	1,630	1,581	1,534	1,488	1,443	1,400	1,356	1,317	1,278	1,239	1,202	1,166
Cabbage/Eggplant	3,800	3,610	3,430	3,250	3,095	1,000	970	941	913	885	859	833	808	784	760	737	715	694	673	653	633	614	596	578	561
Coconut							798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798
<b>TOTAL BENEFIT</b>	11,905	11,644	11,395	11,159	10,267	8,716	9,068	8,998	8,340	7,783	7,701	7,622	7,545	7,470	6,972	6,902	6,834	6,767	6,703	6,258	6,198	6,139	6,082	6,027	5,629
<b>COST</b>																									
Tools	465					465					465					465				465					
Materials	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Labor	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068	2,068
<b>TOTAL COST</b>	2,792	2,327	2,327	2,327	2,327	2,792	2,327	2,327	2,327	2,327	2,792	2,327	2,327	2,327	2,327	2,327	2,792	2,327	2,327	2,327	2,327	2,327	2,327	2,327	2,327
<b>TOTAL NET BENEFIT</b>	9,113	9,317	9,068	8,832	7,941	5,925	6,762	6,371	6,014	5,456	4,909	5,295	5,218	5,144	4,645	4,110	4,507	4,441	4,377	3,931	3,408	3,813	3,766	3,701	3,302

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	PER FARM		PER HECTARE	
	12%	24%	12%	24%
PRESENT VALUE BENEFIT	73,881	42,816	53,152	30,803
PRESENT VALUE COST	19,151	10,216	13,778	7,350
NET PRESENT VALUE	54,730	32,600	39,374	23,453
ANNUALIZED VALUE	6,978	7,860	5,020	5,655
BENEFIT-COST RATIO	3.86	4.19	3.86	4.19
PRESENT VALUE NET BENEFIT (W/O)	54,730	32,600	39,374	23,453

Table 16 (continued)

**ASSUMPTIONS:        WITHOUT PROJECT SCENARIO**

Total farm area of 1.39 ha only 85 % of the area is cultivated.

**Land Use:**

Corn - 0.50 ha.  
Sweet potato - 0.25 ha.  
Vegetables - 0.13 ha.  
Coconut - 0.30 ha.

**Production estimates:**

Corn is planted for two cropping seasons with average yield per hectare of 637.5 kg. at P4/kg.  
Total production is expected to decrease by 10% every five years due to degradation of soil fertility.

Sweet potato - average yield of 5,500 kg/ha at P3/kg.

Vegetables - Baguio beans is planted for one cropping season only. Total production is expected to decrease by 5% every 5 years due to degradation of soil fertility.

Tools - estimated life span of five years, repurchase every five years.

Plow - P375  
Bolo - P90 (45 each - 2 pieces)

Labor - based on the average labor cost per hectare of P2068 (Pasaje, 1991).

measures by the farmer. It measures the difference between what the farmer have earned when he adopted the soil conservation measures and what he could have earned had he not adopted this intervention.

The same analysis was done for the agroforestry cropping systems which involved the cultivation of cash crops along with some fruit and forest tree species (Table 17 ). The difference between the net present value realizable from the without project cropping system (i.e., cash crops with coconut) and that which can be earned under the agroforestry systems over a 25-year period was computed to be ₦20,365. This incremental NPV corresponds to ₦2,597 incremental annualized net income.

In the case of the microwatershed farms, a 2-ha module was analyzed. This system generally entails the adoption of soil conservation measures such as contouring and hedgerow farming in addition to the planting of some forest tree species to improve the water-yielding capacity of the watershed. The list of species included in this system is not meant to be exhaustive as is also the case in the other technologies. There are definitely other crop combinations and even other tree species introduced by CVRP in the project sites but any one farm will not have all of these different types. Hence, only the likely species to be found in most farms were included in the economic analysis.

Results of the benefit-cost analysis revealed that a farm with microwatershed plan, subject to the set of assumptions made, will bring about an annualized net income of ₦8,180 using the 12% rate of discount (Table 18). Considering the annualized net income from the without project scenario (i.e., the income had the farmers continue with their cropping systems without CVRP), a discounted incremental annualized income of ₦1,202 could be attributed to the project. In terms of B/C ratio, the value has decreased a little from the without project value of 3.86 to the with project ratio of 3.59. This difference though may not really be that significant.

In the community-based reforestation scheme, the ideal situation is for communal lands to be reforested through community effort. In cases where there are no longer communal lands available within the community or nearby areas, interested individuals who have control over big land areas which are currently idle, except probably as grasslands, are enjoined to undertake reforestation efforts. Assuming private control over a reforested area, the annualized income to the land owner was estimated (Table 19). Since the land is idle, it was assumed that the without project land use has no economic value to the farmer. The project's net present value could then be attributed totally to the intervention. For the CBCR, the annualized net income from the farm using a 12% rate of discount is ₦10,356 with a B/C ratio of 5.67.

In the case of the short-term investments under the UA component such as the upland fishpond and the livestock dispersal/redispersal, the economic analyses revealed that the upland fishpond was least successful. In particular, the investment made in this project yielded a very small return of ₦216 for 170 sq m of pond (Table 20). The project yields a B/C ratio of 1.30. The poor performance of the upland fishpond can be explained by the prolonged drought in the

**Table 17**  
**BENEFIT-COST ANALYSIS OF AGROFORESTRY INTERVENTION IN CVRP PROJECT AREAS (1992 PRICES)**  
**(Farm Level Analysis)**  
**(Area 2.35 ha)**

PARTICULAR	WITH PROJECT																												
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25				
<b>BENEFIT</b>																													
Annual crops																													
Corn	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550				
Sweet potato	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980				
Begula beans/Mango	1,430	1,387	1,345	1,305	1,266	1,228	1,191	2,080	2,080	2,080	2,080	2,080	2,080	2,122	2,164	2,207	2,251	2,298	2,342	2,389	2,437	2,486	2,536	2,586	2,636				
Cabbage/Eggplant	3,800	3,666	3,575	3,468	3,364	3,263	3,165	1,000	1,000	1,000	1,000	1,000	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195	1,219	1,243	1,268				
Napier	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131				
Perennial crops																													
Gmelina																													
Sawlogs																													
Fuelwood					525					525					525	23,100								525					525
Mahogany																													
Sawlogs																													
Poles																													
Small poles																													
Mango										756																			
Cacao						270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270			
Jackfruit						10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10			
Coconut						798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798				
Madra de cacao	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40				
<b>TOTAL BENEFIT</b>	<b>9,931</b>	<b>9,774</b>	<b>9,622</b>	<b>9,474</b>	<b>10,934</b>	<b>10,270</b>	<b>10,138</b>	<b>10,898</b>	<b>11,278</b>	<b>13,244</b>	<b>13,697</b>	<b>15,432</b>	<b>14,907</b>	<b>14,969</b>	<b>36,132</b>	<b>16,008</b>	<b>16,073</b>	<b>19,008</b>	<b>16,806</b>	<b>17,402</b>	<b>16,948</b>	<b>17,020</b>	<b>17,619</b>	<b>17,109</b>	<b>69,745</b>				
<b>COST</b>																													
Tools						430																							
Planting materials	333	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135				
Fertilizer	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553				
Other materials	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188				
Labor	2,090	2,077	2,077	2,077	2,237	2,077	2,077	2,487	2,327	2,487	2,327	2,467	2,327	2,327	2,647	2,327	2,327	2,467	2,327	2,467	2,327	2,467	2,327	2,467	2,327				
<b>TOTAL COST</b>	<b>3,594</b>	<b>2,952</b>	<b>2,952</b>	<b>2,952</b>	<b>3,112</b>	<b>3,382</b>	<b>2,952</b>	<b>3,362</b>	<b>3,202</b>	<b>3,362</b>	<b>3,632</b>	<b>3,362</b>	<b>3,202</b>	<b>3,202</b>	<b>3,522</b>	<b>3,632</b>	<b>3,202</b>	<b>3,362</b>	<b>3,202</b>	<b>3,362</b>	<b>3,202</b>	<b>3,362</b>	<b>3,632</b>	<b>3,202</b>	<b>3,522</b>				
<b>TOTAL NET BENEFIT (W/P)</b>	<b>6,337</b>	<b>6,821</b>	<b>6,670</b>	<b>6,521</b>	<b>7,822</b>	<b>6,888</b>	<b>7,183</b>	<b>7,534</b>	<b>8,076</b>	<b>9,881</b>	<b>10,065</b>	<b>12,070</b>	<b>11,705</b>	<b>11,766</b>	<b>34,609</b>	<b>12,075</b>	<b>13,470</b>	<b>15,645</b>	<b>13,605</b>	<b>14,040</b>	<b>13,315</b>	<b>13,617</b>	<b>14,258</b>	<b>13,966</b>	<b>66,223</b>				
<b>TOTAL NET BENEFIT (W/O)</b>	<b>9,113</b>	<b>9,317</b>	<b>9,066</b>	<b>8,832</b>	<b>7,941</b>	<b>5,925</b>	<b>6,762</b>	<b>6,371</b>	<b>6,014</b>	<b>5,456</b>	<b>4,909</b>	<b>5,295</b>	<b>5,218</b>	<b>5,144</b>	<b>4,645</b>	<b>4,110</b>	<b>4,507</b>	<b>4,441</b>	<b>4,377</b>	<b>3,931</b>	<b>3,406</b>	<b>3,813</b>	<b>3,758</b>	<b>3,701</b>	<b>3,302</b>				
<b>INC. NET BENEFIT</b>	<b>(2,776)</b>	<b>(2,496)</b>	<b>(2,309)</b>	<b>(2,311)</b>	<b>(119)</b>	<b>963</b>	<b>421</b>	<b>1,162</b>	<b>2,062</b>	<b>4,425</b>	<b>5,156</b>	<b>6,774</b>	<b>6,486</b>	<b>6,623</b>	<b>29,964</b>	<b>8,865</b>	<b>8,964</b>	<b>11,204</b>	<b>9,228</b>	<b>10,106</b>	<b>9,909</b>	<b>10,005</b>	<b>10,500</b>	<b>10,265</b>	<b>62,920</b>				

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	PER FARM		PER HECTARE	
	12%	24%	12%	24%
PRESENT VALUE BENEFIT	100,470	45,708	42,753	19,450
PRESENT VALUE COST	25,375	13,300	10,798	5,660
NET PRESENT VALUE (W/P)	75,095	32,408	31,955	13,791
BENEFIT-COST RATIO	3.96	3.44	3.96	3.44
ANNUALIZED VALUE	9,575	7,814	4,074	3,325
NET PRESENT VALUE (W/O)	54,730	32,600	23,289	13,872
INC. NET PRESENT VALUE	20,365	(192)	8,666	(82)
INC. ANNUALIZED NET BENEFIT	2,597	(46)	1,105	(20)



**Table 17 (continued)**

**ASSUMPTIONS: AGROFORESTRY FARMS**

Total farm area of 2.35 ha. It is assumed that only 85% of the area is cultivated.

<b>Land Use:</b>	Corn - 0.50 ha	Mahogany - 0.25 ha
	Sweet potato - 0.12 ha	Mango - 0.12 ha
	Baguio beans/Mongo - 0.13 ha	Cacao - 0.13 ha
	Cabbage/Eggplant - 0.12 ha	Coconut - 0.30 ha
	Gmelina - 0.25 ha	Jackfruit - 0.08 ha

**Production estimates:**

Corn - planted for two cropping seasons with an average yield of 637.5 kg/ha. Price is P4/kg.

Sweet potato - planted for one season only with an average yield per hectare of 5,500 kgs at P3/kg.

Baguio beans - planted for one season only followed by mongo.

Mongo - planted for one season only yield for 0.13 ha valued at P2,080.

Cabbage - planted for one season only up to year seven. A change in the crop planted will be experienced on the eight year due to declining production brought about by reduction in soil fertility.

Eggplant - yield for 0.12 ha valued at P1,000

Perennials - volume of production is assumed at 70% of Luzon's production. Prices estimated at 60% of Luzon's price.

Tools - estimated life span of five years, repurchase every five years.

Digging bar - P75  
Pick mattock - P190  
Bolo - P90 (45 each - 2 pieces)  
Shovel - P75

**Planting materials:**

Corn - P10/kg  
Sweet potato - P20/sack of cuttings  
Perennials - P0.50/seedling  
Baguio beans - P25/kg  
Eggplant - P20/pack (100 gm)  
Fertilizer cost - based on Pasaje's study of P533/ha

Other materials - based on Pasaje's study on other materials used valued at P187.80/ha

Labor cost - P40 per manday

**Harvesting Cost:**

Fruit harvest - P250/ha  
Cash crops - P150/ha  
Poles - P160/ha  
Timber - P320/ha

**Table 18**  
**BENEFIT-COST ANALYSIS OF MICROWATERSHED DEVELOPMENT FARMS IN CVRP PROJECT AREAS (1982 PRICES)**  
**(Farm Level Analysis)**  
**(Area 2.0 ha)**

PARTICULAR	WITH PROJECT																												
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25				
<b>BENEFIT</b>																													
Annual crops																													
Corn	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550				
Sweet potato	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125	4,125				
Banana	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200				
Vegetable	1,650	1,600	1,552	1,506	1,461	1,417	1,374	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,446	2,497	2,547	2,597	2,649	2,702	2,757	2,812	2,868	2,926	2,984				
Perennial crops																													
Gmelina																													
Sawlogs																													
Fuelwood						525						525						525						525					
Mahogany																													
Sawlogs																													
Poles																													
Small poles																													
Madre de cacao																													
Coconut	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60				
<b>TOTAL BENEFIT</b>	9,525	9,535	9,487	9,441	9,921	9,352	10,106	11,658	11,139	11,869	11,133	11,658	11,133	11,182	34,330	11,280	11,331	13,651	11,436	12,015	11,545	11,802	12,185	11,717	64,277				
<b>COST</b>																													
Tools	500																												
Planting materials	236	93	93	93	93	500	93	93	93	93	500	93	93	93	93	500	93	93	93	93	500	93	93	93	93				
Fertilizer	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320	1,320				
Labor																													
Annual	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310				
Perennial	15	6	6	6	166	6	6	166	6	166	6	166	6	166	6	326	6	6	166	6	166	6	166	6	326				
Construction/establishment of soil conservation																													
Contour bund	200																												
Diversion canal	250																												
Madre de cacao hedgerow	1,440																												
Pruning of hedgerow																													
<b>TOTAL COST</b>	3,271	3,276	3,266	3,266	2,929	3,269	2,769	2,929	2,769	2,929	3,269	2,929	2,769	2,769	3,089	3,269	2,769	2,929	2,769	2,929	3,269	2,769	2,929	2,769	3,069				
<b>TOTAL NET BENEFIT (W/P)</b>	4,255	6,807	6,718	6,672	6,992	6,083	7,339	8,730	8,365	8,961	7,865	8,730	8,365	8,413	31,242	8,012	8,562	10,722	8,667	9,087	8,277	8,833	9,256	8,949	61,180				
<b>TOTAL NET BENEFIT (W/O)</b>	9,113	9,317	9,068	8,832	7,941	5,925	6,762	6,371	6,014	5,456	4,909	5,295	5,218	5,144	4,645	4,110	4,507	4,441	4,377	3,931	3,408	3,613	3,758	3,701	3,302				
<b>INCREMENTAL NET BENEFIT</b>	(4,859)	(2,510)	(2,350)	(2,160)	(948)	159	578	2,359	2,351	3,505	2,956	3,435	3,147	3,270	26,597	3,901	4,055	6,281	4,291	5,155	4,671	5,021	5,500	5,248	57,886				

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	PER FARM		PER HECTARE	
	12%	24%	12%	24%
PRESENT VALUE BENEFIT	88,972	42,617	44,486	21,308
PRESENT VALUE COST	24,815	13,815	12,408	6,907
NET PRESENT VALUE (W/P)	64,157	28,802	32,079	14,401
BENEFIT-COST RATIO	3.59	3.08	3.59	3.08
ANNUALIZED VALUE	8,180	6,945	4,090	3,472
NET PRESENT VALUE (W/O)	54,730	32,600	27,365	16,300
INC. NET PRESENT VALUE	9,427	(3,798)	4,714	(1,899)
INC. ANNUALIZED NET BENEFIT	1,202	(916)	601	(458)

**Table 18 (continued)**

**ASSUMPTIONS: MICROWATERSHED DEVELOPMENT PROJECT**

Farm Area - 2.35 ha., only 85% of which is cultivated

**Land Use:**

Corn - 0.50 ha  
Sweet potato - 0.25 ha  
Vegetables - 0.15 ha  
Gmelina - 0.25 ha  
Mahogany - 0.25 ha  
Madre de Cacao - 0.30 ha  
Coconut - 0.30 ha

**Production Assumptions:**

Corn is planted for two cropping seasons with an estimated average yield per hectare of 637.5 kg. Price is P4/kg.

Sweet potato - planted for one season only with an average yield per hectare of 5,000 kg at P3/kg.

Vegetables - for the first seven years Baguio beans is planted with a declining yield of 3% each year. A change in the cropping pattern occur on the eight year due to decreasing yield. Mongo was planted with an increasing yield of 2% per year.

Gmelina - production is assumed at 70% of Luzon's production. Price is at 60% of Luzon's price.

Mahogany - production is assumed at 70% of Luzon's production. Price is at 60% of Luzon's price.

Madre de cacao - total benefit valued at P200/ha. (Pasaje, 1991)

Coconut - copra yield of 665.4 kg/ha at P4/kg.

Tools - estimated life span of five years, repurchase every five years.

**Planting materials:**

Mahogany - P0.50/seedling  
Gmelina - P0.50/seedling  
Coconut - P0.50/seedling  
Madre de Cacao - P0.10/pc  
Corn - P10/kg  
Sweet potato - P20/sack of cutting  
Banana - P2.50/pc  
Eggplant - P20/pack

Labor Cost - P40/menday

**Table 19**  
**BENEFIT-COST ANALYSIS OF COMMUNITY-BASED REFORESTATION PROJECT IN CVRP PROJECT AREAS (1992 PRICES)**  
**(Farm Level Analysis)**  
**(Area - 2.0 ha)**

PARTICULAR	WITH PROJECT																								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25
<b>BENEFIT</b>																									
Gmelina																									
Sawlogs																									
Fuelwood																									
Fire tree																									
Mine poles																									
Mango																									
Fruit																									
<b>TOTAL BENEFIT</b>																									
<b>COST</b>																									
Tools																									
Planting materials																									
Fertilizer																									
Labor																									
<b>TOTAL COST</b>																									
<b>TOTAL NET BENEFIT</b>																									

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	PER FARM		PER HECTARE	
PERCENT VALUE BENEFIT	12%	24%	12%	24%
PRESENT VALUE BENEFIT	48,616	23,133	49,308	11,567
PRESENT VALUE COST	17,394	9,424	8,697	4,712
NET PRESENT VALUE	81,222	13,709	40,611	6,855
BENEFIT-COST RATIO	5.67	2.45	5.67	2.45
ANNUALIZED VALUE	10,356	3,305	5,178	1,653

**Table 19 (continued)**

**ASSUMPTIONS: COMMUNITY-BASED CONTRACT REFORESTATION PROJECT**

Total farm area is 2.0 ha

Land Use:

Gmelina - 1 ha  
Fire tree - 0.50 ha  
Mango - 0.50 ha

Production assumptions:

Total production estimated at 70% of Luzon' production.

Prices estimated at 60% of Luzon's price.

Cost of planting materials:

Gmelina seedling at P0.50/pc  
Fire tree seedling at P0.50/pc  
Mango seedling at P0.50 /pc

Tools - estimated life span of five years, repurchase every five years

Pick mattock - P190/pc  
Plow - P375/pc  
Bolo (4) - P45 each

Fertilizer - application every five years  
14-14-14 - four bags at P350 per bag

Labor cost - P40 per manday

**Table 20**  
**BENEFIT-COST ANALYSIS OF UPLAND FISHPOND PROJECT**  
**IN CVRP PROJECT AREAS (1992 PRICES)**  
**(Farm Level Analysis)**

PARTICULAR	WITHOUT PROJECT	WITH PROJECT
<b>BENEFIT</b>	<b>THE AREA WAS</b>	
Fish	U	640
Fingerlings	T	86
Clams	I	200
<b>TOTAL BENEFIT</b>	<b>L</b>	<b>926</b>
<b>COST</b>	<b>I</b>	
Tools	Z	39
Supplies and materials	E	
Fingerlings	D	64
Juvenile clams	A	20
Feeds (corn bran)	S	200
Fertilizer	L	
Organic	L	11
Inorganic	O	20
Labor	W	
Pond construction	I	56
Feeding	N	200
Maintenance	G	80
Harvesting	P	20
<b>TOTAL COST</b>	<b>O</b>	<b>710</b>
<b>TOTAL NET BENEFIT</b>	<b>N</b>	<b>216</b>
	<b>D</b>	

**ASSUMPTIONS: UPLAND FISHPOND**

Total farm area of 170 sq m

Fingerling used for 170 sq m is 320 pcs.

Fertilizer used:

Organic - 5.43 kg

Inorganic - 3 kg

Tools: only one year cost is reflected using straight line depreciation

Output:

Fingerlings - 430 pcs.

Fish - 32 kg

project sites which resulted to the drying up of the ponds. Since the area is always subjected to this prolonged drought, it would appear that the upland fishpond may not be suited to the agroclimatic characteristics of the place. In the case of the livestock, it was estimated that a unit of livestock at 10 months of age provides a net return to the farmer of ₱4,500. The only cost item in this intervention was the labor cost of feeding one until the age of 10 months where a saleable weight can already be realized. This cost item amounted to approximately ₱1,000 for an average 40 man-minutes of feeding (cut and carry) daily.

A summary of the results of the farm-level benefit-cost analysis is shown in Appendix Table 9, but a quick assessment may be made by looking at Figure 9. Note that there is a general positive impact of the project in terms of improved profitability of the farm enterprise. For all technologies/interventions, the "with" project scenario yields greater NPV and, correspondingly, higher annualized income than the "without" project scenario. Note though that since the technologies are not mutually exclusive, they can not really be compared the way independent projects will be. The summary presentation though should give one an idea of the magnitude of income difference obtained from these UA interventions.

## **X. EQUITY IN THE DISTRIBUTION OF SEEDLINGS BY CVRP**

An attempt was made to determine whether the materials given out by the project are equitably distributed. This was done by selecting sample tree species in certain UA sites and then based on records of distribution, the Gini coefficient was subsequently computed. The Gini coefficient takes a value of 0 to 1, with values approaching 0 indicating more equitable distribution of seedlings and a value of 1 if distribution is not equitable. The Gini coefficients were estimated for both the individual beneficiaries and "alayan" recipients.

It should be noted though that the analysis was not meant to be exhaustive and thorough due to time constraints and lack of sufficient data. The researchers, furthermore, failed to study in greater depth the mechanisms in which the material benefits get distributed to CVRP cooperators. It is possible, for example, that recipients received what they got by choice or according to their ability to manage the additional planting materials. If this is the case, however, then the project may be helping make the already well-off farmers to become even better off. It is also possible, however, for the inequity to arise from the bias favoring the more marginalized of these hillyland farmers. This means that greater allocation may have been going or will go to those who need most. In which case, there may be inequity but since it favors the needy household units, then this may still be justifiable. Admittedly, there is insufficient analysis done on this matter to be able to say definitive conclusions. The fact, however, that there are reports of favoritism in the study sites somehow also casts some doubts on whether the bias is in favor of the poorer households. The findings, however, could be utilized for whatever improvement in project management these may suggest.

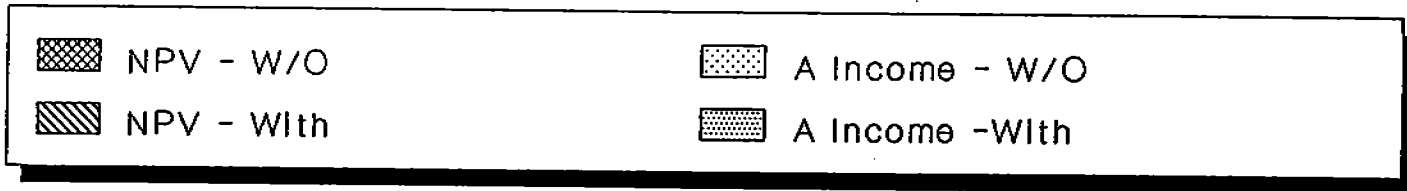
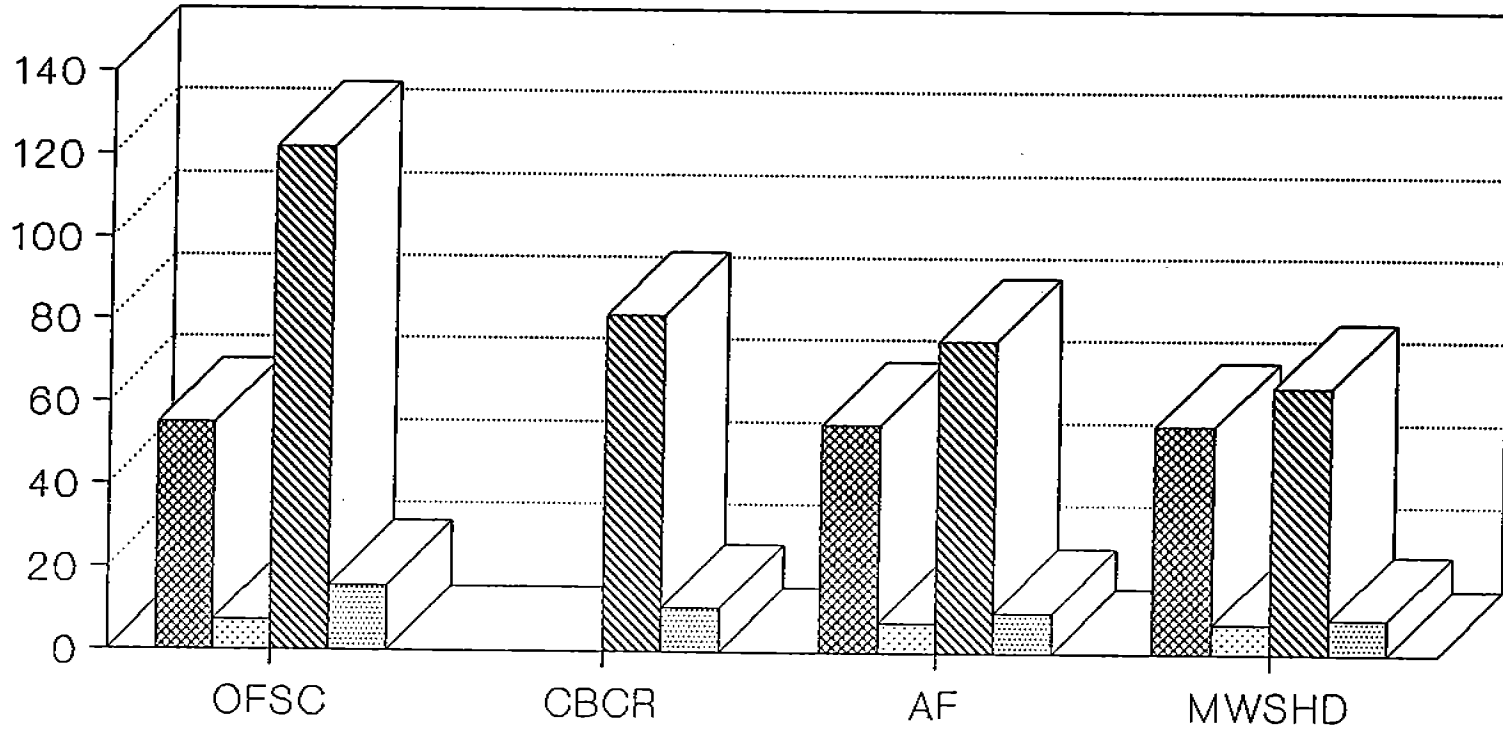
Results of the analysis are shown in Figures 10a-10c. The high Gini coefficient indicates uneven distribution of seedlings among project beneficiaries, be it individual or "alayons".

Figure 9

Results of Economic Analysis of Various UA Technologies,  
1992 Prices, 12% Discount Rate, and 25 Years Economic Life

Thousands

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OFSC - On-Farm Soil Conservation

AF - Agroforestry

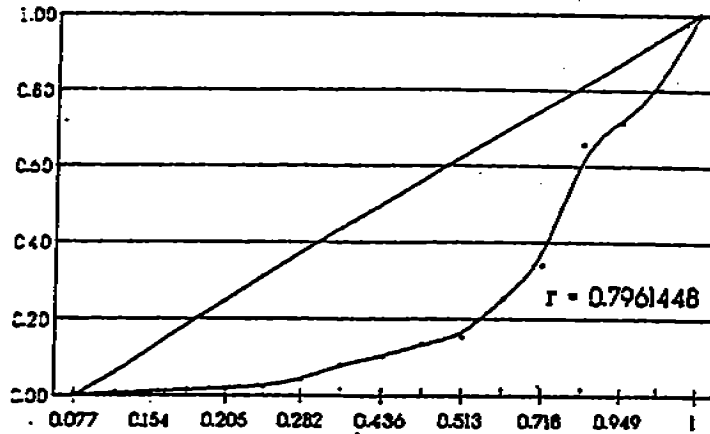
CBCR - Comm.-Based Contract Reforestation

MWSHD - Microwatershed Dev't

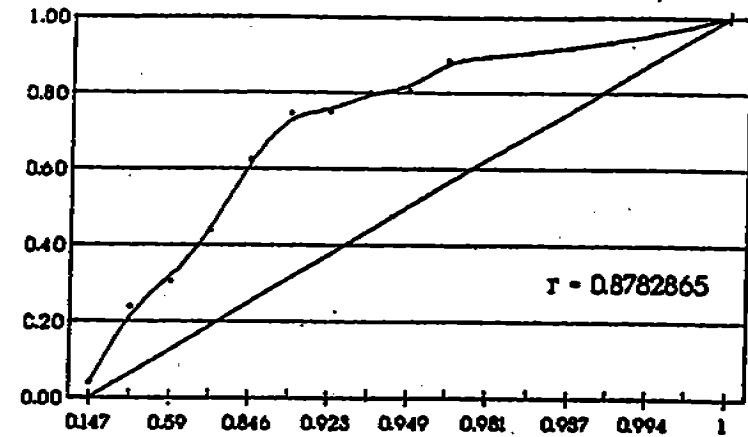


**Figure 10**  
**DISTRIBUTION OF SELECTED SEEDLINGS TO CVRP COOPERATORS**  
**(ALAYON/INDIVIDUAL) IN BOHOL AND SQUIJOR, 1986-1988**

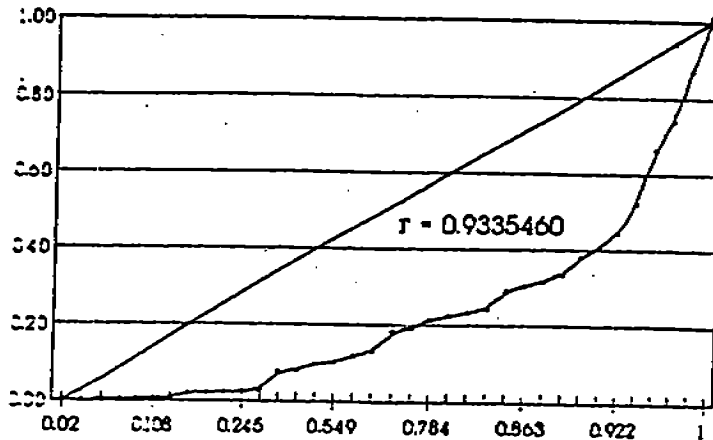
**Distribution of Gmelina**  
**Seedlings to CVRP Cooperators (Alayon),**  
**Bohol and Siquijor**



**Distribution of Gmelina**  
**Seedlings to CVRP Cooperators (Individual),**  
**Bohol and Siquijor, 1986-1988**



**Distribution of Jackfruit**  
**Seedlings to CVRP Cooperators (Alayon),**  
**Bohol and Siquijor, 1986-1989**



**Distribution of Jackfruit**  
**Seedlings to CVRP Cooperators (Individual),**  
**Bohol and Siquijor**

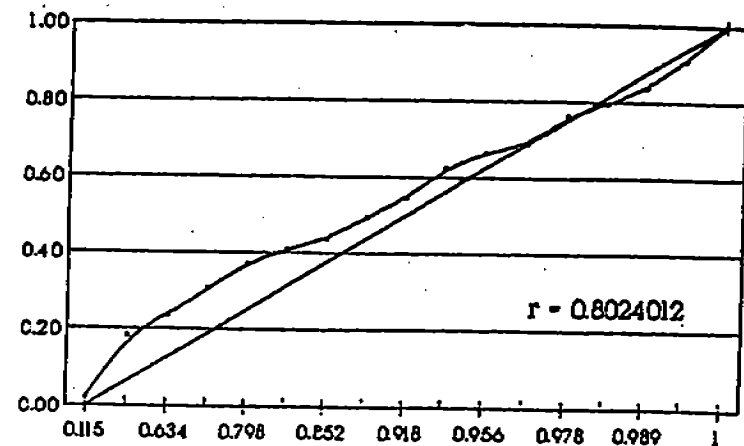
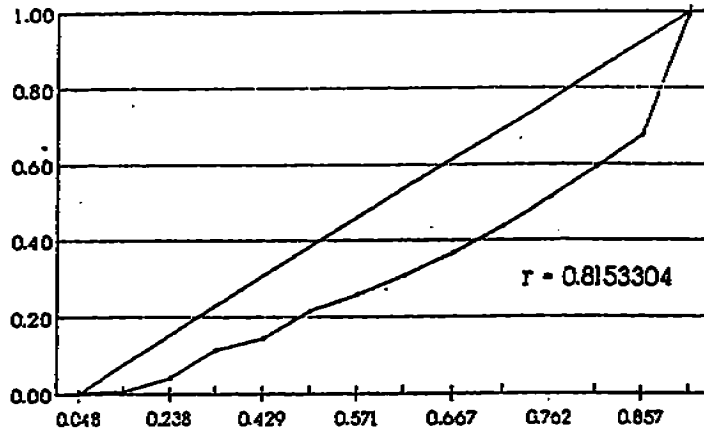
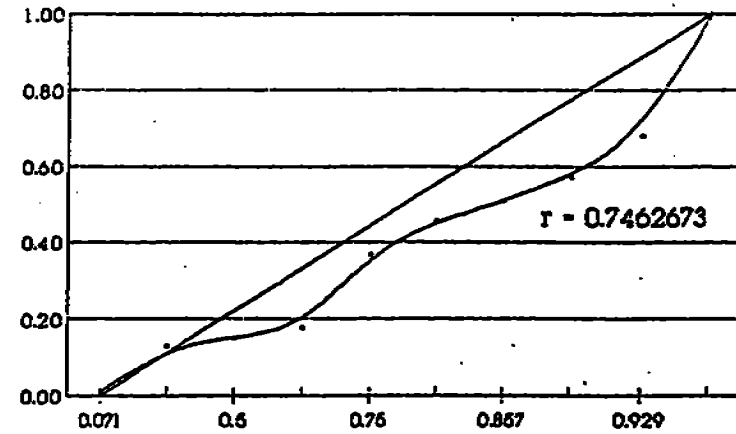


Figure 10 (continued)

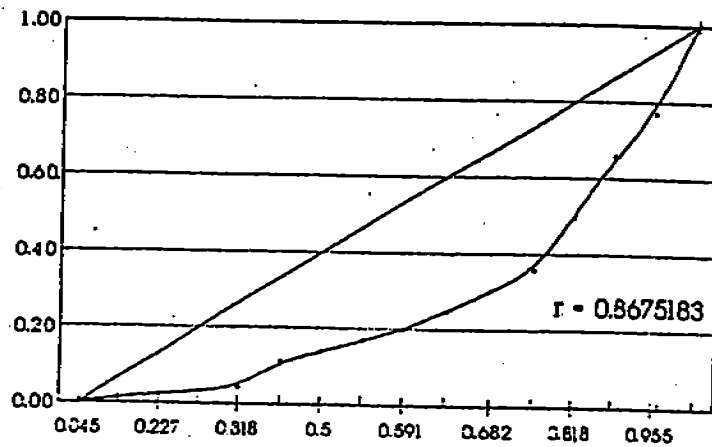
Distribution of Mahogany  
Seedlings to CVRP Cooperators (Alayon),  
Bohol and Siquijor, 1986-1989



Distribution of Mahogany  
Seedlings to CVRP Cooperators (Individual),  
Bohol and Siquijor, 1986-1989



Distribution of Cacao  
Seedlings to CVRP Cooperators (Alayon),  
Bohol and Siquijor, 1986-1989



Distribution of Cacao  
Seedlings to CVRP Cooperators (Individual),  
Bohol and Siquijor, 1986-1989

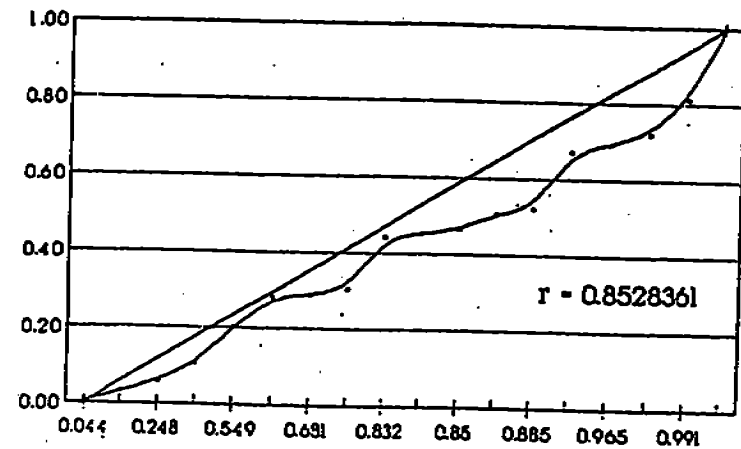
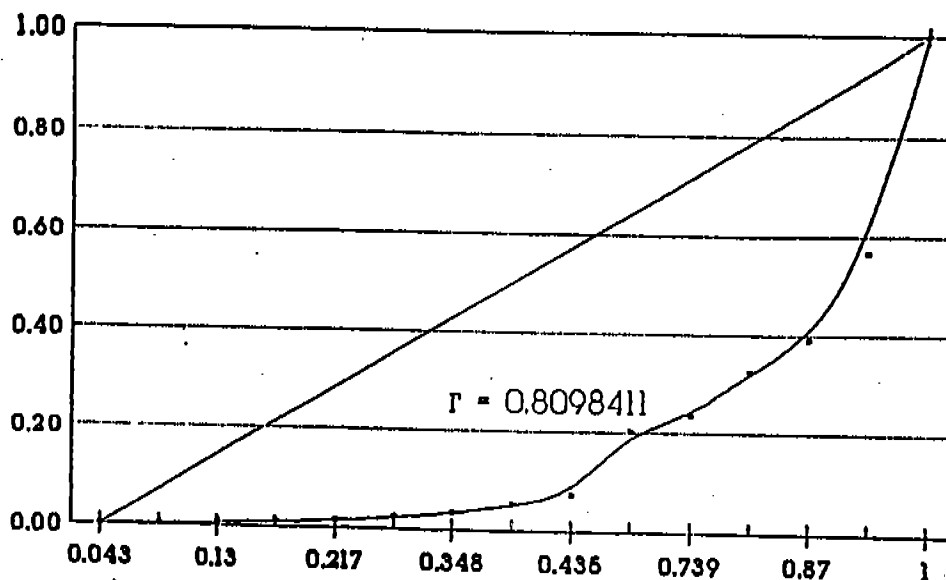
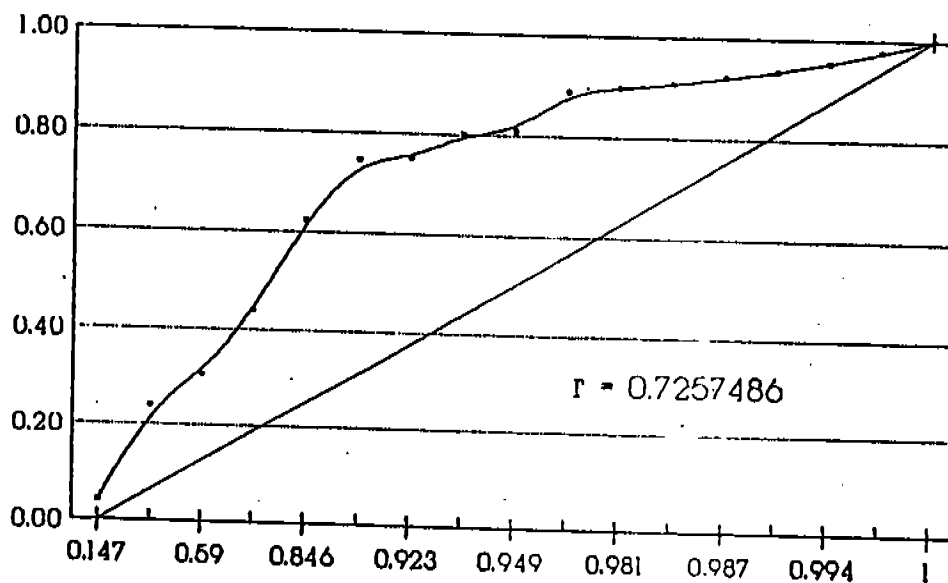


Figure 10 (continued)

Distribution of Calamansi Seedlings to CVRP Cooperators (Alayon), Bohol and Siquijor, 1986-1988



Distribution of Calamansi Seedlings to CVRP Cooperators (Individual), Bohol and Siquijor, 1986-1988



Specifically, it was noted in the list that certain local government or military officials and even CVRP employees got a big number of the seedlings distributed in the locality. What the high Gini coefficient indicates is that the bigger share of the seedlings distributed fell into the hands of a few individuals or certain alayons. Alternatively, it could mean that a smaller proportion of the seedlings went to a bigger proportion of the beneficiaries. The findings somehow support a comment made earlier about the existence of favoritism among those in charge of distributing the seedlings. It is strongly recommended that this aspect be closely looked into in similar projects in the future. Safeguard measures should be instituted to improve the distribution of material inputs or to prevent possible injustice in the allocation of material inputs.

## **XI. MAJOR CONCLUSIONS AND RECOMMENDATIONS**

This section will highlight results of the impact assessment made on the Upland Agriculture component of CVRP. The analysis relied heavily on the survey data collected by the impact evaluation team and on some secondary data to the extent that similar information as those found in the 1992 survey are available.

The major conclusions of the impact analysis and their policy significance are as follows:

1. There is a high level of adoption of upland agriculture technologies among the farming households in the project sites. This is borne out by the survey data which also confirm the high records of participation in UA activities monitored by the Regional Project Office (RPO). The number of practitioners of the various UA practices/technologies is significantly higher than the number of non-practitioners.
2. The respondents' assessment of the impacts of the project on their socioeconomic life is generally positive. The part that they like most about the project are the material things given out for free, such as livestock, seedlings and fertilizers. They are also appreciative of the technical knowledge learned from the project which improve the income potential of the hillyfarms of Central Visayas. These material incentives were found to be necessary in the promotion of interventions wherein the benefits are realizable only at some future time.
3. There are reports of favoritism and inadequate technical support/visits to project participants. It is suggested that these issues be considered seriously in Phase II project sites. In particular, complaints of favoritism could be minimized by building in safeguard mechanisms which will avert some tendency toward this direction. It is furthermore recommended that the use of local people like those who serve as barefoot technicians and livestock men be intensified. In terms of cost involved, they are much cheaper than hiring office personnel or college-trained technical men. A far more important consideration is the wide mass base they already have since they are from the same locality. This means that they can

easily gain access to the people and can therefore have a wider coverage than somebody not from the place. There is, however, a need to maintain an efficient ratio of participant to barefoot technician so that the quality of interaction with the farmers can be improved.

4. As a whole, it can be said that there is a general attitude of optimism among the people as indicated by the overall feeling of **things getting better** as compared to before, relative to others, and after participation in development projects like CVRP. This kind of attitude indicates positive response to development interventions which will pave the way for possible intensification of activity in the same sites during Phase II. Even if no intensification of activity in existing sites is done, the positive assessment will most likely influence those in the Phase II sites to develop the same positive attitude to the project.
5. The big number of participants in CVRP activities reflects the general strategy adopted by the project of covering as many farmers as can be reached by it within the lifespan of the project. There seems to be inadequate attention, however, given to monitor whether the UA technologies are sustainably practiced or not. This strategy may have been acceptable in the first phase where the numbers could be used as indicator of project impact in case it does not prove to be economically efficient. The CVRP should go beyond this overemphasis in numbers in its Phase II implementation. The impact assessment has shown that CVRP-UA generates a high NPV and has a greater than 1 benefit-cost ratio. While the accomplishment in "numbers" may have contributed to this high economic performance, there is now a need to show greater concern on the quality of its accomplishments. This is expected to bring about an even greater economic return to society than what it has accomplished to date.
6. A comparison of gross and farm income among the different types of technology adoptors revealed a significant difference in income between non-adoptors and the medium and high adoptors. Furthermore, gross income in real terms has been improving over the years. Farm income accounts for the biggest proportion of one's income, with non-farm income sources playing a significant role in some provinces.
7. Benefit-cost analysis of the different UA interventions was done at the farm and project levels using the "with" and "without" project analysis. The farm level analysis showed positive net present value (NPV) and greater than 1 benefit-cost ratio. The highest NPV could be realized from farms with on-farm soil conservation measures, followed by agroforestry farms. The least return was realized from the upland fishponds which was reported by some as being inappropriate to the conditions in the project sites.

8. The positive net returns from the UA interventions strongly support the investment in resource conserving projects. Said projects need not only be justified on ecological grounds as they also stand up to economic tests of acceptability. This is to be expected since in the end, sustainable income is possible only with an improved resource base.

## APPENDIX TABLES

**Appendix Table 1  
TENURIAL CHARACTERISTICS OF UPLAND FARMERS  
IN CVRP PROJECT AREAS**

FARM OWNERSHIP CHARACTERISTICS	1981 %
a. full owner	46.86
b. part owner	21.66
c. absolute tenant	29.32
d. settlers	2.16

**Appendix Table 2  
ACTIVITIES LEARNED ONLY FROM CVRP  
All Provinces**

ACTIVITIES	All Provinces	
	No.	%
Contour farming	112	51
Tree farming	59	27
Use of certain crops as fertilizer	10	5
Pasture development	9	4
Grafting/Planting of grafted fruit trees	2	1
Presence of farmers' association	2	1
Crops diversification	2	1
Upland fishpond	2	1
Attendance to seminars	2	1

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**Appendix Table 3**  
**INCOME DATA OF SAMPLE RESPONDENTS IN CVRP PROJECT SITES**  
**BY LEVEL OF ADOPTION OF UA TECHNOLOGIES, 1992**

SOURCE OF INCOME	NON-ADOPTOR		ADOPTOR							
	Mean	%	Low Mean %	Medium Mean %	High Mean %	All Adoptors Mean %				
Farm income										
mean	7,663	56	8,184	70	13,995	67	16,232	72	14,418	70
sd	9,453		10,021		23,600		30,535		25,948	
n	27		17		97		81			
Non-farm income										
mean	5,474	40	3,003	26	5,780	28	5,217	23	5,306	26
sd	8,893		4,436		30,541		9,808		(22,628)	
n	27		17		77		77			
Off-farm income										
mean	496	4	496	4	1,019	5	1,386	6	1,119	5
sd	970		1,148		3,338		3,425		(3,239)	
n	27		17		96		76			
Gross income										
mean	13,633	100	11,683	100	20,783	100	22,491	100	20,699	100
sd	11,597		10,065		37,386		32,030		33,638	
n	27		17		97		81		114	

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**Appendix Table 4a**  
**RESULTS OF ANALYSIS OF VARIANCE FOR GROSS INCOME**  
**OF FARMER RESPONDENTS IN CVRP PROJECT SITES**  
**BY LEVEL OF ADOPTION OF UA TECHNOLOGIES, 1992**

SOURCE OF VARIATION	DF	SS	MS	F-computed
Level of Adoption	3	4.72	1.57	2.10 *
Error	218	163.10	0.75	
Total	221	167.82		

$H_0: \text{mean}_{NA} = \text{mean}_{LA} = \text{mean}_{MA} = \text{mean}_{HA}$

Conclusion: Reject  $H_0$  at alpha = 0.10

CV = 9%

\* Significant at 10%

**Appendix Table 4b**  
**RESULTS OF ANALYSIS OF VARIANCE FOR FARM INCOME**  
**OF FARMER RESPONDENTS IN CVRP PROJECT SITES**  
**BY LEVEL OF ADOPTION, 1992**

SOURCE OF VARIATION	DF	SS	MS	F-computed
Level of Adoption	3	18.46	6.15	3.86 **
Error	218	340.01	1.60	
Total	221	358.47		

$H_0: \text{mean}_{NA} = \text{mean}_{LA} = \text{mean}_{MA} = \text{mean}_{HA}$

Conclusion: Reject  $H_0$  at alpha = 0.05

CV = 14%

\*\* Significant at 5%

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**Appendix Table 4c**  
**TEST OF SIGNIFICANCE OF AVERAGE INCOME**  
**AMONG FARMER RESPONDENTS IN CVRP PROJECT SITES**  
**AT VARYING LEVELS OF ADOPTION**

TYPE OF INCOME	NON-ADOPTOR	ADOPTOR		
		Low	Medium	High
Farm Income*	8,153 <sup>b</sup>	8,624 <sup>ab</sup>	8,999 <sup>a</sup>	9,025 <sup>a</sup>
Gross Income**	9,091 <sup>ab</sup>	9,241 <sup>b</sup>	9,422 <sup>ab</sup>	9,579 <sup>a</sup>

\* Means with the same letters are not significantly different at alpha = 0.05  
 \*\* Means with the same letters are not significantly different at alpha = 0.10

**Appendix Table 4d**  
**RESULTS OF ANALYSIS OF VARIANCE FOR FARM INCOME**  
**OF FARMER RESPONDENTS IN CVRP PROJECT SITES, 1992**

SOURCE OF VARIATION	DF	SS	MS	F-computed
Level of Adoption	1	16.10	16.10	1.12 **
Error	220	350.36	1.59	
Total	221	366.47		

H<sub>0</sub>: mean<sub>NA</sub> = mean<sub>A</sub>  
 Conclusion: Reject H<sub>0</sub> at alpha = 0.01  
 CV = 14%  
 \*\* Significant at 1%

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**Appendix Table 5**  
**HOUSEHOLD DISTRIBUTION BY MAJOR EXPENDITURE ITEM AND BY PROVINCE**  
**ADOPTOR AND NON-ADOPTOR, 1992**

TYPE OF RESPONDENT BY PROVINCE	n	%	EXPENDITURES					TOTAL
			Food	Clothing	Medical	Recreation	Others	
<b>NON-ADOPTOR</b>								
Siquijor	4	19						
mean			6,917	875	108	0	1,096	8,996
sd			4,475	250	89		1,081	
Bohol	2	10						
mean			4,440	500	650	120	0	5,710
sd			1,607	0	354	170		
Cebu	6	29						
mean			5,376	1,117	117	133	0	6,742
sd			2,202	980	117	242		
Negros Or.	9	43						
mean			14,204	1,906	676	338	756	17,879
sd			10,744	1,882	741	639	1,655	
<b>ADOPTOR</b>								
Siquijor	42	23						
mean			7,303	771	546	194	1,451	10,265
sd			5,780	657	755	491	2,565	
Bohol	51	28						
mean			6,240	1,135	965	506	263	9,108
sd			3,998	783	2,324	1,879	1,191	
Cebu	45	25						
mean			6,725	881	403	308	220	8,537
sd			7,747	902	1,178	553	840	
Negros Or.	45	25						
mean			12,634	1,778	1,334	308	1,356	17,409
sd			9,579	2,394	2,437	268	3,181	

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**Appendix Table 6**  
**PROPORTION OF AREA PLANTED TO MAJOR CROPS**  
**BY CROPPING SEASON AND CROPPING INTENSITY**  
**CVRP PROVINCES, 1980 (WITHOUT PROJECT SCENARIO)**

PROJECT AREA	MAJOR CROPS PLANTED IN 1980	1st	2nd	3rd	All
Cebu	Corn	13%	72%	13%	99%
	Root Crops	3%	11%	11%	25%
	Vegetables	2%	2%	4%	7%
		18%	85%	28%	131% <sup>a</sup>
Bohol	Corn	3%	12%	6%	20%
	Root Crops	5%	11%	12%	28%
	Lowland Rice	23%	16%	17%	57%
	Upland Rice		23%		23%
		30%	63%	35%	128% <sup>a</sup>
Negros Oriental	Corn	3%	22%	16%	41%
	Upland Rice		20%		20%
		3%	42%	16%	61% <sup>a</sup>
Siquijor	Corn	14%	66%	50%	130%
	Root Crops	1%	15%	2%	18%
	Lowland Rice	13%	10%	9%	31%
		28%	91%	61%	179% <sup>a</sup>

<sup>a</sup> Cropping intensity

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**Appendix Table 7**  
**PROPORTION OF AREA PLANTED TO MAJOR CASH CROPS**  
**BY CROPPING SEASON AND CROPPING INTENSITY**  
**CVRP PROVINCES, 1991 (WITH PROJECT SCENARIO)**

PROJECT AREA	MAJOR CROPS PLANTED IN 1991	1st	2nd	3rd	All
Cebu	Corn	88%	37%	2%	127%
	Root Crops	—	—	—	0%
	Vegetables	—	0%	—	0%
	Rice	1%	12%	0%	14%
		90%	49%	3%	141% <sup>a</sup>
Bohol	Corn	22%	13%	6%	41%
	Root Crops	5%	6%	1%	12%
	Vegetables	1%	1%	—	1%
	Upland Rice	—	69%	—	69%
	Others	3%	—	0%	3%
		30%	90%	7%	127% <sup>a</sup>
Negros Oriental	Corn	39%	31%	—	71%
	Upland Rice	45%	8%	5%	57%
	Vegetables	—	0%	—	0%
	Others	6%	4%	1%	11%
		90%	43%	5%	139% <sup>a</sup>
Siquijor	Corn	90%	74%	—	165%
	Rice	—	1%	—	1%
	Vegetables	—	1%	32%	33%
		90%	76%	32%	199% <sup>a</sup>

<sup>a</sup> Cropping intensity

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**Appendix Table 8**  
**COMPARISON OF GROSS INCOME BETWEEN**  
**PARTICIPANT/ADOPTOR AND NON-PARTICIPANT/NON-ADOPTOR**  
**1985, 1989, 1992**

TYPE OF RESPONDENT	1985	1989	1992
Participant/Adoptor	4,389	11,268	12,365
Non-Participant/Non-Adoptor	5,062	7,784	8,087

**Appendix Table 9**  
**SUMMARY TABLE OF RESULTS OF ECONOMIC ANALYSIS OF VARIOUS UA TECHNOLOGIES**  
**1992 PRICES, 12% DISCOUNT RATE AND 25 YEARS ECONOMIC LIFE**  
**(FARM LEVEL ANALYSIS)**

TECHNOLOGY	WITHOUT PROJECT			WITH PROJECT			INCREMENTAL NET BENEFIT	
	NPV	A	BCR	NPV	A	BCR	NPV	A
On-Farm Soil Conservation	54,730	6,978	3.86	121,919	15,545	6.02	67,189	8,567
Community-Based Contract Reforestation	-	-		81,222	10,356		-	10,356
Agroforestry	54,730	6,978	3.86	75,095	9,575	3.96	20,365	2,597
Microwatershed Development	54,730	6,978	3.86	64,157	8,180	3.59	9,427	1,202
Upland Fish Culture					216			

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*Part III*

**IMPACT ASSESSMENT OF THE CVRP-I SOCIAL FORESTRY**

**Linda M. Peñalba**



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# IMPACT ASSESSMENT OF CVRP-I SOCIAL FORESTRY\*

Linda M. Peñalba\*\*

## I. INTRODUCTION

The social forestry component of The Central Visayas Regional Project (CVRP-I) was pursued primarily to enhance the rehabilitation and regeneration of forest resources and improve the welfare of the forest occupants. Social forestry (SF) program interventions were introduced in 1984 on a 17,363-hectare logged over area located in the municipalities of Ayungon and Bindoy in Negros Oriental. These lands were formerly covered by a Timber Lease Agreement (TLA) issued to Philippine American Timber Corporation (PATIC). Twelve barangays are covered by the project.

The interventions introduced were aimed towards the development and management of forest lands, timber stand improvement, and reforestation of cogon lands. Issuance of resource access instruments to the forest occupants, in the form of Timber Utilization Permit and Stewardship Contracts also form part of the SF program.

In the implementation of CVRP-SF people participation in protecting the resource was very critical. This Community-Based Resource Management (CBRM) approach works on the principle of partnership between an "external" institution like CVRP and the actual resource users. Thus, CVRP provided technical support while the people respond in terms of improved farming system and protection of the forest resources in the area.

### A. *Project Implementation*

To operationalize the CBRM approach in the SF sites, massive social preparation activities were undertaken by CVRP. This was coupled with the introduction of income generating activities and soil conservation strategies.

The forest occupants were organized into Forest Occupants Stewardship Associations (FOSAs), and were provided training on appropriate farming systems and conservation measures. The first FOSA was organized in 1984 and by the end of 1987, 27 FOSAs with a membership of 50-60 per FOSA have been organized in the 12 barangays covered by the project.

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\* Final Report submitted to the Central Visayas Regional Project Office (CVRPO), Mandaue City, 16 December 1992.

\*\* Director, Institute of Agrarian Studies, UPLB.

Concomitant to the soil and forest conservation requirements, farmers necessarily would have to stop expanding their farms and devote more time for the construction of soil conservation structures. To augment people's income Community Tree Utilization Permits (CTUPs) were issued to the FOSAs. The CTUP allowed the FOSA members to harvest dead and fallen trees. The first CTUP was awarded in 1986 and before its cancellation in 1988, a total of 18 CTUPs were issued.

As a social organization, the FOSAs vary considerably in terms of strength, commitment and developmental orientation. Not long after the operationalization of the CTUPs, anomalies concerning management of funds by some FOSA officials and abuse in the use of CTUPs were reported. So, in 1988, DENR caused the cancellation of the CTUPs. Reactions to the cancellation of the CTUP were mixed. Those who were adversely affected by the cancellation were against the move, while those who felt aggrieved expressed approval of the cancellation.

Efforts to reissue the CTUPs were exerted through representations with the DENR, but up to now, no positive action has yet been made. Another resource access instrument, called the Smallholder Concession License (SCL) was thought of to give the project cooperators access to mature trees. This mode, however, was not pursued.

Reforestation activities were the major concern of the project in its early years of implementation. Reforestation started in 1985 but as of 1987, only about 800 hectares have been reforested. The existence of claims on the lands that are subject of reforestation and the untimely release of project funds caused serious delays in reforestation activities.

In 1989, other reforestation approaches were introduced. Instead of just straight reforestation, SF adopted the assisted natural regeneration (ANR) strategy and pursued on-farm reforestation more vigorously. As of May 1992, a total of 4,306.6 hectares or 85 percent of the project's target have been reforested. Another 3,370.5 hectares of forest areas were being maintained, while 874 hectares of agroforestry farms have been developed.

From 1985 to 1989, reforestation activities were done by administration. Those who participated in reforestation activities were paid daily wages. After 1989, Community-Based Contract Reforestation (CBCR) was adopted. FOSAs were assigned areas to reforest and manage while individual household-occupants were encouraged to do on-farm reforestation.

Additional incentives to encourage on-farm reforestation were provided through Community-Based Contract Nurserying (CBCN). The occupants were paid a minimal sum of ₱1.50 per seedling raised and planted on their own farm.

Under the CBCR, the FOSAs get a contract to do straight reforestation for a total of about ₱11,987.00. The contract is for three years and includes planting and maintenance of the reforested area. Activities during the first year includes clearing and plantation establishment and the contract amount is ₱4,045 per hectare.

On the other hand, the contract for ANR amounts to ₱1,790 per hectare. This amount covers brushing and weeding, construction of firebreaks and maintenance.

Agroforestry was not given emphasis in the early part of the program (1984-87). According to one project document, the development of kaingin farms was deliberately delayed because CVRP wanted to give emphasis to reforestation first. The program also wanted "to allow the farmers to develop livelihood based on the forest/trees and not on the soil beneath it." Farms were expected to serve only as a secondary source of livelihood, so the farmers would not destroy the forest in favor of the farm. However, with the cancellation of CTUP and to promote conservative farming system, on-farm agroforestry farms development was later given emphasis.

CVRP-I is ending in December 1992 but there are plans to pursue a Phase II of the project. As a necessary input to the assessment of the feasibility of CVRP-Phase II, the impacts of CVRP-I on both the lives of the beneficiaries and the condition of the natural resource base is being assessed.

This report presents an assessment of the impact of CVRP-I Social Forestry component on the social welfare condition of the household cooperators, their community, and the natural resource base of the project site.

#### B. *Organization of the Report*

This report consists of four parts: the first part discusses the socioeconomic conditions in the area and the assessment of the impact of CVRP-SF on the socioeconomic condition of the households and the community; the second part presents an assessment of the impact of CVRP-I SF on the natural resource base; the third part presents an analysis of the sustainability and replicability of the CVRP/CBRM experience and the fourth part presents the economic analysis of the project.

## II. METHODOLOGY

#### A. *Sources of Data*

Data for this study were obtained from both primary and secondary sources. A survey was conducted in September and October, 1992 during which residents of the sample barangays, both cooperators and non-cooperators were interviewed. Six barangays from the municipalities of Ayungon and Bindoy were covered by the survey. These are: Banban, Candanaay, Jandalamanon and Nabhang in Ayungon; and Atotes and Nalundan in Bindoy.

A total of 167 respondents were interviewed, distributed as follows: 97 cooperators and 70 cooperators (Table 1). However, some 20 questionnaires with questionable responses on some aspects were discarded so the size of the sample may vary depending on the variable that

**Table 1**  
**DISTRIBUTION OF RESPONDENTS BY MUNICIPALITY**  
**CVRP-SF, 1992.**

Municipality/ Barangay	Cooperators	Non-Cooperators	Total
Ayungon	76	52	128
Banban	12	21	33
Nabhang	16	10	26
Jandalamanon	15	8	23
Candanaay	33	13	46
Bindoy	21	18	36
Atotes	8	7	15
Nalundan	13	11	24
<b>Total</b>	<b>97</b>	<b>70</b>	<b>167</b>

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is being analyzed. About 77 percent of the respondents came from the four sample barangays of Ayungon while the rest (23 percent) came from the two sample barangays of Bindoy.

The respondents are grouped into two: cooperators and non-cooperators. Cooperators are those who were involved in more than 50 percent of the interventions introduced by CVRP while the non-cooperators are those involved in less than 50 percent of CVRP sponsored/initiated activities. In effect, therefore, both the cooperators and the non-cooperators are beneficiaries of CVRP. They differ only in terms of the degree of their involvement and extent of participation in the program.

Key informants/respondents were also interviewed to substantiate the findings from the survey. Much of the qualitative information that are used to validate the survey results were obtained from key informants/respondents. These respondents include the FOSA chairmen, the barangay captains, local government officials (mayors and councilors; governors and other provincial government officials), project managers, Site Management Unit (SMU) managers, other SMU personnel and Regional Project Office (RPO) officials.

Reports (process documentation, monitoring, results of various studies, assessment and progress) and statistics available at RPO were used in the comparative analysis of conditions obtaining during the various stages of CVRP implementation.

#### B. *Analytical Technique*

Both qualitative and quantitative methods of analysis were used. Descriptive/qualitative and tabular analysis were used to describe the socioeconomic conditions of the respondents. Appropriate statistical tests were used to determine the significance of changes in identified socioeconomic variables after CVRP. Economic analysis was also done to determine the cost effectiveness of the project.

Project sustainability was assessed based on the data generated by RPO in the Barangay Profile, and validated by survey results.

The impact of CVRP was assessed by comparing the conditions before and after CVRP, with "before" referring to the period 1984-85 and "after" referring to 1991-1992. Income and production data are for 1991 while other variables, particularly the sociodemographic conditions are reckoned in 1992.

#### C. *Limitations*

The very short time within which the study was conducted did not permit thorough verification of the survey data. Other impact indicators that were earlier identified to be used in this study were finally excluded because of problems with reliability of data.



### III. IMPACT OF CVRP-I SF ON THE SOCIODEMOGRAPHIC CONDITIONS OF THE RECIPIENTS OF CVRP ASSISTANCE

The impact of CVRP on the socioeconomic status of the respondents was assessed in terms of the perceived changes in health and nutritional status, access to productive resources, and other services, household income, farming practices, participation in community and CVRP-sponsored activities, and general perception on the effect of CVRP on the quality of their lives.

#### A. *Migration Into the Area*

Most of the respondents consider themselves as natives of the area. Among those who said they were migrants, however, more than half said they moved into the area within the period 1971 to 1990. Majority (60 percent) of the migrant-respondents are short-distance movers having come from other barangays of Ayungon and Bindoy while about 20 percent are long-distance migrants, having come from as far as "another region" (Table 2).

The most common reason mentioned for moving into the area is their search for a better life. It can be noted, that most of those who moved into the area in the 1970s and 1980s came from a municipality of Negros Occidental. The downfall of the sugar industry was a major factor that compelled them to leave their home province. They reportedly moved in because they could no longer find jobs/sources of livelihood in the sugarlands of Negros Occidental.

When asked if any of the respondents have plans to migrate out of their respective villages, almost all said that they have no intentions to transfer to other areas (Table 2). A few (2%), however, indicated that they have plans to migrate. Interestingly, the proportion of those who have plans to leave is higher among the cooperators (16%) than the non-cooperators (4%). This could be indicative of the characteristics of cooperators that made them actively participate in CVRP -- their continuing quest for ways to improve their lives and openness to new challenges.

Out-migration rate is reportedly very low and the reason for migration is still to look for better opportunities. Only 15 percent of the respondents said that some members of their family have moved out. Again, the proportion of cooperator families who reported out-migration of members is higher than that of non-cooperators. The major reason why family members of cooperators moved out is employment (58%), while for non-cooperators, the primary reason is marriage (43%).

#### B. *Housing Facilities*

Almost all of the respondents owned their houses and homelots even before CVRP came into the area (Table 3). This condition was reported by earlier studies (San Carlos University, 1989; and de los Angeles, 1989) and corroborated by this 1992 survey. The open access to both land resources and housing materials available in the area enabled the people to claim lands for their homelots and build their own houses.

**Table 2**  
**SELECTED MIGRATION INDICATORS, CVRP-SF, 1992**

Item	Cooperators		Non-Cooperators		Total	
	f	%	f	%	f	%
<b>A. Migrants/Non-Migrants</b>	(n=97)		(n=70)		(n=167)	
Migrants	15	15	15	21	30	18
Non-Migrants	82	85	55	79	137	82
<b>B. Year most of the respondents moved in</b>	(n=15)		(n=15)		(n=30)	
1971-1990	8	54	9	61	17	57
<b>C. Place of origin</b>	(n=15)		(n=15)		(n=30)	
Another barangay within the municipality	9	60	9	60	18	60
Another region	5	33	1	7	6	20
<b>D. Plans to move out</b>	(n=97)		(n=70)		(n=16)	
Yes	3	3	-	-	3	2
No	81	84	67	96	148	89

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Table 3  
VALUES OF SELECTED SOCIOECONOMIC INDICATORS  
CVRP-SF, 1992

Socioeconomic Indicators	Cooperator		Non-Cooperator		Total	
	n	%	n	%	n	%
	(n=97)		(n=70)		(n=167)	
<b>A. House ownership</b>						
owned before	92	95	64	91	156	93
owned after	92	95	69	99	161	96
<b>B. Homelot ownership</b>						
owned before	73	75	49	70	122	73
owned after	73	75	52	74	125	74
<b>C. Lighting system</b>						
before CVRP						
kerosene	80	82	48	69	128	77
petromax	15	15	20	28	26	16
after CVRP						
kerosene	76	78	47	67	123	73
petromax	17	18	20	28	37	38
<b>D. Type of houses</b>						
before CVRP						
light materials	57	44	44	63	101	60
mixed (wood & concrete)	40	41	23	33	63	38
after CVRP						
light materials	48	48	42	60	90	54
mixed (wood & concrete)	47	48	26	37	73	44
<b>E. Health Status</b>						
before CVRP						
worse/bad	30	31	18	26	48	29
good	67	69	52	74	119	71
better/very good	-	-	-	-	-	-
after CVRP						
worse	6	6	4	6	10	6
good	85	88	64	91	149	89
better/very good	6	6	6	3	3	5

Springs/rivers remain to be the major source of water by the respondents, although about 35 percent of them said that they have now access to piped water system.

On the other hand, since there is still no source of electric power in the area, the most popular lighting device used by the households is kerosene lamp. About 77 percent reported using kerosene lamp, 16 percent were using "petromax" and the rest were using both "petromax" and kerosene lamp.

### C. *Health and Nutrition*

The respondents said that in general, they consider their health status as good (Table 3). Only about 29 percent assessed their health status before CVRP as bad. After the implementation of CVRP, those who considered their health status as bad/worse declined to only 6 percent while those of the opinion that it is good increased to 89 percent. There were even 8 respondents who said that their family's health status greatly improved and became better after CVRP.

The improvement in the health condition of the respondent-families is attributed to better access to health facilities and services provided by CVRP, and improved knowledge on health care. Before CVRP, they relied mostly on "quack" doctors and herbal medicine for cure of their illnesses. CVRP's primary health care program and the improved roads and consequently better transportation system, provided them much easier access to health services and facilities.

There were also reported improvements in the nutrition status of the farmers. Many of them said that because of better/higher income after CVRP, they can already afford to eat foodstuff that are of higher nutritive value.

### D. *Participation in CVRP*

Almost all of the respondents have positive ideas about CVRP. To them, CVRP is a program that helps farmers learn and understand the concepts and practices of conservation, and ways to improve livelihood through better management of resources and to understand the connection between their farm activities and environmental degradation.

The cooperators share the view that CVRP is a program both for reforestation and livelihood, while many non-cooperators believe that it is a program that provides farmers with the necessary inputs and teaches them various conservation technologies (e.g., contour farming) and methods of tree planting. Apparently, the cooperators have a broader and more in-depth view of the program, considering it as an intervention both for environmental and economic reasons.

The greater proportion (47%) of the respondents learned about the program in 1985 (Table 4). That was also the year when most (39%) of them joined/started participating in the program activities. It can be noted that from 1984 to 1987, the proportion of respondents who

**Table 4**  
**YEAR RESPONDENTS LEARNED ABOUT THE CVRP**  
**AND YEAR WHEN THEY ACTUALLY JOINED THE PROGRAM**

Year	YEAR LEARNED						YEAR JOINED					
	Coop. (n = 97)		Non-Coop. (n = 70)		Total (n = 167)		Coop. (n = 97)		Non-Coop. (n = 70)		Total (n = 167)	
	f	%	f	%	f	%	f	%	f	%	f	%
1984	8	8	6	9	14	8	5	5	2	3	7	4
1985	42	43	36	51	78	47	38	39	28	40	66	39
1986	23	24	13	19	36	22	21	22	11	16	32	19
1987	15	15	13	19	28	17	11	12	11	16	22	13
1988	5	5	1	1	6	4	8	88	3	4	11	7
1989	-	-	-	-	-	-	4	4	6	9	10	6
1990	1	1	-	-	1	1	2	2	1	1	3	2
1991	1	1	-	-	1	1	3	3	3	4	6	4
No response	2	2	1	1	3	2	5	5	5	7	10	6
Total	97	100	70	100	167	100	97	100	70	100	167	100

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actually joined the program is always less than those who learned about it. For instance, while 47 percent came to know about the program in 1985, only 39 percent joined the program during that year. The pattern, however, is reversed from 1988 to 1991, i.e., the proportion of those joining is greater than the proportion "learning" about the program. This implies that people took sometime to decide whether or not to join the program. The decline in the number of people joining/participating in CVRP after 1987 reflects the decline in SF activities as CVRP nears the phase-out stage.

When asked about their initial reaction to CVRP, 89 percent said that they were already willing to join the program even during the early years, while 11 percent stated otherwise (Table 5). Understandably, the percentage of respondents who were initially willing to join the program is much higher among the cooperators (96%) than the non-cooperators (80%).

Of the respondents who, from the start, were willing to join the program, the primary benefit perceived by the majority (54%) is the improvement in their livelihood through possible employment with CVRP (Table 6). The concern of more than one-third (37%) of them, however, seems to go beyond personal gains. Accordingly, the basic benefit they perceived from participation in the program is learning new technologies that they can adopt for purposes of soil conservation and reforestation.

In general, the desire to improve their socioeconomic condition appears to be the basic goals of the respondents joining the program. Majority (56%) of both the cooperators and non-cooperators said that their perceived benefit from participating in CVRP activities is the possible upliftment of their socioeconomic status through employment opportunities and greater crop production.

#### **IV. EFFECTS OF CVRP-SF ON THE ECONOMIC CONDITION OF THE BENEFICIARIES**

The general indicators used in evaluating the impact of CVRP-SF on the economic condition of the beneficiaries are income and farming practices. Farm production would have been a useful measure of the impact of CVRP considering that agroforestry farm development was a major SF intervention. However, there were some problems with the reliability of the farm production data that were gathered, hence these were not used in the analysis.

##### **A. *Distribution of Farmholdings***

The size of farms cultivated by farmers in the area is generally small. Farm size ranges from 0.25 hectares to about 8.5 hectares. The average farm size of cooperators was found to be slightly smaller than that of the non-cooperators (Table 7). In Ayungon, the average farm size of cooperators was 2.63 hectares, while that of the non-cooperators was 3.53 hectares. On the other hand, in Bindoy, average farm size of cooperators was 3.52 hectares while that of the non-cooperators was 3.47 hectares.

**Table 5**  
**RESPONDENTS' INITIAL REACTION TO CVRP**

Initial reaction	Cooperators (n=97)		Non-Cooperators (n=70)		Total (n=167)	
	f	%	f	%	f	%
Willing to join	93	96	56	80	149	89
Not willing to join	4	4	14	20	18	11
<b>Total</b>	<b>97</b>	<b>100</b>	<b>70</b>	<b>100</b>	<b>167</b>	<b>100</b>

**Table 6**  
**PERCEIVED BENEFITS/PROBLEMS AND CONSTRAINTS  
FROM PARTICIPATION IN THE CVRP**

Perceived benefits/problems and constraints	Cooperators (n=93)		Non-Cooperators (n=56)		Total (n=149)	
	f	%	f	%	f	%
Improvement of livelihood/ employment	52	56	28	50	80	54
Reforestation and conservation and new technology	33	35	23	41	56	37

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**Table 7**  
**DISTRIBUTION OF FARM HOLDINGS BY NUMBER AND BY AREA**  
**BEFORE AND AFTER CVRP**

	Before				After			
	Number of Farms		Area of Farms		Number of Farms		Area of Farms	
	%	Cumulative	%	Cumulative	%	Cumulative	%	Cumulative
less than 1	30	30	6	6	23	23	5	5
1 1.9	31	61	16	22	18	54	15	20
2 2.9	15	76	15	37	31	72	16	36
3 3.9	5	81	6	43	7	79	9	45
4 4.9	7	88	20	63	8	87	13	58
5 5.9	5	93	10	73	4	91	10	68
6 6.9	2	95	5	78	4	95	10	78
7 and above	5	100	22	100	5	100	22	100

**Table 8**  
**DISTRIBUTION (n) OF RESPONDENTS BY SIZE, FARMED AND CLAIMED**  
**CVRP, 1992**

Farm Size	Cooperator		Non-Cooperator		Total	
	Farmed	Claimed	Farmed	Claimed	Farmed	Claimed
less than 1	24	22	16	11	46	33
1 - 1.9	24	24	24	26	48	50
2 - 2.9	15	17	13	10	28	27
3 - 3.9	9	9	2	5	11	14
4 - 4.9	8	9	4	5	12	14
5 - 5.9	5	6	2	2	7	8
6 - 6.9	2	1	4	3	6	4
more than 7	4	9	4	7	8	16

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It is observed that there is a slight increase in average size of farms being cultivated by the respondents after CVRP. Before any interventions were introduced, about 30 percent of the farms were less than 1 hectare in size and about 61 percent, less than 2 hectares. This proportion decreased to 23 and 54 percent, respectively, after CVRP. The modal farm size before CVRP was 1.0 to 1.9 hectares, while after CVRP, the modal size becomes 2.0 - 2.9 hectares. The proportion of farms greater than 6 hectares in size increased from 7 percent before to 9 percent at present (Table 7).

These figures indicate that the farmers in the area are still expanding their holdings and opening new lands for cultivation. This observation is validated by respondents who reported that forest destruction still continues. However, while new kaingins are still being opened even in areas that are covered by reforestation activities, it is at a much reduced rate. This is attributed by many to CVRP and the vigilance of the people to protect the remaining forest.

An analysis of the distribution of farmholdings showed that the equitability of land distribution has improved after CVRP. The Lorenz curve after CVRP is relatively closer to the line of perfect equality. The Gini index improved from 0.5233 before CVRP to 0.4848 after CVRP. The distance between the line of perfect equality and the actual distribution of access to lands in the SF project area has decreased as more people gain access to lands. This improvement in the equitability of distribution of access to lands in the project site is reflective of the accomplishments of the project in terms of distribution of access instruments. As of August 30, 1992, 1,000 Stewardship Contracts have already been issued to project cooperators. Based on the SF Manager's Report of 1992, this constitutes 86 percent of the 5-year target for distribution.

While the improvement in the Gini index may be looked at as a positive indication of CVRP accomplishments, it may also be seen as a sign of increasing encroachment in forest lands. This, in a sense, could be viewed as a negative and unintended consequence of CVRP.

#### B. *Size of Lands Claimed/Owned and Farmed*

The size of lands cultivated was compared with the size of lands being claimed to examine the intensity of land use and determine if basic conservation practices like fallowing are being done (Table 8).

It was found out that the size of lands cultivated is somewhat less than the size actually claimed/owned. While only 33 percent reported claiming lands less than 1 hectare in size, 46 percent cultivates less than one hectare of land. This implies that at least 13 percent of those who claim more than 1 hectare of land is not using the entire area for cultivation.

On the other hand, about 16 percent claim/own lands greater than 7 hectares in size but only 8 percent cultivate these lands. About 50 percent of the cooperators and 30 percent of the non-cooperators who claim/own more than 7 hectares are not cultivating 100 percent of their

claimed lands at the time of the survey. These imply that some lands are laid fallow for some time to allow it to regain lost fertility before it is again put under cultivation.

Interestingly, the number of cooperators (22) claiming/owning less than 1 hectare is 100 percent more than the non-cooperators (11). This means that there are more very small operators among the non-cooperators compared to the cooperators.

There was a slight expansion of cultivation in the site. The total area cultivated in 1991 was 51 hectares (18 percent) bigger than in 1984 or an average expansion rate of about 7 hectares per year. Expansion rate is higher among non-cooperators than among cooperators. The farms of the non-cooperators expanded by 24 percent while that of the cooperators increased by only 13 percent.

### C. *Crops Planted*

The kinds of crops planted reflect the diversity of the terrain and the ecological condition in the area. Corn is the major crop particularly in the rainfed farms while irrigated rice is raised on the fertile valleys. Farmers plant three crops of irrigated rice per year but there were reported cases in the recent years when a third cropping of rice was not made possible because of the lack of irrigation water. Bananas, vegetables, fruit trees, corn and root crops are planted on kaingins.

Kaingin farming is still widely practiced in the area. Some install conservation structures on their kaingin farms as part of agroforestry farm development, while others just raise the crops along the slopes without any visible conservation measure applied. There are indications that many of the erstwhile kaingin farms are now permanently cultivated. This was observed particularly in farms of those who did not participate in any of the CVRP-introduced interventions.

Mixed cropping and intercropping are practiced in most of the farms (except in the irrigated rice lands). The respondents said that there has been no major change in their cropping system and that the crop mix now is still mostly the same as that before CVRP. The only change is the planting of hedgerow crops and fruit trees. Seedlings of fruit trees like mango were distributed to cooperators and planted on their farms as part of the agroforestry farm development. It is foreseen, that when the fruit trees would already have grown to size, the area that would be available for growing food crops would decrease considerably. It is also expected that eventually, these fruits trees shall serve as the major source of the farmers' farm income and that intensive land utilization for food crops production will be reduced.

It is noticeable, however, that farmers do not regard row crops as integral part of their cropping system. These are not even included in their enumeration of the crops they are planting. This could be because most of the hedgerow crops are not regarded to have economic value. More information can be provided to farmers in choosing hedgerow crops that could provide additional source of income.

#### D. *Comparison of the Respondents' Income at Various Points of CVRP Implementation*

The (current) total household income of respondents increased consistently from 1985 to 1991 (Table 9). Income of cooperators increased by 146 percent from 1985 to 1991, while that of non-cooperators increased by 126 percent. The amount and the percentage increase in income are higher for the cooperators than for the non-cooperators.

It can be noted, however, that the change in income from 1985 to 1988 is greater than the change from 1988 to 1991. The increase in income from 1985 to 1988 is about 132 percent for cooperators and 123 percent for the non-cooperators. On the other hand, the increase in income from 1988 to 1991 is only about ₱557 (6%) for the cooperators and ₱523 (6%) for the non-cooperators. The 1991 real income is actually lower than the 1988 real income.

The issuance of Community Tree Utilization Permit (CTUP) contributed significantly to the increase in the income of both the cooperators and non-cooperators from 1985 to 1988. The study conducted by de Los Angeles (1989) reported that about 15 percent of both the cooperator and non-cooperator households' real income in 1988 was derived from the sale of forest products. When CTUPs were canceled in August 1988, free and legitimate access to forest products for purposes of income generation were stopped and the farmers lost one of the major sources of their income. Thus, while nominal income increased by 66 percent, real income actually decreased from 1988 to 1991.

CTUPs were introduced for both economic and environmental reasons. CTUP is supposed to allow farmers to generate income by harvesting dead and fallen trees and gradually wean them away from heavy dependence on farming. This strategy is premised on the propositions that when farmers have fully realized the economic value of forest trees it would be easier to convince them to plant forest trees and prevent forest destruction, and that when they are getting sufficient income from trees, they will depend less on forest farming.

CTUP was to a certain extent successful on both accounts. Income of farmers increased and farmers were devoting more time to timber utilization activities than on farming. However, because of the blatant abuse by some farmers and the mishandling of funds by some FOSAs, CTUP was canceled eventually.

#### E. *Sources of Respondents' Income*

Survey results show that both the cooperators and non-cooperators derived their income from three sources: farm, off-farm and non-farm. Their farm is the main source of income, although its importance declined from 1984 to 1991. In 1984, about 79 percent of the respondents' income was derived from the farm, but in 1991 only about 64 percent of total household income was derived from the farm (Table 10). Non-farm income sources have increased in importance as a major source of income. This is a welcome change from the point of view of forest conservation, since upland families now tend to look at non-farm sources for

**Table 9**  
**AVERAGE ANNUAL INCOME (P) OF RESPONDENTS AT VARIOUS POINTS**  
**OF CVRP IMPLEMENTATION (1985, 1988, 1991)**

Year	Cooperator	Non-Cooperator
1985	4,879	3,811
1988	11,348	8,517
1991	11,905	9,040

Source: 1985 and 1988 data. de los Angeles, M.S. 1989  
1991 data. 1992 CVRP Social Forestry Survey

**Table 10**  
**COMPARISON OF INCOME PER HOUSEHOLD OF COOPERATORS**  
**AND NON-COOPERATORS, BEFORE AND AFTER CVRP, 1992**

Sources	Cooperator	Non-Cooperator	Total
Number of Reporting	87	59	146
Before CVRP (1984)			
Farm Income	5,061	5,179	5,105
Off-Farm Income	932	616	775
Non-Farm Income	666	370	582
Sub-Total	6,659	6,165	6,464
After CVRP (1992)			
Farm Income	7,143	6,147	6,878
Off-Farm Income	952	904	818
Non-Farm Income	3,810	1,989	3,071
Sub-Total	11,905	9,040	10,767

Source: 1992 CVRP Social Forestry Survey

Hypothesis Tests For Means: (Mean difference is 0 or  $\geq 0$ )

1. Difference between Farm Income 1984 and 1992. Reject the Hypothesis: The Farm Income in 1992 is greater than the farm income in 1984 at 20% tests of significance.
2. Difference between the Mean Income 1984 and 1992. Reject the hypothesis. The Mean Income in 1992 is significantly greater than the Mean Income in 1984 at 5% tests of significance.
3. Difference of Mean Income and Farm Income between Cooperators and Non-Cooperators is observed to be not statistically significant.

additional sources of income. It is hoped that, eventually, dependence on forest lands and forest products will be greatly reduced such that even without the project, and without outside intervention, forest conservation will not be difficult to attain.

A comparison of the income levels of the cooperators and non-cooperators show that before CVRP, they almost have the same farm income (₦5,061 for cooperators and ₦5,179 for the non-cooperators) (Table 10). After CVRP, the farm income of cooperators increased by 41 percent (to ₦7,143) while that of the non-cooperators by only 19 percent (to ₦6,147).

There is a great increase in the importance of off- and non-farm income sources to total household income for both types of respondents. Before CVRP, farm income accounts for about 76 and 83 percent of the cooperators' and non-cooperators' incomes, respectively. After CVRP (1991) farm sources account for only 59 percent of the cooperators and 68 percent of the non-cooperators' income. The increase in the contribution of non-farm income is greater for the cooperators than for the non-cooperators. The 1991 non-farm income of the non-cooperators is only about 52 percent of the non-farm income of the cooperators. The proportion of non-farm income to total household income of cooperators has increased from 9 to 32 percent, while that of the non-cooperators, from 6 percent to 22 percent.

Based on these observations, it was hypothesized that the income of the cooperators increased more than that of the non-cooperators. Statistical tests, however, show that while there is a 32 percent difference between the 1991 income levels of the cooperators and the non-cooperators, the difference is not statistically significant. This implies that statistically, there is really not much difference between the incomes of the two groups of respondents.

One factor that may explain the relatively small difference in their income could be the minimal difference (16%) between the farm income levels of the cooperators and non-cooperators. This can be attributed to the late implementation of the agroforestry component. Agroforestry can spell the difference in the productivity of the farms and therefore, the farm income of the cooperators. However, agroforestry and development of kaingins were not given emphasis until 1988, so the economic benefits from the fruit trees that were planted on the cooperators' farms may not yet be fully realized at the time of the assessment.

The same statistical tests, however, show that there is a significant difference between the 1984 and 1991 mean income of the respondents. The 1991 farm income is also found to be significantly higher than the 1984 farm income at 20 percent level of significance. These test results indicate that in general, CVRP may have contributed significantly to the improvement in the income status of the farmers in the project area. The entire community can be said to have benefitted from CVRP as evidenced by the increase in household income.

To further test the hypothesis on increase in income and determine what factors aside from being cooperators and non-cooperators would have caused differences in income, further analyses were conducted. A number of factors were identified as possible causes of differences in income levels between the cooperators and the non-cooperators. These are:

(1) type of intervention adopted; (2) year they joined/participated in CVRP activities; (3) year land was acquired; and (4) tenurial status.

### 1. Type of Intervention Adopted

The different practices and/or interventions initiated by CVRP and the number of respondents who adopted these types of interventions are shown in Table 11. The type of interventions adopted were classified as: (1) production enhancing/on-farm conservation practices; (2) off-farm conservation/reforestation; (3) resource gathering/CTUP; and (4) employment/income generating. Combination of these interventions were practiced by both cooperators and non-cooperators.

The sub-hypothesis is that those who were involved in on-farm conservation/production enhancing activities would have sustainable increases in income compared to those who were involved only in off-farm/reforestation activities. The former can expect to derive a stream of benefits accruing to improvement in farm productivity after a considerable period of gestation, while the latter rely only on their temporary employment and the wages they earn from the project. Once introduced and continuously adapted, the stream of benefits may be obtained even without the project. On the other hand, income from temporary employment will no longer be realized when the project is terminated.

Based on the survey results, 21 and 16 percent of cooperators and non-cooperators, respectively, adopted the production enhancing or on-farm conservation interventions. About 25 percent of the cooperators and 28 percent for non-cooperators adopted both on-farm and off-farm conservation activities while 30 percent of the cooperators are involved in all the interventions introduced by CVRP. By definition, none of the non-cooperators adopted more than two types of interventions.

Among the cooperators, the income of those who adopted on-farm reforestation increased by 149 percent (from ₱9,168 before CVRP to ₱22,847 in 1991). Those who adopted both on-farm and off-farm conservation intervention increased by about 89 percent. Cooperators who adopted more than 3 interventions increased their income by more than 100 percent.

Income of the non-cooperators also has increased. The adoptors of on-farm intervention increased their income by 73 percent. Those who adopted interventions 1 and 2 reported about 100 percent increase in income. Those who adopted resource gathering/CTUP activities increased their income by more than 250 percent. Income obtained from resource gathering (intervention no. 3) contributed substantially to greater increases of income of both cooperators and non-cooperators.

With the cancellation of CTUP and the coordinated efforts of the FOSAs, the PNP, CVRP and the local government to control illegal logging activities under the Bantay Lasang project, it is expected that income from sale of forest products will be significantly reduced.

**Table 11**  
**AVERAGE INCOME OF RESPONDENTS BY TYPE OF INTERVENTION**  
**COOPERATORS AND NON-COOPERATORS, AFTER CVRP, 1992**

Intervention	Cooperators		Non-Cooperators		Total	
	No.	Ave.	No.	Ave.	No.	Ave.
1	1	6,000	2	10,000	3	8,667
2	1	1,000	8	2,375	9	2,222
3	23	17,586	17	13,191	40	15,718
12	3	9,167	4	6,069	7	7,396
13	3	9,733	4	6,125	7	7,671
14			1	25,200	1	25,200
23	9	5,844	13	6,508	22	6,236
24	2	7,700	1	-	3	5,133
34	23	3,187	9	2,639	32	3,033
123	10	13,850	-	-	10	13,850
124	1	1,000	-	-	1	1,000
134	3	8,100	-	-	3	8,100
234	14	9,139	-	-	14	9,139
1234	8	44,850	-	-	8	44,850

Codes for Interventions:

- 1 - Production Enhancing
- 2 - Off-Farm Conservation
- 3 - CTUP
- 4 - Employment/Income Generating

**Hypothesis Tests for Means (Mean Difference is = or > 0)**

1. One activity vs four activities: Reject the hypothesis: Income of those who participated four activities is significantly greater than those who participated in only one activity at 2.5% tests of significance.
2. One activity vs two activities: Reject the hypothesis at 20% tests of significance.
3. One & two activities vs three & four activities: Reject the hypothesis at 40% tests of significance.
4. Mean difference between interventions:
  - a. 1 & 2: Reject the hypothesis at 20% tests of significance
  - b. 12 vs 13: Reject the hypothesis at 20% tests of significance
  - c. 23 vs 24: Reject the hypothesis at 10% tests of significance
  - d. 123 vs 124: Reject the hypothesis at 20% tests of significance

## 2. Year Joined/Participated in CVRP Activities

The year the respondents joined/participated in CVRP was also considered a factor affecting the change in the respondents' income (Table 12). The underlying assumption was that those who joined earlier would have better opportunities to establish positions so as to access all potential benefits from the project.

Analysis, however, show that the highest increase in income is reported by respondents who joined CVRP in 1988 and 1990. Their income increased by about 113-114 percent. The lowest (42%) increase is reported by those who joined CVRP in 1985, followed by those who joined in 1986 (69%). The relatively small difference in income of these adoptors may be due to the relatively high level of their income at the time they joined CVRP. Those who joined in 1985 and 1986 reported an income level of about ₦7,000 before joining CVRP, while the income of the other respondents before CVRP ranged only from ₦2,900 to ₦6,000. No distinct pattern of income distribution is observed following this analysis. The rate of changes in income cannot be associated with the timing of interventions introduced. It may be recalled that income generating reforestation activities were introduced by CVRP-SF in 1984-85, CTUP was operational from 1986 to mid-1988, and agroforestry farm developments were introduced in 1988-89. However, the greatest income increases do not correspond to these time periods when benefits would have been realized.

These results indicate that in general, the length of time of being cooperators is not a critical variable that could explain changes in income.

Cooperators reported a much higher increase in income compared to non-cooperators. The greatest increase (215%) in income is reported by those who joined CVRP in 1987 while the smallest increase (35%) is noted for those who joined in 1985. However, even if the increase in income of the 1985 joiners is small, their income (₦10,414) is still higher than those who joined in 1984, 1990 and 1991 (₦6,000 to ₦7,000).

For non-cooperators, the highest increase (460 percent) in income is reported by those who joined in 1991. This is surprising considering that most of the CVRP activities were already winding up at this point in time. On the other hand, being non-cooperators, the increase in their income may have been derived from other sources that are not directly related to CVRP activities.

Results of the comparison of disaggregated income of cooperators and non-cooperators indicate that there is a positive relationship between income and participation in CVRP introduced activities. It is, however, apparent, that the critical variable is not the length of time but the timing of participation in CVRP-introduced interventions. The cooperators who joined in 1987 were probably able to take full advantage of CTUP operations, while those who joined in 1990 and 1991 did not benefit much from either employment or CTUP because these activities were either winding up or fully stopped at that time.



**Table 12**  
**AVERAGE INCOME OF RESPONDENTS ACCORDING TO YEAR**  
**THEY JOINED/STARTED PARTICIPATING IN CVRP ACTIVITIES, 1992**

Year joined/ participated in CVRP	AVERAGE INCOME					
	BEFORE			AFTER		
	Coop.	Non-Coop.	Total	Coop.	Non-Coop.	Total
1984	3,250	2,850	2,983	6,000	4,625	5,083
1985	7,729	7,762	7,740	10,414	12,062	10,963
1986	9,680	5,245	7,803	17,740	6,991	13,192
1987	3,738	9,656	5,993	11,767	10,769	11,388
1988	4,793	6,187	5,300	12,764	8,850	11,341
1989	6,440	3,333	5,275	14,186	5,833	11,054
1990	2,500	3,000	2,833	7,100	5,500	6,033
1991	4,540	2,500	4,200	7,232	14,000	8,360
Average	6,659	6,165	6,462	11,905	9,040	10,767

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### 3. Year Land was Acquired

The respondents were grouped according to the year they gained possession of their land to determine if this is a factor that can explain differences in income. The sub-hypothesis is that the longer the farmers have their farms in their possession, the more developed they are and the more responsive they are to any on-farm improvement innovations that may be introduced. Moreover, the more developed their farms are, the farmers would have more time to devote to other income generating activities that may be introduced by CVRP. Both of these conditions are expected to redound to higher income.

It was found out that more than half (64%) of the respondents gained possession of the lands they are occupying, before 1984 (Table 13). It was also observed that transfer of lands and opening of new farms continue to date. About 12 percent of the respondents reportedly gained possession of their lands only from 1989 to date.

Higher income was generally reported after CVRP intervention, except for the non-cooperators who obtained their lands in 1991 and 1992 (Table 14). For those who acquired their lands from 1984 to present, the percentage increase in income after CVRP intervention was higher for cooperators (73%) than for non-cooperators (42%). Among the cooperators, the greatest increase in income (272%) was reported by those who acquired their lands in 1991-92 while the lowest increase (29%) was reported by those who acquired their lands in 1985-86. Among the non-cooperators, on the other hand, the greatest increase in income (184%) was reported by those who acquired their lands in 1987-88, while the lowest increase (43%) was reported by those whose lands were acquired in 1985-86.

These trends in income changes for both the cooperators and non-cooperators indicate that there are other underlying variables, aside from length of time farmers have the lands in their possession, that may have influenced income changes. For one, the state of development of the farm may not be directly related to length of possession. The farms that were more recently acquired may have been more developed than those acquired much earlier and this could be the reason why there are takers/buyers of those lands.

### 4. Tenurial Status

The tenurial status of the respondents reflect the complexity of landownership claims. Farmers in the area are classified as claimant cultivator, claimant non-cultivator, share tenant, leaseholder, hired farm worker, CSC holder, amortizing owner, and others (Table 15).

Thirty eight-percent (44 cooperators and 20 non-cooperators) of all respondents are claimant cultivators. Share tenants, ISF (CSC holders) and claimant non-cultivators comprise 19, 10 and 7 percent, respectively, of all respondents.

**Table 13**  
**DISTRIBUTION OF RESPONDENTS BY YEAR OF ACTUAL LAND ACQUISITION**  
**CVRP, 1992**

Year of Actual Land Acquisition	Cooperator		Non-Cooperator		Total	
	n	%	n	%	n	%
Before 1984	59	67	35	60	94	64
1984 - 86	9	10	10	17	19	13
1987 - 88	5	6	5	9	10	7
1989 - 90	8	9	2	3	10	7
1991 to present	4	4	3	5	7	5
No year	3	3	3	5	6	4
<b>Total</b>	<b>88</b>	<b>99</b>	<b>58</b>	<b>99</b>	<b>146</b>	<b>100</b>

**Table 14**  
**AVERAGE INCOME OF COOPERATORS AND NON-COOPERATORS BY ACTUAL YEAR**  
**OF LAND ACQUISITION, BEFORE AND AFTER CVRP, 1992**

Year of Land Acquisition	Cooperator		Non-Cooperator	
	Before	After	Before	After
No. of Respondents	87		59	
Before 1984	7,382	12,771	7,401	10,485
1985 1986	5,303	6,855	6,688	9,570
1987 1988	5,800	9,680	1,880	5,340
1989 1990	5,137	12,062	3,625	6,250
1991 present	4,675	17,420	2,667	2,000
No response	4,633	5,970	2,333	5,500
<b>Average</b>	<b>6,659</b>	<b>11,905</b>	<b>6,165</b>	<b>9,040</b>

Source: 1992 CVRP Social Forestry Survey

Hypothesis Tests for Means: (Mean difference is 0 or greater than 0)

1. Difference of Income before 1984 and after 1990. Reject the Hypothesis: The income before 1992 is significantly greater than the income before 1984 at 50% tests of significance.
2. Difference of Income :
  - a. Before 1987 and after 1987
  - b. Before 1986 and after 1989
  - c. 1986 1987 and after 1989
  - d. 1984 and after 1990
  - e. 1985 1986 and after 1989
  - f. 1984 to 1985 and 1986 to 1987

Accept the Hypothesis from a to f: The income difference between the groups is observed to be not statistically significant.

**Table 15**  
**TENURIAL STATUS OF RESPONDENTS, COOPERATORS AND NON-COOPERATORS**  
**CVRP, 1992**

Tenure	Cooperator		Non-Cooperator		Total	
	No.	%	No.	%	No.	%
Number of Respondents	97		70		167	
Claimant cultivator	44	45	20	28	64	38
Claimant non-cultivator	2	2	9	13	11	7
Share Tenant	24	25	8	11	32	19
Leaseholder	2	2	2	3	4	2
ISF (CSC holder)	6	6	10	14	16	10
Amortizing owner	2	2	2	3	4	2
Others	17	18	19	28	36	22

**Table 16**  
**AVERAGE INCOME BY TENURIAL STATUS, BEFORE AND AFTER CVRP**  
**COOPERATORS AND NON-COOPERATORS, 1992**

Tenure	Cooperator		Non-Cooperator		Total	
	before	after	before	after	before	after
1	5,805	9,361	3,000	8,191	5,521	8,922
2	6,333	8,333	6,750	14,750	6,500	10,900
3	4,984	4,776	1,875	5,250	4,253	4,888
4	-	-	50,000	70,000	50,000	70,000
6	7,550	18,575	3,750	3,233	5,900	12,000
7	16,000	11,680	5,150	3,700	8,767	41,400
8	3,469	10,204	7,022	8,807	5,014	9,597
1,2	6,600	4,667	-	-	6,600	4,667
1,3	5,740	7,733	10,000	15,000	6,805	9,550
1,4	-	-	5,000	10,000	5,000	10,000
1,6	23,000	29,833	3,100	5,125	11,629	15,714
1,8	-	-	12,000	5,600	12,000	5,600
3,6	1,500	2,000	-	-	1,500	2,000
4,7	-	-	16,800	21,000	16,800	21,000
4,8	-	-	6,500	7,000	6,500	7,000
1,3,4	8,200	55,680	-	-	8,200	55,680
1,3,6	-	-	5,000	8,000	5,000	8,000
Average	6,659	11,905	6,165	9,041	6,463	10,767

Codes for tenure: 1 - Claimant cultivator  
 2 - Claimant non-cultivator  
 3 - Share tenant  
 4 - Leaseholder  
 5 - Hired farm worker  
 6 - ISF (CSC holder)  
 7 - Amortizing owner  
 8 - Others

In general, the income of all respondents across tenure types increase after CVRP intervention, except for some who fall within the mixed tenured group (i.e., claimant cultivators/non-cultivators, and claimant cultivators/others).

Among the cooperators, similar increases in income after CVRP intervention were reported except for share tenants, amortizing owners, and the claimant cultivator/non-cultivator. The same trend is observed for all non-cooperators except for ISF (CSC holders), amortizing owners, and claimant cultivators/"others" (Table 16).

Among cooperators, the highest percentage increase in income (574 %) is observed for those with triple tenure (i.e., cultivator claimants/share tenant/and leaseholder). For non-cooperators, however, the highest percentage increase in income is reported by the share tenants (182%), although their average income (₱5,250) is still much lower than the average (₱9,041).

It is notable that among the single-tenured cooperators, the CSC holders reported the highest income level (₱18,575), followed by the amortizing owners (₱11,680). These results corroborate the earlier results of other studies showing a positive relationship between tenurial security and productivity that can be translated into higher incomes. However, tenurial security alone is not a guarantee that productivity and income will increase. The CSC holders and amortizing owners among the non-cooperators reported incomes much lower than the share-tenants. Adoption of productivity enhancing practices is necessary to improve farm productivity and increase income.

To further test the variables that may explain the changes in income of cooperators and non-cooperators after CVRP, a regression analysis was conducted (Table 16a). The dependent variables identified were: actual year of being a CVRP member; income before CVRP; area of land being claimed; area of land presently planted; and the type of intervention adopted.

The regression coefficients indicate that after making statistical adjustments for other variables in the equation, the income of cooperators was found to be higher than the income of non-cooperators by ₱3,489. On the other hand, more intensive utilization of lands would also increase income. One unit of increase in land area planted can cause income to increase by about ₱700.

It was also found that the variables that significantly affect income are: active participation in CBRM; number of years respondents have been participating in CBRM, area of farms presently cultivated, and adoption of CBRM interventions. These are significant at 20 percent level of significance.

Further analysis was conducted to determine how much of the variation in income is explained by the identified variables. Table 16b presents the analysis of variance and the F and R square statistics of the multiple regression with income as the dependent variable. The value of R square indicates that only 46.97 percent of the variance in income was explained by the

**Table 16a**  
**MULTIPLE REGRESSION COEFFICIENT, STANDARD ERRORS**  
**AND SIGNIFICANCE OF THE COEFFICIENTS**

Variable	B	SEB	T
Member	3489.92	3193.58	1.093 *
Year	3.49	3.36	1.036 *
Income-b	1.29	0.17	7.645
Area-c	212.45	442.51	0.480
Area-p	699.68	820.75	0.852 *
Intervention	72.4	53.32	1.358 *

\* significant 20% tests of significance

**Table 16b**  
**ANALYSIS OF VARIANCE AND STATISTICS FOR THE**  
**REGRESSION EQUATION**

Source	DF	Sum of Squares	Mean Square
Regression	6	20038086328.02	3339681054.67
Residual	93	22620681336.73	243233132.65
Total	99	42658767664.75	

F = 13.73  
Multiple R = 0.6854  
R Square = 0.4697  
Standard Error = 15595.93

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independent variables under consideration. However, the relationship was significant as indicated by the F statistic with a value of 13.73. The linear model was not expected to produce the best fit since there were more unaccounted variables which may be directly or indirectly related to income, but which were not included due to unavailability of accurate data. Variables that are related to production, when included in the equation can help improve the value of R square.

#### F. *Perception of Socioeconomic Status Before and After CVRP*

When made to assess how much should the income level be for one to be considered poor or not poor, the respondents indicated that before CVRP, someone who was earning about ₦3,200 to ₦5,000 was poor (Table 17). To be considered not poor, one has to earn about ₦14,000 to ₦17,000 per year. In 1992, they said, those earning about ₦8,000 to ₦10,000 are still poor while those earning about ₦25,000 can be considered not poor. The perceived "poverty line" is higher among the cooperators compared to the non-cooperators. On the other hand, the estimated income level for one to be considered not poor is slightly lower among cooperators than non-cooperators.

In 1984 (before CVRP), about 71 percent of the cooperators and 51 percent of the non-cooperators considered themselves poor. In 1992 (after CVRP), the proportion of those who considered themselves no longer poor, both cooperators and non-cooperators increased. The proportion of those who think that they belong to the "not poor" group is higher among non-cooperators compared to the cooperators. The change from the poor to not poor status is 11 percent among non-cooperators compared to only 6 percent among the cooperators. This observation may be attributed to the difference in the perceived "poverty line" by the two groups of respondents.

#### G. *Soil Conservation Practices Employed*

Almost all of the respondents said that they are now practicing soil conservation measures (Table 18). Where before only as much as 43 percent of the respondents were using conservation practices, almost all of the respondents now adopt at least two types of conservation strategy. Such practices include terracing, contour farming, rockwalling, planting of hedgerows, construction of "A" dams, composting, green manuring and fallowing. Understandably, the proportion of cooperators adopting conservation practices is higher than that of non-cooperators. The common practices being adopted are terracing, contour farming, hedgerows and rockwalling.

#### H. *Assessment of CVRP*

Most of the respondents (94%) reported they are satisfied with CVRP (Table 19). Only 5 percent claimed to be dissatisfied with the project. Expectedly, the proportion of those who expressed satisfaction with CVRP is relatively higher among the cooperators (97%) than among the non-cooperators (90%).

**Table 17**  
**PERCEPTION OF THE SOCIOECONOMIC STATUS BEFORE AND AFTER CVRP**  
**AND ESTIMATED INCOME (Y) LEVELS (PESOS) OF POVERTY GROUPS**

Perceived Socio- Economic Status	Cooperator		Perceived Y level	Non-Cooperator		Perceived Y level
	No.	%		No.	%	
<b>Before CVRP (1984)</b>						
Poor	69	71	5,248	36	51	3,287
Not poor	25	26	14,840	33	47	16,939
<b>After CVRP (1992)</b>						
Poor	64	66	9,622	28	40	7,743
Not poor	31	32	25,806	41	58	25,878

Source: 1992 CVRP Social Forestry Survey

**Table 18**  
**SOIL CONSERVATION PRACTICES EMPLOYED BEFORE AND AFTER CVRP**  
**COOPERATORS AND NON-COOPERATORS, 1992**

Practices	Cooperator				Non-Cooperator				Total			
	Before		After		Before		After		Before		After	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Terracing	9	9	95	98	6	8	64	91	15	9	162	97
Contour Farming	3	3	91	94	8	11	59	84	11	7	153	92
Hedge Rows	4	4	87	90	8	11	54	77	12	7	144	86
Rock Walls	12	12	74	76	9	13	44	63	21	13	121	72
Construction of "A" Dams	10	10	53	55	6	9	33	47	16	10	89	53
Composting	2	2	7	7	4	6	10	14	6	4	18	11
Green Manuring	1	1	4	4	3	5	7	10	4	2	11	7
Fallowing	-	-	3	3	2	3	2	3	2	1	5	3

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**Table 19**  
**SUMMARY OF RESPONDENTS REACTION TO/ASSESSMENT OF CVRP**

Reaction/Assessment	Cooperators		Non-Cooperators		Total	
	No.	%	No.	%	No.	%
<b>A. Reaction to program</b>	(n=97)		(n=70)		(n=167)	
<b>Satisfied</b>	94	97	63	90	157	94
<b>B. Reasons for satisfaction</b>	(n=94)		(n=63)		(n=167)	
<b>Provided income/employment</b>	39	42	34	56	73	46
<b>Introduced new/conservation technology</b>	42	45	34	54	73	46
<b>C. Strengths</b>	(n=97)		(n=70)		(n=167)	
<b>Effective in providing livelihood sources</b>	26	37	45	46	71	42
<b>Taught people new conservation practices</b>	34	49	51	52	85	51
<b>D. Weaknesses</b>	(n=97)		(n=70)		(n=167)	
<b>Problems in management</b>	13	16	18	19	31	18

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Of those who expressed satisfaction with the program, the foremost reason cited is the fact that CVRP introduced livelihood projects and employment opportunities in the area from which villagers obtained additional income. Other reasons cited were: (a) CVRP provided free seedlings and introduced new technologies which eventually led to improvement in the forest resource base; (b) CVRP provided them some hope (5%); and (c) they think that the components introduced and the management of the program were good (3%). Those who expressed dissatisfaction with the program, particularly the non-cooperators, cited improper management as the reason.

### 1. Perceived Strengths and Weaknesses of the Program

In the perception of the respondents, the three basic strengths of CVRP lie in its environmental, economic and infrastructural assistance to the villages covered by the project (Table 20). The most common cited strength of the program concerns its provision of free seedlings and introduction of new production and conservation technologies (51%); provision of employment and livelihood opportunities and, therefore, income generation in the sample upland communities (42%); and construction and widening of roads/trails that improved their linkage with other sitios/barangays and the town proper (17%). The perceived weaknesses of the program, aside from improper management, are delayed salaries, unfulfilled promises and inadequate assistance.

### 2. Contributions and Beneficial Effects of CVRP

The respondents perceive that the greatest contributions of CVRP to themselves and their families are employment and the new farming techniques that they learned through the program. Almost all (95%) of the respondents noted the beneficial effects of CVRP (Table 21). The recognized beneficial effects are increased income due to increased production and employment; resource conservation; and increased knowledge on improved farming practices and resource conservation.

### 3. Effect of CVRP on Forest Destruction

More than two-thirds (69%) of the respondents noted a reduction in the rate of forest destruction as a result of CVRP/CBRM (Table 22). The perception of reduction in forest destruction is higher among non-cooperators than among cooperators. This could be indicative of the greater desire among CVRP cooperators to further reduce the rate of destruction and that forest destruction is still going on at an alarming rate.

Knowledge of reforestation technology and presence of forest guards were cited as the major reasons for the decrease in forest destruction (Table 22a). On the other hand, destruction by kaingineros was cited as the major cause of increase in forest destruction. Another major reason, cited mostly by the cooperators, was the alleged connivance of CVRP in illegal logging activities. Other reasons are lack of proper supervision, security people and maintenance.

**Table 20  
PERCEIVED STRENGTHS AND WEAKNESSES  
OF THE CVRP-SF PROGRAM**

Strengths/Weaknesses	Cooperators		Non-Cooperators		Total	
	f	%	f	%	f	%
<b>1. Strengths *</b>						
Employment/Livelihood projects/ additional income	26	37	45	46	71	42
Introduction of new technologies/ free seedlings	34	49	51	52	85	51
<b>2. Weaknesses *</b>						
Improper management	13	16	18	19	31	18
Delayed salaries	3	4	15	15	18	11
Unfulfilled promises	2	3	10	10	12	7
Inadequate assistance	3	4	1	1	4	2

\* Multiple responses

**Table 21  
BENEFICIAL EFFECTS OF CVRP  
COOPERATORS AND NON-COOPERATORS, 1992**

Effects	Cooperators		Non-Cooperators		Total	
	f	%	f	%	f	%
1	39	40	31	44	70	42
2	14	14	14	20	29	17
3	5	5	2	3	7	4
12	29	30	9	13	38	23
13	5	5	5	7	10	6
23	2	2	-	2	3	2
123		-	1	1	1	1
No answer	3	3	8	11	9	5
<b>Total</b>	<b>97</b>	<b>100</b>	<b>70</b>	<b>100</b>	<b>167</b>	<b>100</b>

**Beneficial Effects:**

- 1 - increase income/production/employment
- 2 - resource conservation
- 3 - increase knowledge/training

**Table 22  
DECREASE IN FOREST DESTRUCTION  
COOPERATORS AND NON-COOPERATORS**

	Cooperators		Non-Cooperators		Total	
	n	%	n	%	n	%
Yes	59	61	56	80	115	69
No	32	33	11	16	43	26
No Answer	6	6	3	4	9	5
<b>Total</b>	<b>97</b>	<b>100</b>	<b>70</b>	<b>100</b>	<b>167</b>	<b>100</b>

**Table 22a  
REASONS FOR INCREASE/DECREASE IN FOREST DESTRUCTION  
COOPERATORS AND NON-COOPERATORS**

Reasons	Cooperators		Non-Cooperators		Total	
	n	%	n	%	n	%
<b>Decrease</b>						
Technology on reforestation & farm helps	30	51	23	41	53	46
New trees are added/ presence of forest guards	27	46	28	50	55	48
Proper supervision and monitoring	—	—	3	5	3	3
1 & 4	2	3	1	2	3	3
Cooperation among farmer	—	—	1	2	1	1
<b>Sub-Total</b>	<b>59</b>		<b>56</b>		<b>115</b>	
<b>Increase</b>						
Destruction due to "kaingineros"	16	50	6	55	22	51
CVRP connection with illegal logging	11	34	2	18	13	30
Lack of proper supervision	2	6	3	27	5	12
Lack of security and maintenance	3	9	—	—	3	7
<b>Sub-Total</b>	<b>32</b>		<b>11</b>		<b>43</b>	
No Answer	6	6	3	4	9	5
<b>Total</b>	<b>97</b>	<b>100</b>	<b>70</b>	<b>100</b>	<b>167</b>	<b>100</b>

#### 4. Sustainability of CBRM

The respondents believe that the communities and the FOSAs are not strong enough to sustain CBRM efforts. While they expressed willingness and commitment to pursue the CBRM activities that have been started, they expressed a strong need for administrative and leadership support. Their need for technical support is no longer strong having already acquired "sufficient" knowledge on the techniques for soil and forest conservation and resource management. They cited their perceived inability to stop illegal entry and illegal logging activities particularly if there are local political elites involved.

This perception may be supported by the statistics on participation compiled by the Regional Project Office (RPO). Data show that in almost all activities, FOSAs and individual members are mostly involved only in implementation. Despite the efforts of SMUs to encourage them to take active involvement in planning, the involvement of many of them is still confined to implementation.

Attendance in FOSA meetings is generally very good ranging from 70 percent in Atotes to 99 percent in Nabhang. However, the frequency of attendance in meetings is quite low. Reports indicate that most of the farmers attended meetings only twice. Involvement in agroforestry farm development is also good and so with reforestation-related activities. However, there is no assurance that the high rate (90%) of participation in reforestation will be maintained if there are no more monetary incentives that can be provided to them.

The low involvement (8%) in infrastructure maintenance activities is also not a good sign that CBRM can be sustained. Most of the farmers participated in this activity only once and only in the implementation aspect of it.

It is only the agroforestry farm development activity that has the greatest probability of being sustained considering that participation and involvement of farmers in all aspects (planning, implementation and management) is consistently high. The assurance of increasing production and gaining additional income from such activity apparently serves as incentive for farmers to actively pursue agroforestry farm development.

##### I. *Recommendations on CVRP*

Almost all of the respondents agree that CVRP should be continued (Table 23). More than half (55%) said that CVRP and community organizing activities should be pursued together with the introduction of new technologies. About 28 percent favor the continuation of CVRP because of the employment and improvement in the livelihood that go with it, while about 16 percent reason that continuation of CVRP is based on the ground that it helps develop the barangays.

**Table 23**  
**RECOMMENDATIONS ON CVRP**  
**BY COOPERATORS AND NON-COOPERATORS, 1992**

Recommendations	Cooperators		Non-Cooperators		Total	
	n	%	n	%	n	%
Number of Respondents	97		70		167	
			(multiple answers)			
1. Continue the program of CVRP and FOSA organization and hoping that other technologies will be applied to them.	47	48	31	44	92	55
2. Continue the program of CVRP so that there will be employment/ improvement of livelihood.	25	26	20	29	46	28
3. Continue CVRP because it helps develop the barangay	18	19	8	11	27	16
4. Add more trees to regain forest	3	3	6	9	9	5
5. Continue monitor CVRP and FOSA	4	4	4	6	8	5
6. CVRP should not encourage CTUP w/c promote more cutting of trees	2	2	2	3	4	2
7. Others	6	6	4	6	10	6

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12.94

## V. IMPACT OF CVRP ON THE NATURAL RESOURCE BASE

CVRP-I introduced four types of interventions in the Social Forestry sites, namely, reforestation, agroforestry farm development, community timber utilization and assisted natural regeneration (ANR). Approaches adopted in reforestation were straight reforestation undertaken via Community-Based Contract Reforestation (CBCR) and Community-Based Contract Nurserying (CBCN). ANR was introduced in 1989 to hasten reforestation activities.

The impact of the project is assessed by focusing on the following: (a) changes in the forest resources condition; (b) the suitability and long-term effect of the various technology interventions introduced by the project and adopted by the farmers; and (c) the impact to the natural ecosystem upon which the different resource management utilization activities were conducted. Due to time constraints, however, quantification of the project's effects on the environment (e.g., soil erosion, water yield) and on the natural resource base (e.g., soil fertility, density of forest cover) was not done. Most of the information used in this assessment were gathered from interviews conducted with key respondents/informants in 11 of the 27 Forest Occupants Steward Associations (FOSAs) formed.

At the onset of the project in 1984 land uses in the area consisted of virgin (746 hectares) and logged-over forests (8,080 hectares), open/cogonal and brushland (7,768 hectares) and active and cultivated kaingins (769 hectares) (CVRP-I Mid-Project Review, 1986). By the end of May 1992, CVRP-SF has, as reported, reforested a total land area of 4,306.6 hectares; maintained the 3,370.5 hectares of forest land; developed 874 hectares of agroforestry farms; and issued 932 certificates of stewardship contracts (CSCs) to the farmers (CVRPO, 1992) (Table 24).

While the upland farmers were initially enticed into doing only reforestation because of the monetary rewards they get, perceptions of the FOSA respondents on CBCR indicate that the upland farmers have already appreciated the value of planting trees toward the end of the project. They have through the years developed among themselves a desire to conserve the forest and protect the soil to sustain the productivity of their farms. This is an indication that the project has succeeded in impressing upon them the significance of the forests in maintaining a desirable ecological balance.

One observation however is that, in general, the growth of some of the tree species planted on the reforestation sites is not very good (Table 24a). *Gmelina arborea*, for instance, does not suit most of the areas where it is planted. While the species can adopt to practically all rainfall conditions, it is a particularly demanding species as far as soil is concerned. It requires good drainage and a high base status and thrives best up to a maximum elevation of 600 meters above sea level. On difficult sites, as in some portions of the project areas, the tree has been observed to be short-lived or does not reach its maximum growth potential.

The same is true with *Swietenia macrophylla*, a relatively fast-growing species. It is a poor choice for short rotation crops in adverse conditions such as those existing in the project site. Considering these observations, one can infer that more care should have been employed

**Table 24**  
**SOCIAL FORESTRY COMPONENT ACCOMPLISHMENTS**

	Accomplishment 1984-1992 (May)	5-Year Target	% Accom- plishment
* Barangays Covered (No.)	12.0	12.0	100.0
* FOSAs Organized (No.)	27.0	26.0	103.8
* Client-Beneficiaries (HH)	1,421.0	1,200.0	118.4
Reforestation (has.)	4,306.6	5,050.0	85.3
Straight reforestation (has.)	1,585.0	1,759.0	90.1
Assisted natural regeneration (ANR)	1,354.6	400.0	338.6
Agroreforestation	1,367.0	2,891.0	47.3
Reforestation Maintenance	3,370.5	3,550.0	94.9
Resource Access Instruments (No.)	950.0	1,222.0	77.7
CSC issued (No.)	932.0	1,174.0	79.4
Wood lot lease (No.)		27.0	NA
Timber utilization permits (No.)	18.0	21.0	85.7
** Agroforestry farm development (has.)	874.0	700.0	124.8

\* Barangays covered and FOSAs organized are maintained

\*\* 50.8 hectares of solid plantation of forest/fruit trees are re-categorized under agroforestation.

Source: CVRPO. Status Report of Physical Accomplishments as of May 1992.



**Table 24a**  
**SPECIES USED FOR REFORESTATION, NEGROS ORIENTAL**  
**CVRP-SF, 1992**

Name of FOSA Location	Species Planted	Age/Date Planted	Area (has.)	Spacing (m)	Estimated % Survival	Growth Pattern Height Diameter	Remarks
MANTA-FOSA Mantahaw, Nalundan	G. arborea	5/1987	15.0	2 x 2	> 60%		
	A. maguim	5/1987	15.0	2 x 2			
SABA-FOSA Banban, Ayungon	G. arborea	3/1989	5.0	2 x 3	> 40%		
	S. macrophylla (Mahogany)	3/1989	5.0	2 x 3			
UNITED-FOSA Mabato, Ayungon	G. arborea	5/1987	5.0	2 x 3			All seedlings planted died in 1990 due to extreme dry season
MAMA-FOSA Mabato, Ayungon	G. arborea	6/1986	20.0	2 x 2	poor		Extensive fire damage
	S. macrophylla	6/1986	10.0	2 x 2			
MALICON-FOSA Ilaya, Banban	G. arborea	1/1991	9.0	2 x 3	60%		
BEMAPAHAMA-FOSA Jandalamanon	G. arborea Eucalyptus camaldutensis (mixed plantings)	2/1990	5.0	2 x 3	60%		
MALAMA-FOSA Maabhang, Ayungon	G. arborea S. macrophylla	2/1990 2/1990	4.0	2 x 3			Whole planted area destroyed by fire in March 1992
LABA-ABU FOSA Lamigan, Ayungon	G. arborea	1985/87	7.0	2 x 3	70%		
MABABANG-FOSA Makalob, Banban, Ayungon	G. arborea	1985/87	29.0	2 x 3	80%		
	A. maguim	1990	5.0				
SA-FOSA Karul-an, Ayungon	G. arborea S. macrophylla (interplanted)	3/1987	12.0	2 x 3	80%		
ASFFA Atotes, Bindoy	G. arborea	4/1988	31.6	2 x 3	70%		
	Eucalyptus	2/1990	7.5				

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in the choice of appropriate species and more information should have been provided to farmers in deciding what species to use.

The Community-Based Contract Nurserying is a good strategy that helped achieve both the social and technical objectives of the program. Aside from being a focal point of organization, the nurseries provided learning laboratories which enhanced farmers' ability in nursery seedling culture. Furthermore, forest nursery operations enabled the organizations to make use of quality seedling stocks for field planting.

However, a dependence on inorganic fertilizer was noted in most of the forest nurseries visited. Soil-ameliorating practices which could reduce dependence on inorganic fertilizers seem to be wanting in the different nurseries established. An exemption, however, is the UNITED FOSA which makes use of organic fertilizer alone and MABABANG FOSA which combined organic with inorganic fertilizers.

In the maintenance of forest plantations, clear brushing is used by some of the FOSAs, while others adopted the strip brushing approach. Clear brushing is recommended in areas which are considered very prone to fire. Complete removal of vegetation meanwhile is a very good control measure to prevent fire. This is not, however, recommended in steep slopes as this practice may help cause soil erosion.

The various technical aspects of reforestation were satisfactorily undertaken by the farmer participants. This is a reflection of the extent to which the project was able to transfer technical information to the farmers. The institution of ANR, for example, made possible the protection and rehabilitation of extensive areas than what could have been achieved with straight reforestation alone. ANR involves less intensive operations and the activities required are quite simple, the very reason many of the farmers prefer ANR over straight reforestation.

Other factors which had largely contributed to the increase in forest cover within the CVRP-I SF sites include: protection of the areas covered by ANR from kaingin making and illegal logging, the enhancement of the growth of the liberated broad-leafed species (even if some do not have any commercial value), and the augmentation plantings done in the area.

Agroforestry farm development is another integral part of SF program that farmers have adopted. The introduction of agroforestry techniques provided farmers the opportunity to cultivate farm crops other than what they traditionally raise. Aside from incorporating fruit trees and other perennials in their farms, farmers have learned to use napier, *Flemengia*, kakauate and ipil-ipil as alley crops.

The introduction of perennials, mostly in the form of fruit tree crops, not only assures farmers of long-term productivity but also ensures stability and sustainability of farming operations. Tree crops, however, have not yet been widely incorporated in the farmers' farms with the exception of the farms in LABA-ABU FOSA. Furthermore, farmers have not yet

recognized the value of hedgerows and the importance of choosing the better hedgerow species. Farmers in the area do not even consider these as farm crops.

The occurrence of pests and diseases before and after adoption of the various interventions may indicate the necessity to come up with the right crop combinations other than those that are currently being used. Otherwise, the incidence of pests and diseases can seriously undermine the stability of the farming systems currently being followed in the area.

The original design to provide farmers access to resources through forest stand improvement (FSI) was consistent with sustainable management of logged-over forests through appropriate silvicultural prescriptions. This design, however, was changed into a basically utilization-oriented activity through the issuance of the Community Timber Utilization Permit (CTUP) by DENR.

CTUP was, however, canceled in 1988 after two years of its enforcement when three of the 12 FOSAs reportedly abused its use by harvesting not only dead standing/fallen trees. They were reported to have started cutting living trees as well. This proved that great risk is involved when the economic orientation of resource use was encouraged even before proper understanding of the whole concept of resource utilization and conservation. Utilization should not be made a pump-priming activity for people-oriented strategies like CBRM because without proper understanding of the conservation aspect, utilization permits can really be abused.

Culled trees left by previous logging operations have grown as a result of their liberation from other competing vegetation. The incremental growth attained by healthy residuals in the second growth forests has increased forest biomass. The enhancement of growth of the liberated broad-leafed species and the augmentation plantings conducted through ANR have generally increased the area with forest cover.

Another major agent of destruction in reforestation areas is fire. In the last two years, vast areas of thriving trees have been destroyed by fire. Measures to deal with burning of farms/forests outside the jurisdiction of the FOSAs should thus be devised, especially with the advent of summer.

Agroforestry farm development further enhanced the resource base with the advent of crop diversification and adoption of tree-based farming systems and improved cultural management practices. These are initial attempts at evolving a productive, stable and sustainable upland farming system.

The intangible environmental benefits of a preserved natural forest ecosystem cannot be quantified at this point, but there are obvious signs of improvement in stream flow (quality and volume) and reduction of soil erosion. Farmers, however, observed the beneficial effects of trees as windbreaks and they reported increases in farm income which may be a reflection of the increase in farm productivity.

The awareness among farmers of the importance of natural resource conservation and the value of forests and forest resources that was acquired through CVRP is a project benefit that will yield substantial long-term "downstream effects."

In general, CVRP-SF contributed greatly to the enhancement of the natural resource base in the project site. This contributed to the preservation of the remaining virgin forest; the protection of brushlands and logged-over areas from further kaingin making and illegal logging; the increase in area with adequate forest cover; and the adoption of more conservation upland farming methods.

## **VI. BENEFIT-COST ANALYSIS OF CVRP'S SOCIAL FORESTRY COMPONENT**

The major economic benefits of social forestry are in the form of incremental production and income from timber harvest and agroforestry and the expected increase in crop production due to agroforestry farm development. The incremental benefits of the program are assumed to be the differences between the total value of the products (i.e., agricultural crops, timber, etc.) sold and the actual cost of the project. Without the project, however, the area would just be land undergoing shifting cultivation or the forest could have been totally destroyed.

Aside from the above-mentioned benefits, the other direct and indirect benefits that could be gained from this project include: (a) manpower development (e.g., seminars, training, etc.); (b) institutional strengthening; (c) infrastructure; (d) security of tenure; and (e) environmental impacts (e.g., control of soil erosion, landslide, and flooding). However, these benefits are not accurately, if at all, quantifiable and are therefore not included in this study's benefit-cost analysis (BCA).

Table 25 shows the benefit-cost analysis of CVRP social forestry component at the project level, using 1992 prices. The benefits were divided in reforestation three sub-components, namely: straight reforestation, agroforestry, and assisted natural regeneration (ANR). Given the set of assumptions made (see Table 25a), the annual estimated income is in the range of 0 to 73.39 million pesos and 0 to 107.21 million pesos for straight reforestation and ANR, respectively. Fluctuations in benefits are due to the long gestation period and cyclical nature of harvest of trees. The immediate benefits from Gmelina, for example, would come from fuelwood harvests in year 5. The next thinning takes place after four years and sawlogs could only be harvested after 15 years. Another example is mahogany, where small poles and sawlogs could be harvested after 10 years and 25 years, respectively.

In agroforestry, the annual estimated income ranges from 17.13 million to 51.52 million pesos. Increased production could be attributed to CVRP's assistance (e.g., provision of production inputs, training on farm development, etc.)

The net present value (NPV) of the project after 25 years (12 percent discount rate) is 270.52 million pesos with a benefit-cost ratio (BCR) of 6.94. At a higher discount rate, say 24 percent, the NPV was calculated at 94 million pesos with BCR equal to 4.38. On a per hectare

**Table 25**  
**BENEFIT-COST ANALYSIS OF CVRP SOCIAL FORESTRY COMPONENT (PROJECT LEVEL)**  
**1992 PRICES, IN THOUSAND PESOS**

Particular	Y					E					A					R									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>BENEFIT</b>																									
A. Straight Reforestation	0	0	0	0	1,831	555	0	1,684	0	11,893	0	19,138	0	0	73,369	0	0	2,951	0	12,758	0	0	1,684	17,474	55,636
B. Agroforestry	17,131	12,236	26,648	27,192	27,736	29,095	30,183	33,718	37,579	43,044	45,655	48,265	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528
C. Assisted Natural Regeneration	0	0	0	0	0	0	0	0	0	2,978	0	0	0	0	0	0	0	0	0	107,211	0	0	0	0	0
<b>TOTAL BENEFIT</b>	<b>17,131</b>	<b>12,236</b>	<b>26,648</b>	<b>27,192</b>	<b>29,566</b>	<b>29,650</b>	<b>30,183</b>	<b>35,382</b>	<b>37,579</b>	<b>57,916</b>	<b>45,655</b>	<b>67,403</b>	<b>51,528</b>	<b>51,528</b>	<b>124,916</b>	<b>51,528</b>	<b>51,528</b>	<b>54,479</b>	<b>51,528</b>	<b>171,497</b>	<b>51,528</b>	<b>51,528</b>	<b>53,192</b>	<b>69,002</b>	<b>107,166</b>
<b>COST</b>																									
A. Personal Services	247	317	4,311	4,038	5,105	5,827	2,463	2,334	934																
B. Maintenance & Operating Expenses		1,231	2,638	4,483	3,901	1,675	1,401	2,594	234																
C. Capital Outlay	3,407	1,319	5,041	10,311	6,661	5,306	5,359	31																	
<b>TOTAL COST</b>	<b>247</b>	<b>4,954</b>	<b>6,269</b>	<b>13,561</b>	<b>19,317</b>	<b>14,162</b>	<b>9,170</b>	<b>10,287</b>	<b>1,199</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Net Benefit (Cost)	16,884	7,282	18,379	13,630	10,249	15,488	21,013	25,095	36,380	57,916	45,655	67,403	51,528	51,528	124,916	51,528	51,528	54,479	51,528	171,497	51,528	51,528	53,192	69,002	107,166

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**Per Hectare**

Discount Rate	12%	24%	12%	24%
Benefit Present Value	316,069	122,769	66	25
Cost Present Value	45,545	28,027	9	6
Net Present Value (NPV)	270,524	94,742	56	24
Benefit-Cost Ratio	6.94	4.38	6.94	4.38

**Table 25a**  
**ASSUMPTIONS**  
(For Tables 25 and 26)

1. Fifty percent of the total area under straight reforestation was planted with Gmelina. The remainder was planted with mahogany, eucalyptus, and acacia.
2. For agroforestry, half of the total area was planted with agricultural crops while the other half was planted with cacao, mangoes, coffee, jackfruit, and santol.
3. The assisted natural regeneration (ANR) project covers 1,418 hectares of mixed soft dipterocarp (e.g., white lauan, tanguile, and eucalyptus). Fuelwood and sawtimber are harvested after 10 and 20 years, respectively. The net prices of ANR fuelwood and sawtimber are assumed to be the same as that of eucalyptus.
4. The harvest schedule, estimated yield per hectare and net prices of different species planted are indicated in the box.
5. The actual cost incurred from 1984 to May 1992 (1992 price) was used in the analysis at project level.
6. At farm level, costs include tools, planting materials, fertilizers and chemicals, and labour. All labour costs and prices are maintained throughout the 25-year period.
  - a. Tools included sprayer, shovel, digging bar, etc., with an estimated price of 600 pesos per hectare. All tools are assumed to have a usable period of 5 years, using the straight line method of depreciation.
  - b. The cost of perennial fruit trees seedlings is P1.50/seedling, while agricultural crop seeds (e.g., string beans, mungo, corn, sweet potato, etc.) are P717/hectare.
  - c. Inorganic fertilizers = P1,000/hectare  
Organic fertilizers = P1,500/hectare  
Chemicals = P98/hectare
  - d. Labour included land preparation, hauling, outplanting maintenance, harvesting, and marketing at P40 per man-day. For easy computation, one animal day is given an equivalent of one man-day of labour. Hired labour is 50% of the total labor requirement and the other half is family labour. One man-day is equivalent to 8 hours.

Species	Harvesting Schedule	Yield/Ha (cubic meter)	Net Price (Pesos) Stumpage Value
<b>A. STRAIGHT REFORESTATION</b>			
<b>Gmelina arborea</b>			
sawlogs	rot = 15 years	154	600
fuelwood	thinning yrs. 5, 8, 12	35	60
<b>Mahogany</b>			
sawlogs	rot = 25 yrs	140	1,500
poles	thinning yr. 18	21	432
small poles	thinning yr. 10	14	216
<b>Eucalyptus</b>			
sawlogs	rot = 12 yrs	123	540
fuelwood	thinning yr. 6	35	60
<b>Acacia</b>			
fuelwood	thinning yr. 5	11	60
boardwood	rot = 10 yrs	140	300
<b>B. AGROFORESTRY</b>			
<b>Agricultural Crops</b>			
Mangoes	1, 2 years and after	4.9, 3.5 tons	2,700
	8, 9, 10-11, 12-15 yrs and after	3.5, 5.6, 8.4, 11.2 14, 17.5 tons	3,600
Cacao	3 yrs and after	0.5 tons	15,000
Coffee	3 yrs and after	1 ton	12,000
Jackfruit	4 yrs and after	100, 200, 450, 650, 700, 1050, 1575 fruits	30
Santol	3 yrs and after	3 tons	20,000
<b>C. ASSISTED NATURAL REGENERATION (ANR)</b>			
<b>Different Species</b>			
boardwood	rot = 20 yrs	140	540
fuelwood	thinning yrs. 10	35	60

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**Table 26**  
**BENEFIT-COST ANALYSIS OF CVRP SOCIAL FORESTRY COMPONENT (FARM LEVEL)**  
**1992 PRICES, IN THOUSAND PESOS**

Particular	Y					E					A					R									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>BENEFIT</b>																									
Agricultural Crops	17,131	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236	12,236
Mangoes								3,263	5,221	7,831	10,442	13,052	16,315	16,315	16,315	16,315	16,315	16,315	16,315	16,315	16,315	16,315	16,315	16,315	16,315
Cacao			1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360
Coffee			2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175
Jackfruit			0	544	1,088	2,447	3,535	3,807	5,710	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565	8,565
Santol			10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877
<b>TOTAL BENEFIT</b>	17,131	12,236	26,646	27,192	27,736	29,095	30,183	33,718	37,579	43,044	45,655	48,265	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528	51,528
<b>COST</b>																									
Tools	1,088					1,088					1,088					1,088					1,088				
Planting	2,333	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209	1,209
Fertilizer/chemicals	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303	2,303
Labour	3,372	2,175	2,030	2,030	1,958	1,958	2,030	2,320	1,885	2,175	3,372	2,175	2,030	2,030	1,958	1,958	2,030	2,320	1,885	2,175	3,372	2,175	2,030	2,030	1,958
<b>TOTAL COST</b>	9,185	5,867	5,722	5,722	6,650	6,737	5,722	6,012	5,577	5,867	8,151	5,867	5,722	5,722	5,650	6,737	5,722	6,012	5,577	5,867	8,151	5,867	5,722	5,722	5,650
<b>Net Benefit (Cost)</b>	7,945	6,369	20,928	21,470	22,086	22,358	24,461	27,705	32,002	37,177	37,504	42,398	45,806	45,806	45,879	44,791	45,806	45,518	45,951	45,661	43,377	45,661	45,806	45,806	45,879

Per Hectare

Discount Rate		12%	24%	12%	24%
Benefit Present Value	256,929	111,066	142	61	
Cost Present Value	49,829	27,223	27	15	
Net Present Value (NPV)	207,101	83,842	114	46	
Benefit-Cost Ratio	5.16	4.08	5.16	4.08	

basis, the NPV was calculated at 56 and 24 million pesos per hectare at 12 and 24 percent discount rate, respectively.

Table 26 shows the benefit and cost analysis of CVRP-SF at farm level using 1992 prices. In a 25-year period, the calculated NPV of the project (12% discount rate) is 207.10 million pesos with BCR equal to 5.16. At 24 percent discount, the NPV is 83.84 million pesos with a BCR of 4.08. On a per hectare basis, the NPV was calculated at 114 and 46 million pesos at 12 and 24 percent discount rate, respectively.

The NPV would be a lot higher than the presented calculation if all the benefits (direct and indirect) are included in the analysis. Hence, there is a need of a complete and realistic valuation of social and environmental impacts (although difficult and often impossible). This may provide more than enough reasons in warranting the implementation and continuation of the project. It may take a long time, however, before the farmers/beneficiaries could fully appreciate and reap these many "unseen" benefits in the long run.



*Part IV*

**CENTRAL VISAYAS REGIONAL PROJECT-PHASE I (CVRP-I)  
NEARSHORE FISHERIES COMPONENT**

**IMPACT EVALUATION REPORT**

**Marian S. delos Angeles and Ramyleo T. Pelayo**

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# CENTRAL VISAYAS REGIONAL PROJECT - PHASE I (CVRP-I) NEARSHORE FISHERIES COMPONENT

## IMPACT EVALUATION REPORT\*

Marian S. delos Angeles and Ramyleo T. Pelayo\*\*

### I. SALIENT FEATURES OF THE NEARSHORE FISHERIES COMPONENT

The Central Visayas Regional Project - Phase 1 (CVRP-I) Nearshore Fisheries Component (NSF) implemented various resource conservation and enhancement activities. In terms of physical accomplishments, the project achieved the following: management of fish sanctuaries in coral reef areas (4,130 ha), installation of artificial reefs (1,074 clusters), use of fish aggregating devices (244 units), seafarming (90 ha) and mangrove reforestation (974 ha). These interventions were expected to rehabilitate and sustain the fishery resources as depicted in Figure 1. Artificial reefs (Figure 2) in particular are known to renew fish abundance in damaged coral reef areas and help increase income from fishing.

Management of nearshore resources was done through the building of community organizations, enforcement of fishery laws and issuance of stewardship contracts (1,490) for mangrove areas. Another form of intervention although not as widely introduced, the livestock dispersal and redispersal activities (132 heads), also benefitted some participants. Such activities, together with seaweed and other mariculture projects (Figure 3), miracle holes, shellfish, fry and timber gathered from replanted mangrove areas were designed to augment the fishing incomes of the participants. Over a period of seven years (1984-1991), 182 barangays participated in the various project activities (Table 1a and 1b) undertaken in the five NSF pilot sites in Bohol, Cebu, Negros Oriental and Siquijor (Figure 4).

### II. EXTENT OF ADOPTION OF NSF INTERVENTIONS

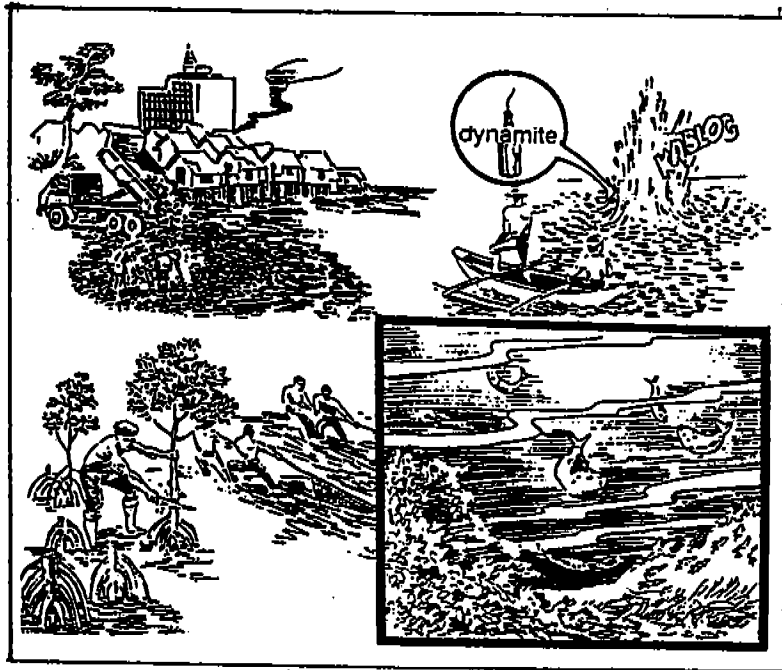
CVRP-I's strategy of community-based local resource management is aimed at ensuring sustainability of efforts at resource management in addition to enhancing equity in the potential benefits of such management. As depicted in Figures 5a-5e, with data presented in Table 2, the incidence of involvement of target beneficiaries in various community organization (CO) and nearshore fisheries (NF) activities accelerated during the late eighties and peaked during 1988-89, the pre-planned final years of the project. On the other hand, infrastructure (IN) building shows late start-ups, as a general rule, with continuous increases until 1991.

---

\* Final Report submitted to the Central Visayas Regional Project Office (CVRPO), Mandaue City, 16 December 1992.

\*\* Fellow II and Research Associate, Philippine Institute for Development Studies (PIDS).

Before CVRP



After CVRP

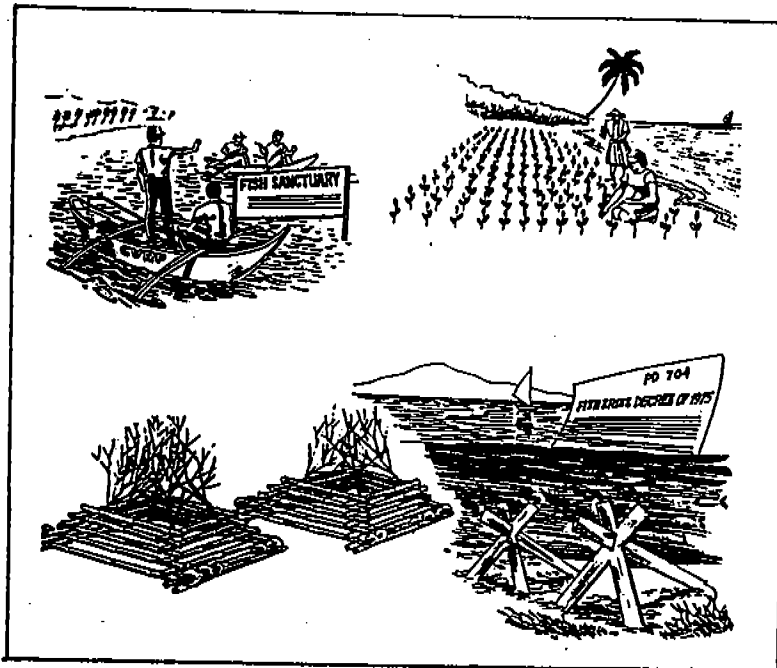
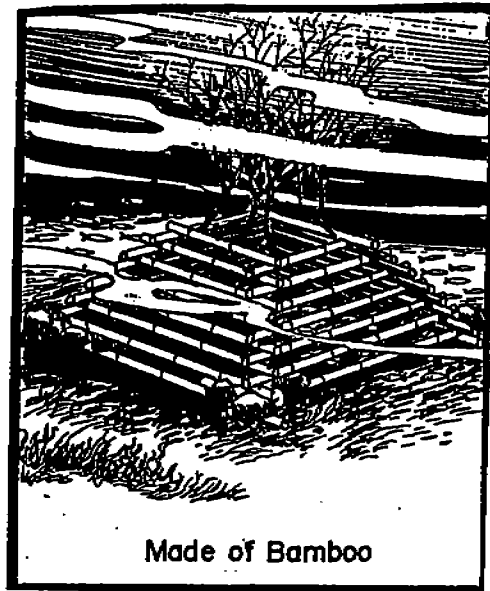


Figure 1  
EXPECTED CHANGES IN RESOURCE USE INDUCED BY CVRP-I

Source: Handbook in the Teaching of Elementary Agriculture (Pursuant to DECS-MLC and the CVRP's Philosophy, Concept and Technology), Gr. IV-VI Volumes. Published by CVRP-I.



Made of Bamboo



Concrete



Used Tires

3

Figure 2  
ARTIFICIAL REEF TECHNOLOGIES

Due to the abundance of fish, more fishermen are attracted to fish in these areas. The most effective way of catching fish in the artificial reefs is by using hand line, gill nets, fish pots.

Artificial reefs are protected from all forms of destructive fishing like use of dynamite, poisonous substances and encircling nets. Protection is primarily done by the community through fishermen's associations, Bantay-Dagat and/or CVRP-organized Composite Law Enforcement Teams.



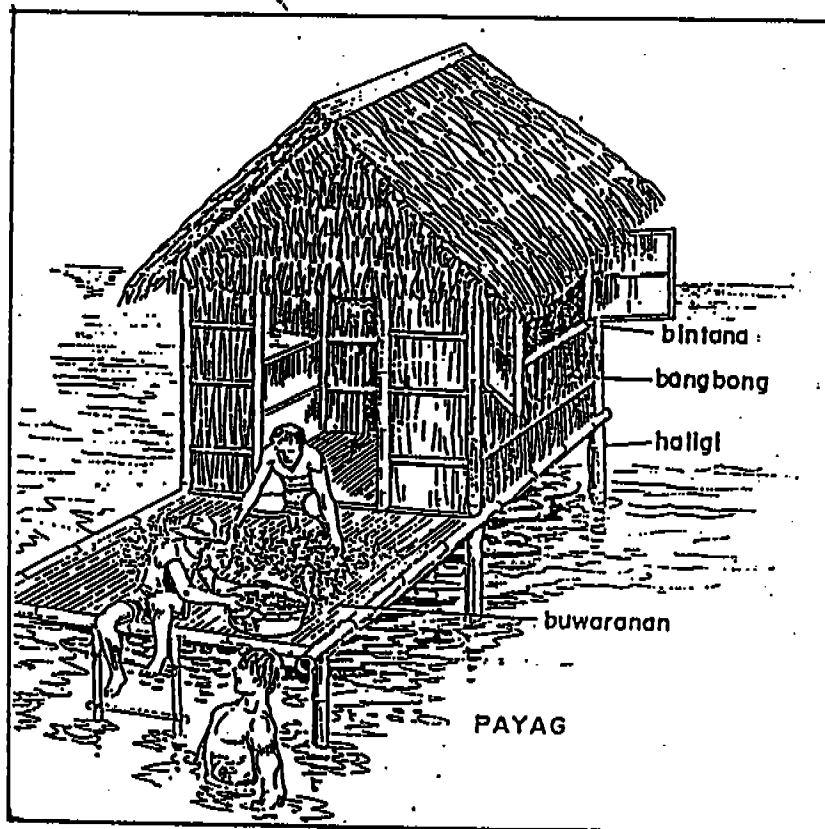
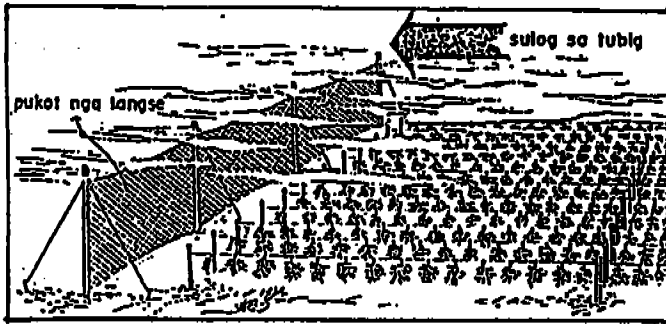
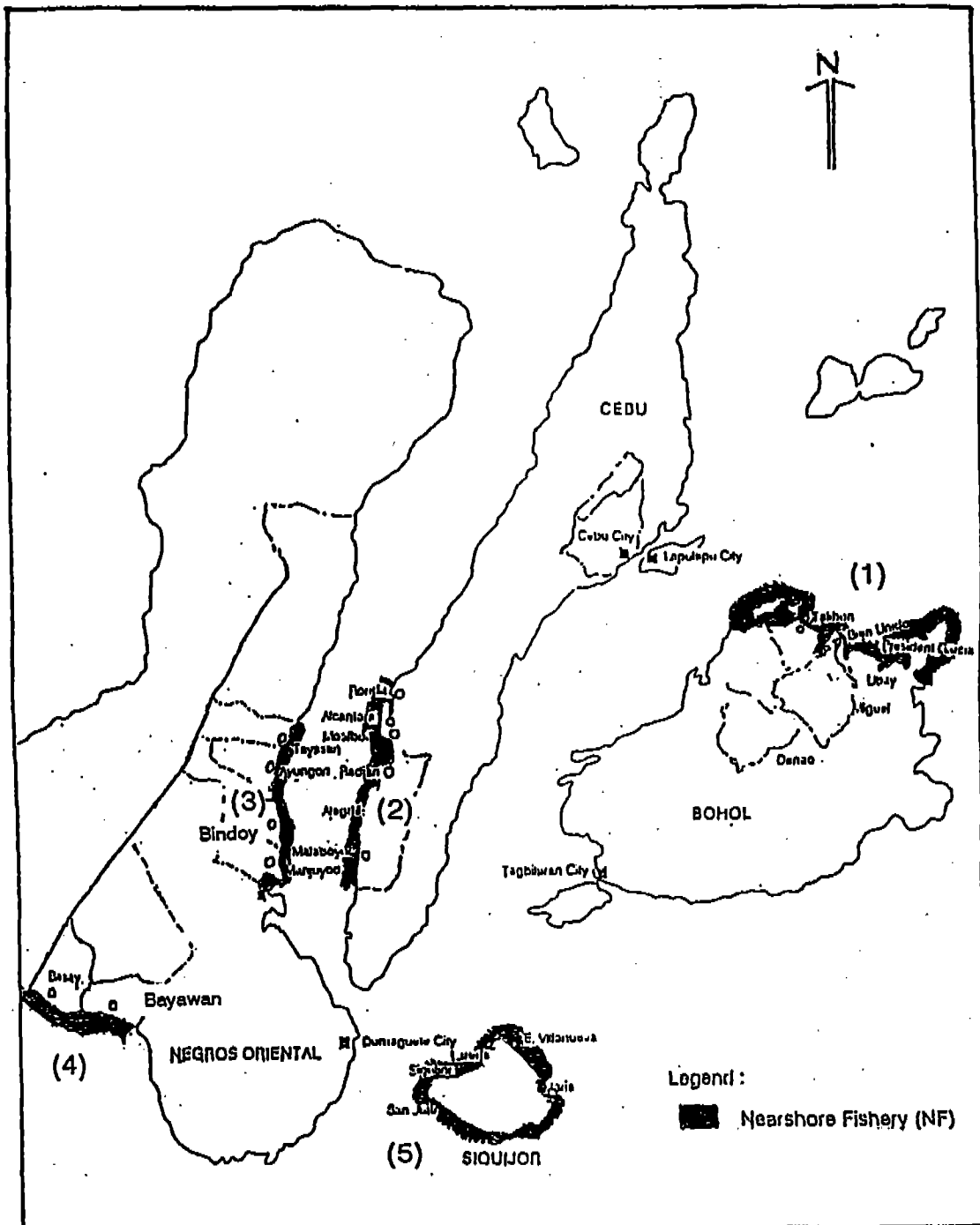


Figure 3  
 MARICULTURE ACTIVITIES: SEAWEED FARMING



**Figure 4**  
**MAP OF REGION 7 SHOWING CVRP-I NEARSHORE FISHERIES PILOT SITES**



- |                            |                                    |
|----------------------------|------------------------------------|
| (1) BOHOL - Northern       | (3) NEGROS ORIENTAL - Eastern      |
| (2) CEBU - Southwestern    | (4) NEGROS ORIENTAL - Southwestern |
| (5) SQUIJOR - Entire Coast |                                    |

**Table 1a**  
**PHYSICAL TARGETS (REVISED) & ACCOMPLISHMENTS**  
**Nearshore Fisheries Component**  
**As of December 1991**

NEARSHORE FISHERIES	5 YEAR TARGET	1984-1990 ACCOMPLISHMENTS	CY 1991		% ACCOMPLISHMENTS (As of Dec. 1991)	
			ANNUAL TARGETS	Jan.- Dec. ACCOMPLISHMENTS	OVER 5-YR.	OVER CY 1991
Barangays Covered (no.)	180	163	17	19	101.1 %	111.1 %
Families Benefited (no.)	6,069	8,086	0	NA	133.2 %	NA
Artificial Reef Clusters	1,236	929	307	145	86.9 %	47.2 %
Mangrove Reforestation (ha.)	1,000	919	135	55	97.4 %	40.4 %
Coral Reef Area Mgt. (ha.)	3,716	2,902	1,344	1,228	111.1 %	91.4 %
Livestock Dispersed (no.) *	63	63	0	0	100.0 %	NA
Livestock Redispersed (no.)	76	45	20	24	90.8 %	120.0 %
Stewardship Contracts (no.)	1,736	1,255	525	235	85.8 %	44.8 %
FADs (unit)	237	212	52	32	103.0 %	61.5 %
Mariculture (ha.)	48	33	15	57	186.5 %	376.9 %

Note: \* New intervention implemented early 1987

Source: CVRP-I 1991 Progress Report, p.8

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01.06.94

**Table 1b**  
**1991 PHYSICAL TARGETS & ACCOMPLISHMENTS**  
**Nearshore Fisheries Component**  
**(By Province)**

NEARSHORE FISHERIES	1991 TARGET	1991 ACCOMPLISHMENTS					TOTAL ACCOM.	PERCENT ACCOM.
		CEBU	BOHOL	NEGROS (BINDOY)	NEGROS (BAYAWAN)	SIQUIJOR		
Barangays Covered (no.)	17.0	4.0	8.0	0.0	3.0	4.0	19.0	111.8 %
Families Benefited (no.)	0.0	NA	0.0	0.0	63.0	NA	63.0	-
Artificial Reef Clusters	307.0	7.6	25.8	56.2	16.0	40.4	146.0	47.6 %
Mangrove Reforestation (ha.)	135.0	0.0	6.0	25.4	23.5	0.0	54.9	40.7 %
Coral Reef Area Mgt. (ha.)	1,344.0	110.0	155.0	834.0	64.0	65.0	1,228.0	91.4 %
Livestock Dispersed (no.) *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
Livestock Redispersed (no.)	20.0	0.0	8.0	16.0	0.0	0.0	24.0	120.0 %
Stewardship Contracts (no.)	525.0	0.0	63.0	70.0	29.0	73.0	235.0	44.8 %
FADs (unit)	52.0	3.0	0.0	18.0	4.0	7.0	32.0	61.5 %
Mariculture (ha.)	15.0	1.0	0.0	2.5	2.0	51.0	56.5	376.7 %

Note: \* Livestock dispersal targets were 100% accomplished in 1990, and no targets were set in 1991.

Source: CVRP-I 1991 Progress Report, p.8

**Table 2**  
**FREQUENCY COUNT OF HOUSEHOLD PARTICIPATION IN NSF ACTIVITIES**  
**1984-1991**

Site/ Municipality/ Activity	1984	1985	1986	1987	1988	1989	1990	1991
<b>BOHOL</b>	<b>361</b>	<b>1,059</b>	<b>1,595</b>	<b>2,525</b>	<b>5,729</b>	<b>5,154</b>	<b>5,124</b>	<b>4,622</b>
CO	257	569	825	1,275	2,971	1,939	1,888	1,750
IN	0	0	4	55	143	281	336	445
NF	104	490	766	1,195	2,615	2,934	2,900	2,427
<b>BIEN UNIDO</b>	<b>86</b>	<b>113</b>	<b>333</b>	<b>806</b>	<b>1,624</b>	<b>1,601</b>	<b>1,567</b>	<b>1,416</b>
CO	78	82	185	465	799	586	570	544
IN	0	0	0	14	45	99	111	151
NF	8	31	148	327	780	916	886	721
<b>PRES. C.P. GARCIA</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>26</b>	<b>283</b>	<b>228</b>	<b>216</b>	<b>215</b>
CO	0	0	0	16	166	86	80	79
IN	0	0	0	0	3	16	28	38
NF	3	3	3	10	114	126	108	98
<b>JETAFAE</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>6</b>	<b>5</b>	<b>6</b>
CO	0	0	0	0	7	3	3	3
NF	0	0	0	0	2	3	2	3
<b>TALIBON</b>	<b>107</b>	<b>655</b>	<b>914</b>	<b>1,086</b>	<b>1,935</b>	<b>1,749</b>	<b>1,734</b>	<b>1,457</b>
CO	63	319	437	471	849	609	596	519
IN	0	0	4	7	27	44	53	63
NF	44	336	473	608	1,059	1,096	1,085	875
<b>UBAY</b>	<b>165</b>	<b>288</b>	<b>345</b>	<b>607</b>	<b>1,878</b>	<b>1,570</b>	<b>1,602</b>	<b>1,528</b>
CO	116	168	203	323	1,150	655	639	605
IN	0	0	0	34	68	122	144	193
NF	49	120	142	250	660	793	819	730

T2, P1/5

Table 2 (continued)

Site/ Municipality/ Activity	1984	1985	1986	1987	1988	1989	1990	1991
<b>CEBU</b>	<b>367</b>	<b>828</b>	<b>1,331</b>	<b>2,365</b>	<b>4,377</b>	<b>3,954</b>	<b>3,942</b>	<b>3,658</b>
CO	252	468	708	1,240	2,350	1,509	1,439	1,356
IN	1	0	6	83	159	254	306	384
NF	114	360	617	1,042	1,868	2,191	2,197	1,918
<b>ALCANTARA</b>	<b>25</b>	<b>56</b>	<b>175</b>	<b>239</b>	<b>453</b>	<b>401</b>	<b>386</b>	<b>316</b>
CO	22	31	94	126	216	123	113	113
IN	0	0	0	1	8	12	13	13
NF	3	25	81	112	229	266	260	190
<b>ALEGRIA</b>	<b>20</b>	<b>256</b>	<b>281</b>	<b>280</b>	<b>338</b>	<b>346</b>	<b>333</b>	<b>261</b>
CO	11	138	131	135	160	130	123	107
IN	0	0	0	1	8	8	8	8
NF	9	118	150	144	170	208	202	146
<b>BADIAN</b>	<b>145</b>	<b>200</b>	<b>468</b>	<b>889</b>	<b>2,233</b>	<b>1,932</b>	<b>1,988</b>	<b>1,902</b>
CO	89	109	241	452	1,218	729	706	682
IN	1	0	0	42	81	164	213	289
NF	55	91	227	395	934	1,039	1,069	931
<b>BARILI</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>23</b>	<b>15</b>	<b>15</b>	<b>13</b>
CO	0	0	0	4	13	5	5	5
IN	0	0	0	1	1	1	1	1
NF	0	0	0	2	9	9	9	7
<b>DUMANJUG</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>17</b>	<b>44</b>	<b>33</b>	<b>31</b>	<b>29</b>
CO	0	0	0	5	21	9	9	9
IN	0	0	0	4	4	4	4	4
NF	1	1	1	8	19	20	18	16

T2, P2/5

Table 2 (continued)

Site/ Municipality/ Activity	1984	1985	1986	1987	1988	1989	1990	1991
<b>CEBU (continued)</b>								
<b>MALABUYOC</b>	15	40	37	69	101	90	98	93
CO	13	25	26	41	60	43	44	40
IN	0	0	0	6	6	6	6	6
NF	2	15	11	22	35	41	48	47
<b>MOALBOAL</b>	161	275	363	734	949	950	902	869
CO	117	165	213	414	531	402	369	334
IN	0	0	5	6	22	29	31	33
NF	44	110	145	314	396	519	502	502
<b>RONDA</b>	0	0	6	130	236	187	189	175
CO	0	0	3	63	131	68	70	66
IN	0	0	1	22	29	30	30	30
NF	0	0	2	45	76	89	89	79
<b>NEGROS ORIENTAL</b>								
<b>NEGROS-BINDOY</b>	390	1,056	1,490	2,562	4,556	4,397	4,399	4,042
CO	282	599	778	1,298	2,279	1,690	1,637	1,502
IN	0	0	10	66	164	236	261	301
NF	108	457	702	1,198	2,113	2,471	2,501	2,239
<b>AYUNGON</b>	59	79	212	417	791	656	666	633
CO	37	43	112	214	384	230	222	217
IN	0	0	2	21	39	53	60	66
NF	22	36	98	182	368	373	384	350
<b>BINDOY</b>	160	444	638	1,066	1,439	1,347	1,350	1,298
CO	101	239	321	528	753	537	520	486
IN	0	0	2	3	24	33	35	45
NF	59	205	315	535	662	777	795	767

Table 2 (continued)

Site/ Municipality/ Activity	1984	1985	1986	1987	1988	1989	1990	1991
<b>NEGROS-BINDOY (continued)</b>								
<b>MANJUYOD</b>	128	460	515	764	1,775	1,833	1,800	1,552
CO	118	279	275	394	836	699	673	585
IN	0	0	2	22	79	101	108	107
NF	10	181	238	348	860	1,033	1,019	860
<b>TAYASAN</b>	43	73	125	315	551	561	583	559
CO	26	38	70	162	306	224	222	214
IN	0	0	4	20	22	49	58	83
NF	17	35	51	133	223	288	303	262
<b>NEGROS-BAYAWAN</b>	210	395	654	1,367	2,350	2,214	2,223	2,240
CO	141	222	364	692	1,193	862	836	820
IN	1	0	7	37	61	126	165	223
NF	68	173	283	638	1,096	1,226	1,222	1,197
<b>BASAY</b>	94	213	382	713	1,216	1,073	1,098	1,041
CO	69	121	210	363	624	419	410	383
IN	1	0	7	6	22	34	35	52
NF	24	92	165	344	570	620	653	606
<b>BAYAWAN</b>	39	59	102	402	900	845	848	850
CO	29	38	61	213	458	326	316	318
IN	0	0	0	28	37	90	128	169
NF	10	21	41	161	405	429	404	363
<b>SANTA CATALINA</b>	77	123	170	252	234	296	277	349
CO	43	63	93	116	111	117	110	119
IN	0	0	0	3	2	2	2	2
NF	34	60	77	133	121	177	165	228

Table 2 (continued)

Site/ Municipality/ Activity	1984	1985	1986	1987	1988	1989	1990	1991
<b>SIQUIJOR</b>	<b>20</b>	<b>27</b>	<b>122</b>	<b>741</b>	<b>1,083</b>	<b>1,083</b>	<b>1,111</b>	<b>1,101</b>
CO	6	12	67	407	562	412	417	422
IN	0	0	0	39	82	113	140	152
NF	14	15	55	295	439	558	554	527
<b>E. VILLANUEVA</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>144</b>	<b>163</b>	<b>186</b>	<b>200</b>	<b>195</b>
CO	0	0	4	91	85	70	71	70
IN	0	0	0	2	24	34	43	47
NF	0	0	2	51	54	82	86	78
<b>LARENA</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>112</b>	<b>181</b>	<b>162</b>	<b>164</b>	<b>149</b>
CO	0	0	3	44	73	42	43	41
IN	0	0	0	18	20	24	25	27
NF	0	0	3	50	88	96	96	81
<b>LAZI</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>69</b>	<b>59</b>	<b>61</b>	<b>62</b>	<b>58</b>
CO	0	0	0	45	35	30	29	29
IN	0	0	0	2	4	5	5	5
NF	0	0	0	22	20	26	28	24
<b>MARIA</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>134</b>	<b>138</b>	<b>142</b>	<b>136</b>	<b>129</b>
CO	0	0	0	70	63	49	46	47
IN	0	0	0	6	15	17	17	17
NF	0	0	0	58	60	76	73	65
<b>SAN JUAN</b>	<b>2</b>	<b>2</b>	<b>27</b>	<b>128</b>	<b>192</b>	<b>189</b>	<b>197</b>	<b>201</b>
CO	1	1	16	80	107	78	79	81
IN	0	0	0	0	7	15	26	30
NF	1	1	11	48	78	96	92	90
<b>SIQUIJOR</b>	<b>18</b>	<b>25</b>	<b>83</b>	<b>154</b>	<b>350</b>	<b>343</b>	<b>352</b>	<b>369</b>
CO	5	11	44	77	199	143	149	154
IN	0	0	0	11	12	18	24	26
NF	13	14	39	66	139	182	179	189

Notes: 1. CO refers to community organization activities, such as: Barangay Association, Committee, Dev't Council and Assembly Meetings.

2. IN refers to infrastructure activities, such as: road or trail construction, road maintenance, and water supply.

3. NF refers to nearshore fisheries activities, such as: artificial reef (AR) construction, mangrove reforestation and management, coral reef area management, mariculture, livestock redispersal, Stewardship Contract award, and fish aggregating device (FAD) construction and installation.

Source: CVRPO, 1991. Barangay Household/Adoption Profiles: Nearshore Fisheries, As of December 1991. (Details in Annex Table 1)

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Figure 5a  
 FREQUENCY COUNT OF NSF PARTICIPATION

BOHOL BENEFICIARIES

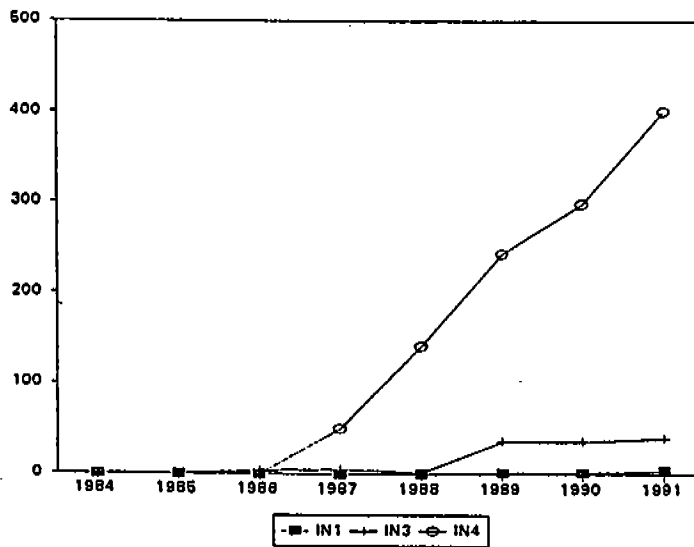
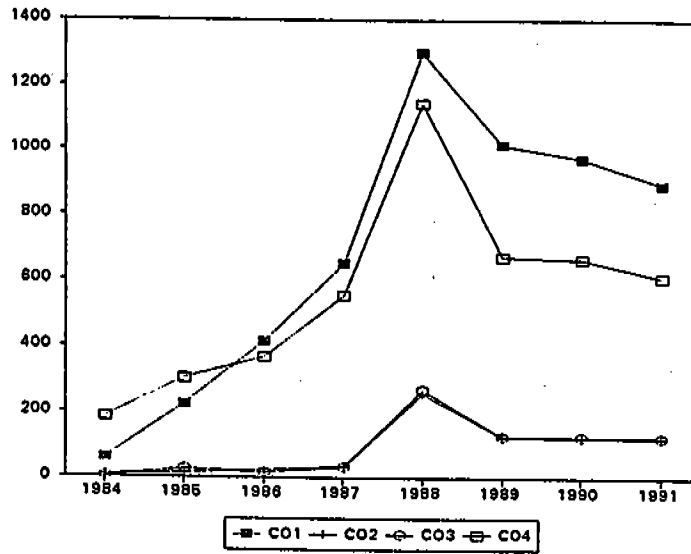
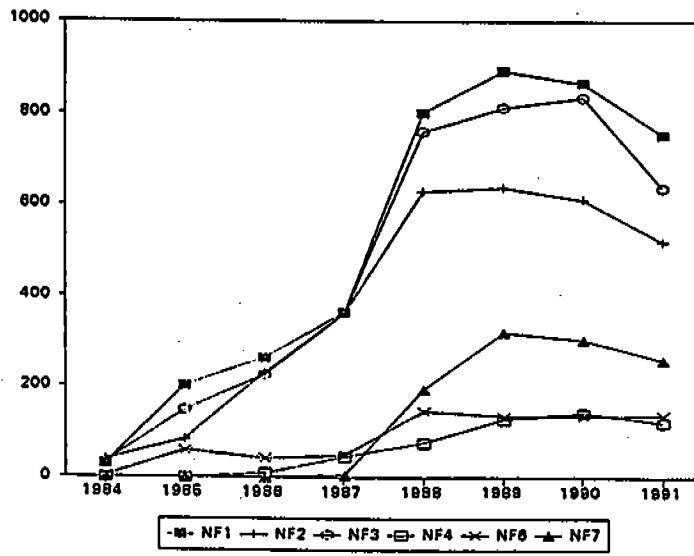


Figure 5b  
 FREQUENCY COUNT OF NSF PARTICIPATION

CEBU BENEFICIARIES

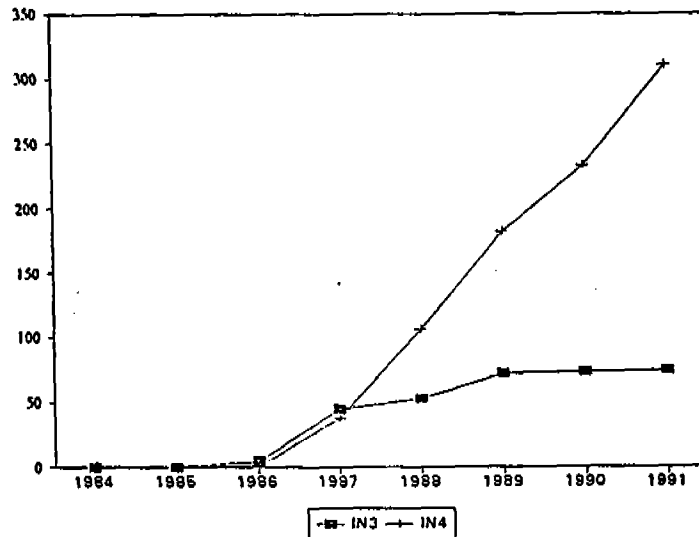
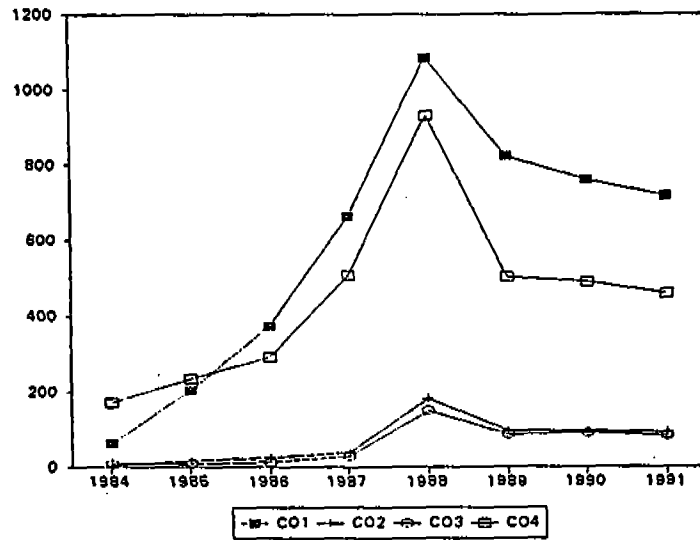
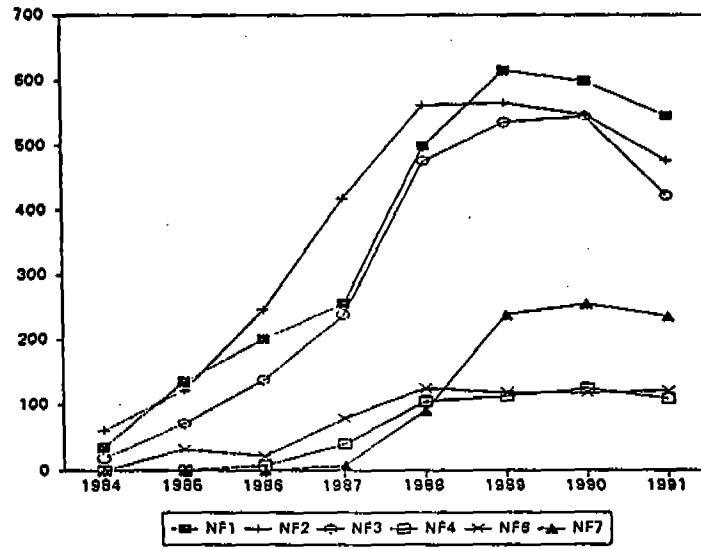
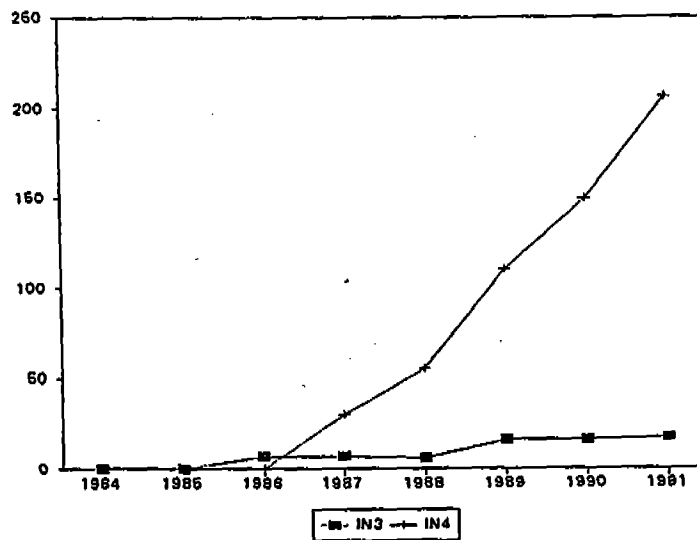
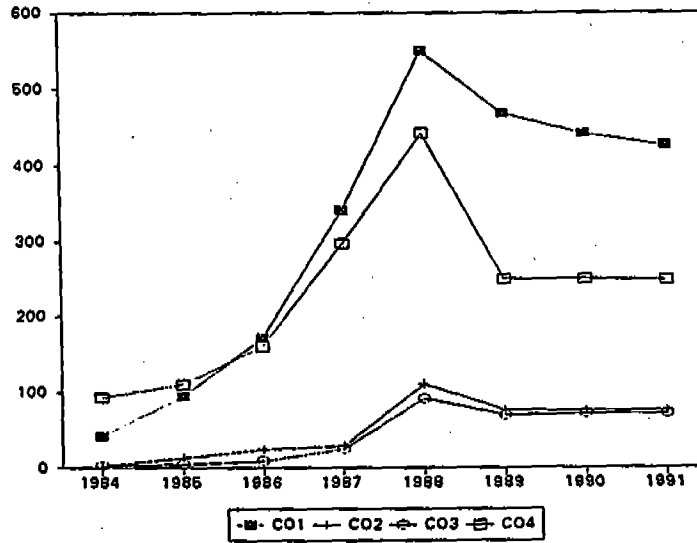
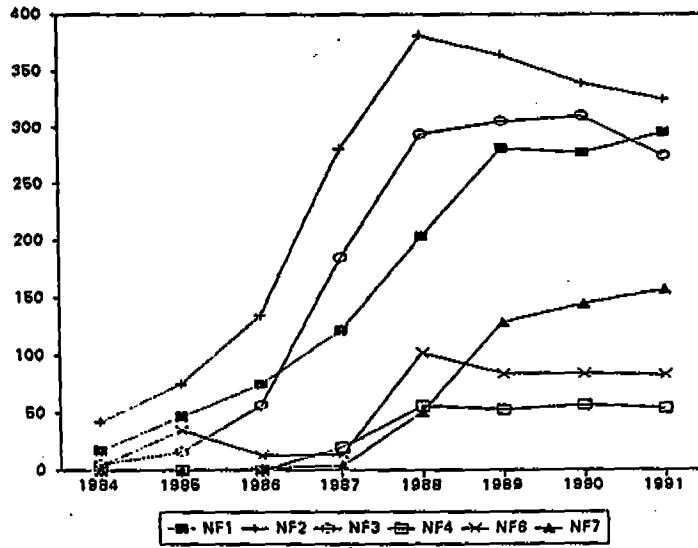


Figure 5c  
 FREQUENCY COUNT OF NSF PARTICIPATION

BAYAWAN, NEGROS ORIENTAL BENEFICIARIES



**Figure 5d**  
**FREQUENCY COUNT OF NSF PARTICIPATION**  
**BINDOY, NEGROS ORIENTAL BENEFICIARIES**

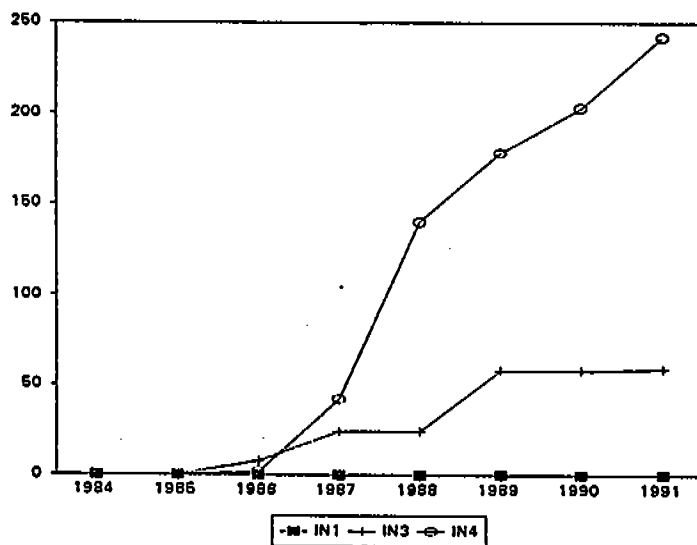
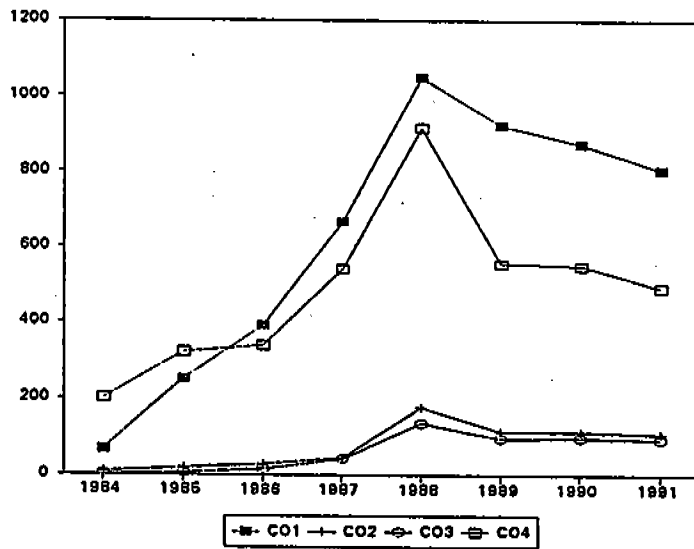
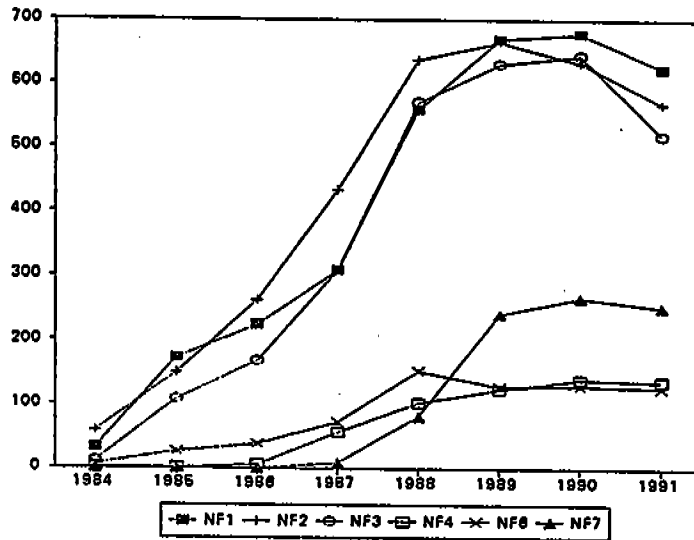
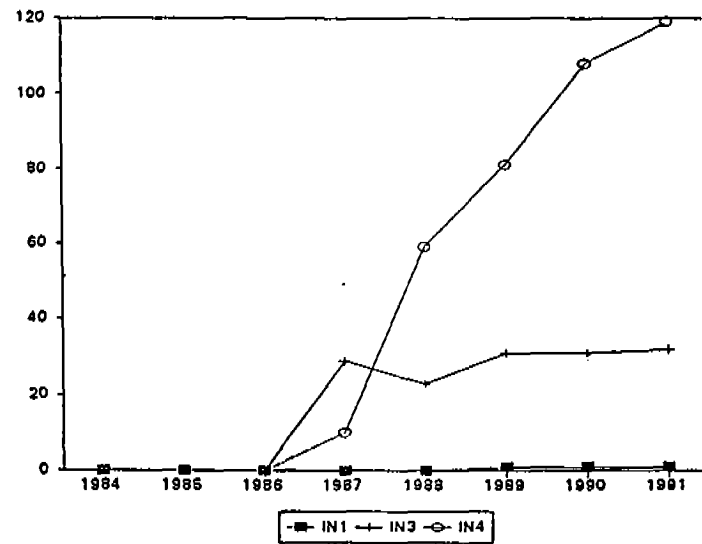
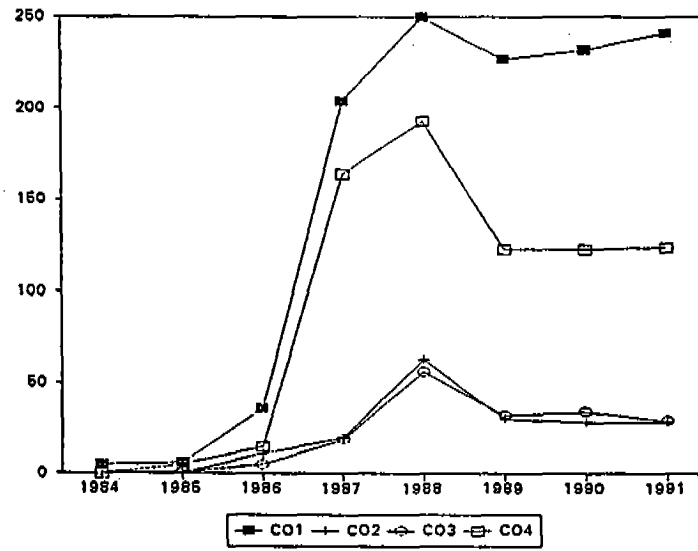
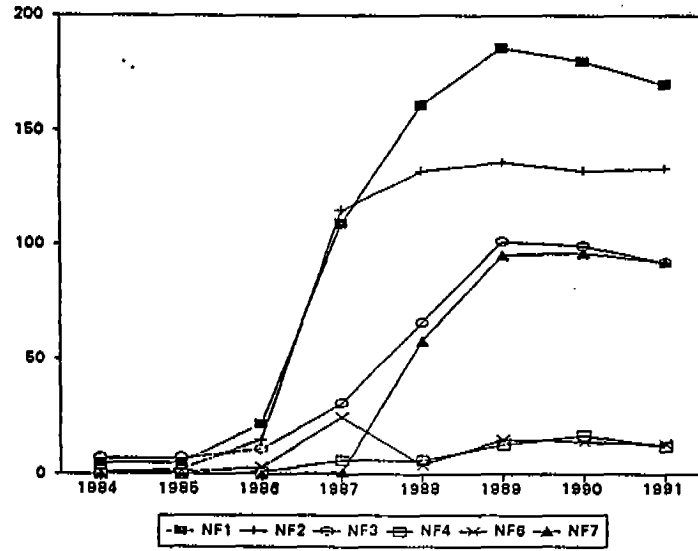


Figure 5e  
**FREQUENCY COUNT OF NSF PARTICIPATION**  
**SIQUIJOR BENEFICIARIES**



**Figure 5: FREQUENCY COUNT OF NSF PARTICIPATION**

<b>LEGEND:</b>	
<b>NEARSHORE FISHERIES (NF)</b>	
NF1	Artificial Reef Management Activities
NF2	Mangrove Reforestation & Management
NF3	Coral Reef Area Management Activities
NF4	Mariculture Activities
NF5	Livestock Redispersed
NF6	Stewardship Contract(s) Received
NF7	Fish Aggregating Device Activities
<b>COMMUNITY ORGANIZATION (CO)</b>	
CO1	Barangay Association Meeting Attended
CO2	Barangay Committee Meeting Attended
CO3	Barangay Dev't Council Meeting Attended
CO4	Barangay Assembly Meeting Attended
<b>INFRASTRUCTURE (IN)</b>	
Participant of Community-Based Labor Utilization Program	
IN1	Road Construction
IN2	Road Maintenance
IN3	Trails Construction
IN4	Water Supply

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There are expected differences in CO, NF and IN implementation across the project sites. Such differences are evident in the distribution of household participation in the various NSF activities (Table 3a, Figure 6a and 6b); this was caused by variations in management, biophysical site conditions, and phased expansion of the project.

Based on the CVRPO 1991 Household Profile Survey, more than fifty percent of household cooperators participated in artificial reef management in all sites except Cebu. In terms of coral reef management, Bohol, Siquijor and Cebu had high participation rates. At least a quarter of household beneficiaries conducted the recently-introduced mariculture activities in two sites (Bindoy, Negros and Siquijor), while the use of fish aggregating devices was prevalent in only the two Negros Oriental sites.

The same Household Profile indicates that 47 percent of the total number of household cooperators conducted mangrove reforestation and management activities, with high prevalence in three of the five sites, i.e., the Negros-Bindoy, Bohol and Siquijor. However, only forty-one percent of these reforesting households had been issued mangrove stewardship contracts, with the following variations across sites: Bohol, 68 percent; Siquijor, 48 percent; Cebu and Bayawan at 26 percent, and Bindoy at only 13 percent. Particularly noteworthy is the case in Bohol where in 8 barangays 100% of their participants in mangrove reforestation had been issued stewardship contracts, indicating the relative efficiency of the SMU there in facilitating the awarding of contracts. Most of these barangays were not involved in any other NSF activities, and in fact some beneficiaries were found to be non-fishing households, or at most part-time fishermen, during the field survey undertaken by this study.

The CVRPO Household Profile also sorted the household participants according to the number of NSF technologies or interventions they were involved in, as summarized in Table 3b and depicted in Figure 7a and 7b. Majority of the households participated in one to three activities in all sites. Bohol, Siquijor and Bayawan had the most number of households participating in two activities, likely a combination of mangrove reforestation-stewardship contracts received or artificial reef-mangrove reforestation. The Bindoy site exhibited a wider spread in the number of activities of the participants. Again, this household distribution indicates the variations in the suitability of the sites to specific interventions and perhaps in the capabilities and efficiency of the SMU staffs.

Other data sources confirm such variations in the practice of introduced resource conservation efforts. For example, the differences in adoption of CVRP-initiated activities noted in the 1989 CVRP Benefit Monitoring Study continue to be detected in the 1992 PIDS Household Survey of NSF Sites. High participation rates in artificial reef construction (78 percent), mangrove reforestation (73 percent), barangay council meetings (57 percent) and law enforcement (55 percent) were reported by 40 cooperators (Table 4).

There are also spread effects in such practices among the non-targetted households. In particular, for the 35 respondent non-cooperators, artificial reef activities and mangrove reforestation are notable.

**Table 3a**  
**NUMBER OF HOUSEHOLD PARTICIPANTS**  
**BY NSF TECHNOLOGY/MANAGEMENT INTERVENTIONS**

NSF ACTIVITY/ INTERVENTION	ALL SITES	BOHOL	CEBU	NEGROS OR.		SIQUIJOR
				(BINDOY)	(BAYAWAN)	
1. Artificial Reef Management Activities	2,964 (55)	714 (53)	585 (44)	613 (66)	319 (52)	733 (61)
2. Mangrove Reforestation & Management	2,539 (47)	769 (57)	484 (36)	559 (60)	119 (20)	608 (51)
3. Coral Reef Area Management Activities	2,385 (44)	678 (50)	711 (53)	283 (30)	12 (2)	701 (58)
4. Mariculture Activities	843 (16)	47 (3)	171 (13)	246 (26)	51 (8)	328 (27)
5. Livestock Redispersal	103 (2)	37 (3)	25 (2)	24 (3)	0 (0)	17 (1)
6. Stewardship Contract(s) Received	1,047 (19)	522 (39)	126 (9)	74 (8)	31 (5)	294 (24)
7. Fish Attracting Device Activities	1,323 (24)	37 (3)	349 (26)	527 (57)	304 (50)	106 (9)
<b>Total No. of Household Participants</b>	<b>5,419 (100)</b>	<b>1,346 (100)</b>	<b>1,331 (100)</b>	<b>931 (100)</b>	<b>608 (100)</b>	<b>1,203 (100)</b>

Note: ( ) means % to total

Source: CVRPO, 1991. Barangay Household/Adoption Profiles:  
Nearshore Fisheries, as of December 1991.

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Figure 6a. NO. OF HH PARTICIPANTS  
BY NSF INTERVENTION, BY SITE

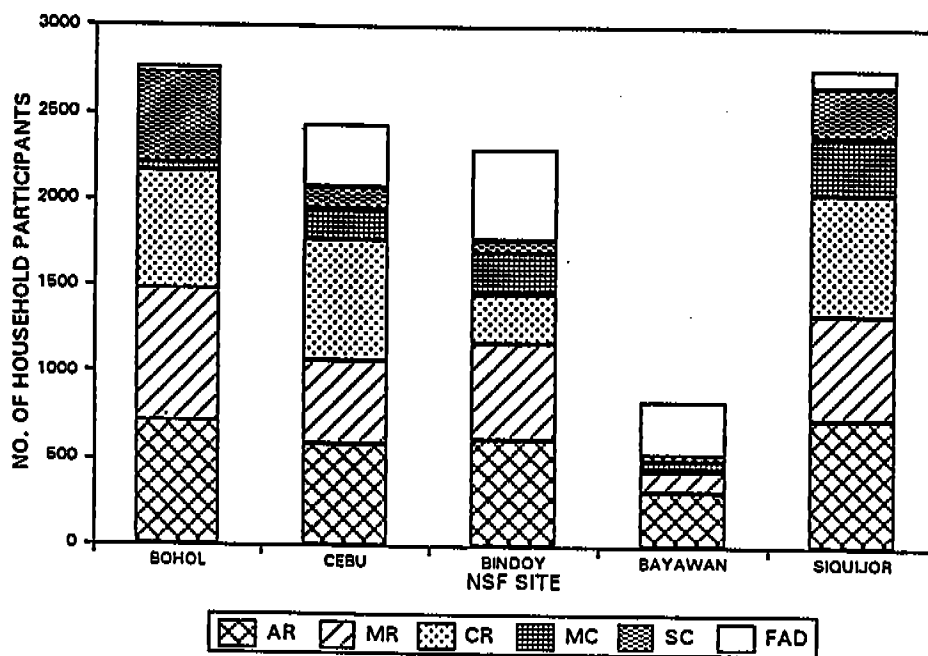
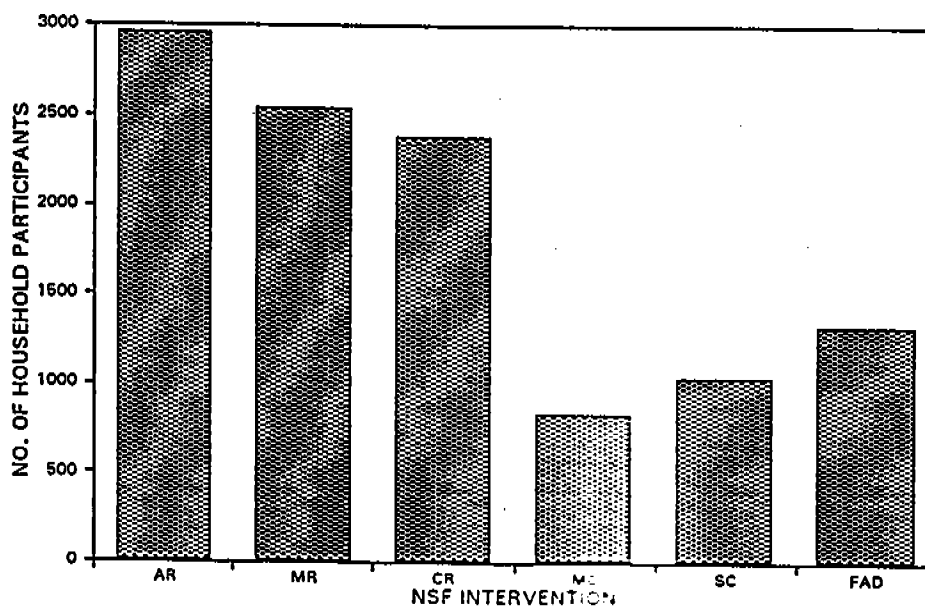


Figure 6b. NO. OF HH PARTICIPANTS  
BY NSF INTERVENTION, ALL SITES



**Table 3b**  
**DISTRIBUTION OF HOUSEHOLD PARTICIPANTS**  
**BY NUMBER OF NSF TECHNOLOGY/MANAGEMENT INTERVENTIONS**

NO. OF NSF INTERVENTIONS	ALL SITES	BOHOL	CEBU	NEGROS OR. (BIDOY) (BAYAWAN)	SIQUIJOR	
1	1,048	281	349	215	35	168
2	1,958	758	314	188	215	483
3	1,038	229	243	229	79	258
4	458	64	130	90	26	148
5	214	12	39	114	6	43
6	32	1	4	15	0	12
7	5	0	1	4	0	0
Total No. of Household Participants	5,419	1,346	1,331	931	608	1,203

Source: CVRPO, 1991. Barangay Household/Adoption Profiles:  
Nearshore Fisheries, as of December 1991.

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Figure 7a. DISTRIBUTION OF HOUSEHOLDS BY NO. OF INTERVENTIONS, BY SITE

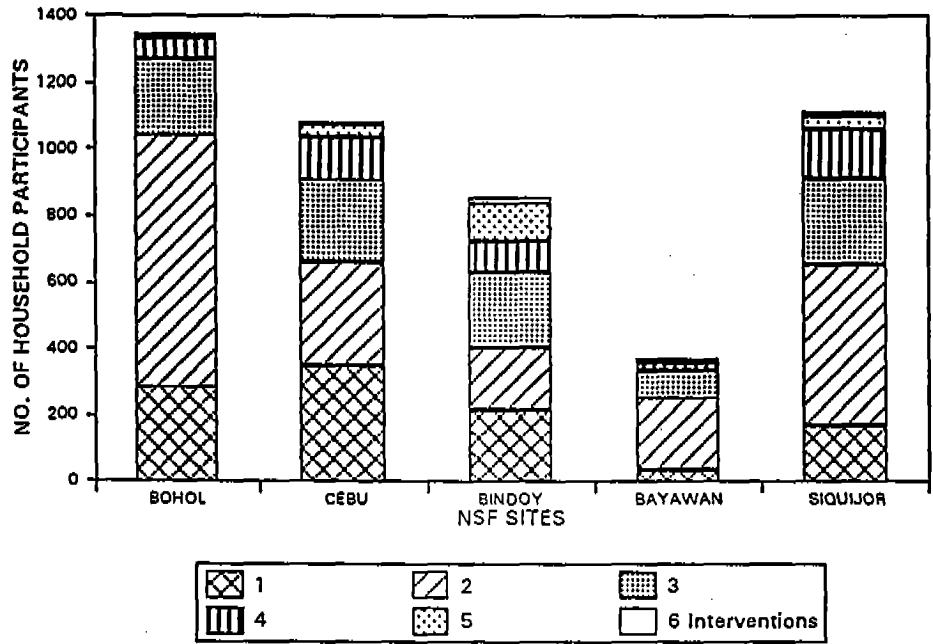
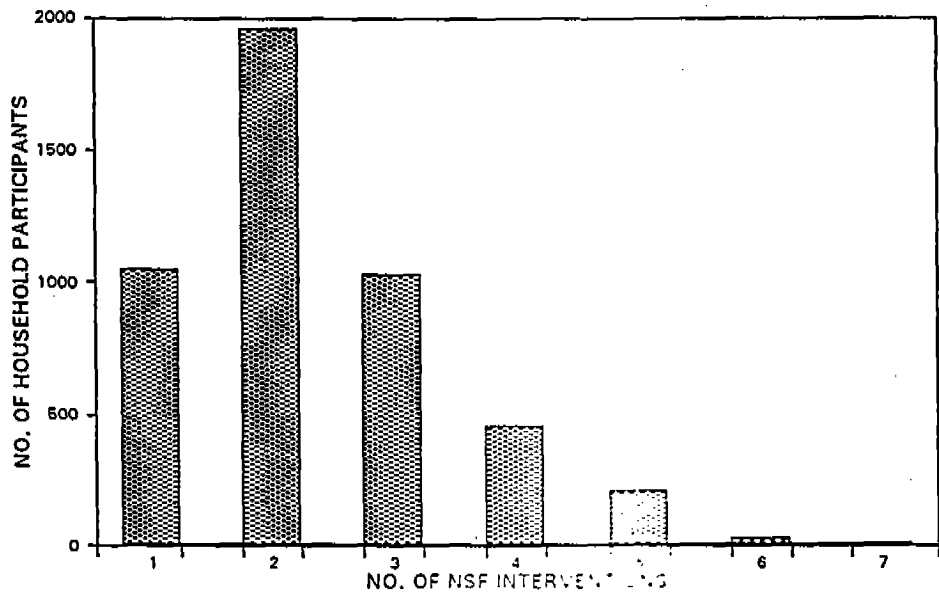


Figure 7b. DISTRIBUTION OF HOUSEHOLDS BY NO. OF INTERVENTIONS, ALL SITES



**Table 4**  
**FREQUENCY COUNTS OF RESPONDENTS' INVOLVEMENT IN CVRP ACTIVITIES, 1992**

ACTIVITY	NSF-BOHOL		NSF-CEBU		NSF-NEGROS (BINDOY)		NSF-SIQUIJOR		NSF-ALL SITES	
	COOP. N = 13	NON-COOP. N = 13	COOP. N = 10	NON-COOP. N = 8	COOP. N = 8	NON-COOP. N = 8	COOP. N = 9	NON-COOP. N = 6	COOP. N = 40	NON-COOP. N = 35
Project/Barangay planning	2 15%	1 8%	2 20%	0 0%	3 38%	1 13%	5 56%	0 0%	12 30%	2 6%
Barangay Association meetings	6 46%	1 8%	8 80%	0 0%	3 38%	0 0%	6 67%	1 17%	23 57%	2 6%
Barangay Committee meetings	5 38%	3 23%	4 40%	0 0%	2 25%	1 13%	4 44%	1 17%	15 38%	5 14%
Barangay Development Council	2 15%	1 8%	1 10%	0 0%	1 13%	1 13%	3 33%	0 0%	7 18%	2 6%
Training and manpower development activities	1 8%	0 0%	5 50%	1 13%	2 25%	0 0%	7 78%	0 0%	15 38%	1 3%
Research activities	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Development communication activities	1 8%	0 0%	0 0%	0 0%	0 0%	0 0%	1 11%	0 0%	2 5%	0 0%
Barangay-level monitoring activities	1 8%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 3%	0 0%
Nursery establishment	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 11%	0 0%	1 3%	0 0%
Nursery maintenance	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 11%	0 0%	1 3%	0 0%
Land tenure settlement activity	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 11%	0 0%	1 3%	0 0%
Artificial reef activities	9 69%	2 15%	10 100%	2 25%	7 88%	3 38%	5 56%	0 0%	31 78%	7 20%
Mariculture/seafarming	0 0%	0 0%	1 10%	0 0%	0 0%	0 0%	3 33%	0 0%	4 10%	0 0%
Coral reef fish sanctuary	0 0%	0 0%	3 30%	0 0%	0 0%	0 0%	1 11%	0 0%	4 10%	0 0%
Fish attracting device	0 0%	0 0%	3 30%	0 0%	2 25%	0 0%	3 33%	0 0%	8 20%	0 0%
Mangrove reforestation	12 92%	1 8%	5 50%	1 13%	7 88%	3 38%	5 56%	0 0%	29 73%	5 14%
SC/MSA	1 8%	0 0%	1 10%	0 0%	0 0%	0 0%	1 11%	0 0%	3 8%	0 0%
Livestock dispersal	1 8%	0 0%	0 0%	0 0%	1 13%	0 0%	0 0%	0 0%	2 5%	0 0%
Miracle hole in mangroves	2 15%	0 0%	2 20%	0 0%	0 0%	0 0%	0 0%	0 0%	4 10%	0 0%
Law enforcement	5 38%	2 15%	7 70%	0 0%	5 63%	1 13%	5 56%	0 0%	22 55%	3 9%
No answer	0 0%	10 77%	1 10%	5 63%	1 13%	4 50%	1 11%	4 67%	3 8%	23 66%

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

The data so far presented give no indication as to the sustainability of the technology and management interventions. The project's accomplishments in terms of hectares covered, units installed, and number of household participants vis-a-vis the targets do not give the total picture of how the project has achieved its objectives. Field interviews revealed that several of the artificial reefs, FADs and mangrove plantations were no longer extant, either destroyed by typhoons or lost due to other causes. Data on such losses or mortalities may have been documented in some SMU reports but these are not available in summarized form that could help in assessing the success of the interventions as well as in re-designing future projects.

### III. IMPACTS OF CVRP-I NSF COMPONENT

#### A. *Fish Catch*

A survey conducted by the ADFI (1992) on 260 fishermen indicates increases in fish catch in the project sites where artificial reefs were installed. Gill net fishing in AR areas yielded 65 percent increase in fish catch over the pre-CVRP levels while handline fishing rose by 107 percent. The highest absolute increases of 174 percent for gill nets and 124 percent for handlines were recorded in Bohol (Table 5).

Among those CVRP fishermen cooperators and non-cooperators who observed increases in fish catch, the most frequently cited factors are minimized illegal fishing that resulted from improved law enforcement activities and the presence of artificial reefs and fish attraction devices. On the other hand, fishermen who noted decreases in fish catch raised concern on the increase in the number of fishing effort in terms of more fishermen, more kinds of fishing gear and encroachment by commercial operations (Table 6a and 6b).

#### B. *Determinants of Impact*

To investigate further the mechanism through which community-based resource management activities impact on CVRP adoptors' quality of life, various regression analyses on different data sets were conducted.

Production function estimates per fishing area and by fishing gear for all fishermen monitored during 1988-91 by CVRPO indicated statistically significant Cobb-Douglas estimates. For fishing in artificial reef either through fish corral or gill nets, and in coral reefs with the use of gill nets, increase in fishing effort raises fish catch. On the other hand, higher fishing efforts through the use of fish corral in coral reefs and gill nets in the open sea tend to decrease fish catch. This difference appears to signal varying degrees of depletion and productivity and possibly, efficiency (and resource destruction) between fish corral and gill net technologies in the coral reefs (Table 7).

Fishing season's impact likewise varies across fishing area and gears. This may be attributed to differences in exposure to monsoon winds and weather conditions across the fishing areas.

**Table 5**  
**AVERAGE FISH CATCH PER DAY OF FISHERMEN BEFORE AND AFTER THE**  
**INTRODUCTION OF ARs IN THE PROJECT SITES**  
(in kg/day)

Project Sites	Fishing Gears						Total No. of Respondents
	Gill Net			Handline			
	Before	After	% Increase	Before	After	% Increase	
Bohol	3.21	8.79	173.83	1.95	4.46	128.71	47
Cebu	6.90	8.36	21.15	2.13	4.08	91.54	77
Negros Oriental	4.09	8.81	115.40	1.55	3.73	140.64	40
Siquijor	3.49	5.71	63.61	1.30	2.51	93.07	96
Average catch/day for all sites	4.54	7.52	65.60	1.70	3.52	107.06	260

Note: Average number of fishing days = 15/month

Source: ADFI (1992), Table 30, p. 20.

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**Table 6a**  
**OBSERVED CHANGES IN RESOURCE BASE/FISHING ACTIVITIES**  
**AFTER CVRP INTERVENTIONS, 1992**

COOPERATORS	X	NON-COOPERATORS	X
<b>In Fishing Ground</b>			
Increased fish abundance and catch	17	Increased fish abundance and catch	7
Illegal fishing now minimized	7	Illegal fishing now minimized	7
Decreased catch due to more fishermen	6	Less catch due to more fishermen and fine-meshed nets	7
Fishing area now farther due to presence of sanctuary	1	No change	10
No change	3		
<b>In Fishing Time</b>			
No change	18	No change	18
Same or more catch for less fishing time	3		
<b>In Fishing Gear</b>			
No change	19	No change	16
Changed to more efficient gear	2	Changed to more efficient gear	3
More illegal fishing before	1	More kinds of fishing gear now	1
Illegal and commercial fishing are still operating	1		
No answer	4		7

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

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**Table 6b**  
**FACTORS CAUSING OBSERVED CHANGES IN RESOURCE BASE/FISHING ACTIVITIES**  
**1992**

COOPERATORS	X	NON-COOPERATORS	X
Increased fish abundance and/or catch due to:		Increased fish abundance and/or catch due to:	
Law enforcement minimized illegal fishing	11	ARs and FADs	6
Presence of ARs and FADs	10	Minimized illegal fishing; shore patrols	5
Mangrove reforestation/plantation	7	Mangrove reforestation	3
Fish sanctuary and other CVRP projects	6	Fish sanctuary	2
Less catch due to more fishermen, more kinds of fishing gear, illegal fishing and commercial operations	6	Less catch due to more small fishermen, big-time fishing operations, compressor (illegal) fishing	6
No change due to rampant illegal fishing	2	No change due to illegal fishing methods, more fishermen, nets and commercial operations	3
Changed gear to (more efficient) ring net due to more fishermen	1	No answer	13
Fishing in farther areas due to presence of sanctuary	1		
No answer	6		

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

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**Table 7**  
**REGRESSION OF FISH CATCH ON FACTOR INPUTS BY SELECTED FISHING AREA AND FISHING GEAR,**  
**ALL NSF SITES**

Fishing Area/ Gear	n	Intercept	Independent Variables			F	R <sup>2</sup>
			Effort (man-days)	Year	Season		
Artificial Reef/ Fish Corral	287	0.133	0.093 **	0.895 ***	-0.024	13.205 ***	0.113
Artificial Reef/ Gill Net	3,775	1.377 ***	0.186 ***	0.147 ***	-0.174 ***	41.076 ***	0.031
Coral Reef/ Fish Corral	331	-0.288	-0.098 ***	1.063 ***	0.353 ***	16.174 ***	0.121
Coral Reef/ Gill Net	801	1.216 ***	0.414 ***	0.067	0.108	27.492 ***	0.090
Open Sea/ Gill Net	1,396	0.594 ***	-0.219 ***	0.456 ***	0.341 ***	55.912 ***	0.106
Payao	293	1.119 ***	0.233	1.504 ***	-0.767 ***	5.907 ***	0.048
Sea Grass/ Gill Net	413	0.985 ***	0.000	0.637 ***	-0.370 ***	9.879 ***	0.061

29

Notes: a. Equation estimated is:

$$\log \text{ Fish Catch (in kg)} = a + b \log \text{ Fishing Effort (person-days)} + c \log \text{ Time (t = 1, 1988, = 2, 1989, = 3, 1990, = 4, 1991)} + d \log \text{ Season (2 = Jan-June, 1 = Jul-Dec)}$$

b. \*\*\* Significant at 5 per cent level  
 \*\* Significant at 10 per cent level  
 \* Significant at 15 per cent level

c. Effort per trip, in person-days = (No of Hours / 8 hours) X (Crew)

Source of basic data: CVRPO, NSF Fish Catch Monitoring Data, 1988-1991.

In all areas and regardless of fishing gear, the passage of time appears to enhance fish catch for all sites, as indicated by the statistically significant positive coefficients for year. This is indicative of increased resource enhancement through time as a result of CVRP-I.

While the relationships so derived were statistically significant, the model was not able to fully capture all the determinants of fish catch. Thus, the model's low predictive capability deters its use for deriving projections on future fishing productivities.

When the regressions are estimated by fishing area and site, regardless of fishing gear, the results appear to be more consistent: higher fishing effort increases fish catch. The passage of time has more ambiguous results however: more years into CVRP reduced fish catch in Bohol, and otherwise for the other sites (Table 8).

A major emphasis of CVRP-I, is the control of fishing effort, in terms of shifting from destructive technologies towards safe ones, as well as providing respite for resource renewal by designating areas for fishing and for sanctuaries. While this may be observed from the cooperators of CVRP, it may not necessarily be the case among the non-cooperators. Access to improved resource productivity conditions has virtually been non-exclusive. This arises partly from the fugitive nature of fishery resources and the failure in general policy-making in implementing tools to regulate access to common property resources. With these and under conditions of high population pressure, it appears that the early gains from fishery conservation activities may not be sustainable in the long term.

The project's contribution in regulating fishing effort is investigated through the relationship presented in Table 9. The hypothesis pursued in the regression equation is: more intensive involvement in CVRP-I reduces fishing effort. The results for the community organization index and number of years passed with CVRP do prove this hypothesis. However, this is not true for nearshore fisheries activities and infrastructure. It appears that the attractiveness of the potential gains from nearshore fishery activities and the enhanced access into the fishing areas due to better roads result in higher fishing effort. These empirical results signal the urgent need for regulating access to the nearshore fisheries to maintain the gains from enhancing fish productivity.

### C. *Income Effects*

In terms of impact on income, Table 10 which presents the results of the 1989 Benefit Monitoring data indicates increase in income of 27 percent for the cooperators and 11 percent for the non-cooperators. While the increases persisted into 1991, there is a reversal in the magnitude of increases: adoptors' income rose by 9.9 percent during 1988-1991 while the income of non-adoptors increased by a higher 22.6 percent during the same period. It appears that the problem of non-exclusion has resulted in the larger portion of the gains from CVRP to have been captured by the non-CVRP participants. Thus, by 1991, in all sites but Bindoy, Negros Oriental mean incomes of the non-adoptors were higher than those of the adoptors (Table 11, Figure 8).

**Table 8**  
**REGRESSION OF FISH CATCH ON EFFORT AND TIME,**  
**BY FISHING AREA AND PROVINCE**

Fishing Area/ Province	n	Intercept	Independent Variables		F	R <sup>2</sup>
			Effort (person-hrs)	Year		
<b>ARTIFICIAL REEF</b>						
Bohol	4,552	4.0723 ***	0.3125 ***	-0.3506 ***	47.01 ***	0.02
Siquijor	2,551	-2.0050 *	0.0484 *	2.1513 ***	15.19 ***	0.01
Cebu	2,241	-2.5835	0.2706 ***	4.1530 ***	47.33 ***	0.04
Bayawan, Neg Or.	615	4.0512 ***	0.0626	0.0511	0.52	0.00
Bindoy, Neg Or.	2,391	-0.8008	0.3093 ***	2.2423 **	57.74 ***	0.04
<b>CORAL REEF</b>						
Bohol	4,063	3.9360 ***	0.4453 ***	-1.0264 ***	226.97 ***	0.10
Cebu	909	-1.6172	0.0235	2.1135 ***	17.10 ***	0.03
Bindoy, Neg Or.	630	-1.4044	0.6082 ***	0.7389	54.42 ***	0.14
<b>OPEN SEA</b>						
Bohol	744	1.0843	0.0443	2.3689 ***	11.00 ***	0.03
Siquijor	110	-8.0573 ***	1.6264 ***	2.7238 ***	23.46 ***	0.29
Cebu	654	-16.2406	2.4624 ***	5.9151	97.97 ***	0.23
Bindoy, Neg Or.	3032	-6.4017 ***	0.0339 ***	4.4826 ***	199.83 ***	0.12
<b>FAD/Payao</b>						
Bohol (non-CVRP)	95	40.1397 **	3.5948 ***	-18.5800 ***	24.98 ***	0.34
Cebu (CVRP)	440	15.7540 **	0.9337 ***	-0.5152	36.16 ***	0.14
Cebu (non-CVRP)	919	22.7112 *	1.0601 ***	0.2114	89.25 ***	0.16
Bayawan (non-CVRP)	358	-2.0855	2.0704 ***	-0.3745	84.03 ***	0.32
Bindoy (CVRP)	60	-7.2183 ***	-0.0136	3.0515 ***	9.75 ***	0.23
Bindoy (non-CVRP)	1034	-1.9189	-0.5346 **	4.3088 **	3.26 ***	0.00
<b>SEA GRASS</b>						
Bohol	582	7.6390 ***	-0.1474 ***	-1.0784 ***	33.69 ***	0.10
Bindoy	484	-10.4178 **	0.2867 ***	5.3564 ***	11.43 ***	0.04
<b>FISH SANCTUARY</b>						
Bindoy	719	-9.3492	0.1499 ***	7.4748	15.73 ***	0.04

Notes: a. Equation estimated is:

$$\text{Fish Catch (in kgs)} = a + b (\text{Fishing Effort (person-hrs)}) + c (\text{Time})$$

(t = 1, 1988,  
= 2, 1989,  
= 3, 1990,  
= 4, 1991)

b. \*\*\* significant at 5 per cent level  
\*\* significant at 10 per cent level  
\* significant at 15 per cent level

c. Effort per trip (in person-hrs) = (Fishing Time, in hrs) X Crew

Source of basic data: CVRPO, NSF Fish Catch Monitoring Data, 1988-1991

**Table 9**  
**REGRESSION OF FISHING EFFORT ON NSF ACTIVITIES AND TIME,**  
**SELECTED CASES FROM CVRPO FISH CATCH MONITORING DATA, 1988-1991**

Independent Variable	Mean Values	Coefficient	T-value
Intercept		0.403	
Community Organization Index (CO)	426.6	-1.471	-1.907 **
Infrastructure Index (INF)	613.3	0.614	3.155 ***
Nearshore Fisheries Technology Index (NSF)	94.4	1.176	1.734 **
Time (t)		-0.528	-2.290 ***
Adjusted R <sup>2</sup> = 0.1134			
F = 3.142 ***			

**Notes:**

a. Equation estimated:

$$\log(\text{Effort, in man-hours per fishing trip}) \\ = a + b \log(\text{CO}) + c \log(\text{INF}) + d \log(\text{NSF}) + e \log(t)$$

b. Based on data on 35 fishermen with daily observations greater than 100 cases per year, and observed for at least two years. ( Source: CVRPO Fish Catch Monitoring Data).

c. Data on CO, NSF and NF were obtained from relevant scores in Table 2 based on fisherman's residence, as observed from the CVRPO 1991 Household Profile.

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**Table 10**  
**INCOME DIFFERENCES, NSF COOPERATORS AND NON-COOPERATORS**  
**1985 and 1988**

Year	Fishing Households in CVRP-NSF Sites	Gross income from all sources, in 1985 prices	
		Average	Standard deviation
1985	Cooperators	P 4,216.3	P 3,843.9
	Non-Cooperators	6,119.2	4,861.0
1988	Cooperators	8,703.3	6,790.3
	Non-Cooperators	8,369.6	4,723.4
Change during period	Cooperators	4,487.0	8,400.1
	Non-Cooperators	2,250.4	7,941.5
Annual Change, in per cent	Cooperators	27.3%	
	Non-Cooperators	11.0%	

Source: delos Angeles and Rodriguez (1992).

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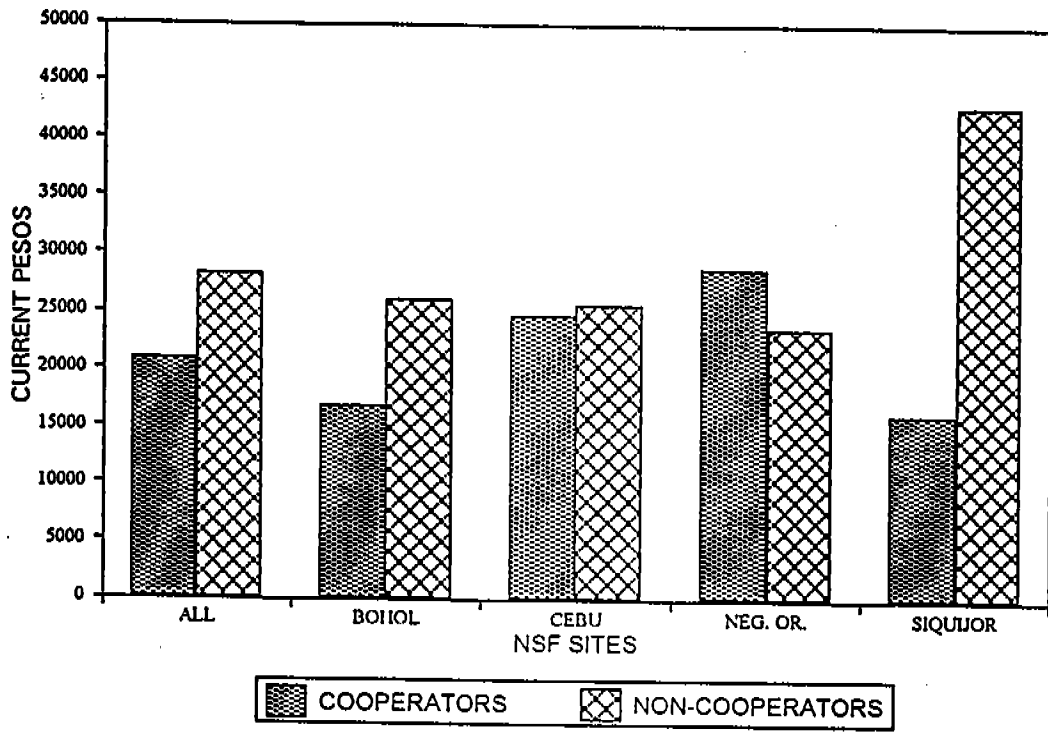
**Table 11**  
**TESTS FOR DIFFERENCES IN GROSS FISHING INCOME**  
**CVRP-NSF PARTICIPANTS VS. NON-PARTICIPANTS, 1991**

	n	MEAN INCOME (s.d.), in current pesos		t values	Conclusion
		Cooperators	vs. Non-Cooperators		
All Sites	75	20,946 (18,338)	< 28,235 (20,961)	(16.066)	significant at $\alpha = .10$
Cebu	18	24,589 (12,179)	< 25,641 (9,306)	(0.2015)	n.s.
Negros Or.	16	28,642 (27,510)	> 23,442 (22,413)	0.4145	n.s.
Siquijor	15	16,188 (14,778)	< 43,060 (31,366)	(2.2519)	significant at $\alpha = .05$
Bohol	26	16,703 (17,541)	< 25,939 (18,867)	(1.2929)	significant at $\alpha = .10$

Source of basic data: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

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Figure 8. DIFFERENCES IN GROSS FISHING INCOME, 1991



While these results are disconcerting with respect to fairness in the distribution of private costs and benefits of CVRP there is more reason to be optimistic, in terms of alleviating poverty. Table 12 indicates that all those surveyed, whether cooperators or non-cooperators, were way below the poverty thresholds for Region 7 in 1985. Increases in their incomes brought both groups closer to the poverty thresholds in 1988. Thus as a project that is designed to uplift the rural poor, CVRP has achieved considerable gains.

However, since both groups are still below the poverty thresholds, changes in the quality of life have not yet occurred. This is reflected in the various indicators reported in Table 13. Note that some fishermen do not own fishing craft or gear, which could explain their low fishing incomes since they either borrow their equipment as part-time fishermen or serve as fishermen-crew to some owner-operator and given a limited share of the income.

A potential significant contributor to future income increases is mangrove reforestation. Here increased supply of wood and non-timber products, particularly gathered aquatic products on the site would enhance the livelihood of the nearshore communities. In addition, where stewardship contracts do limit the use of the resources in mangrove reforested areas, the benefits are expected to accrue to CVRP participants more directly. Measurements of such potential benefits were not feasible, however, because of poor data on the areas effectively reforested and the absence of growth and yield models on reforested mangroves. The high mortality rates in some sites result from poor growing conditions and weather patterns and the experimental nature of CVRP. There is also undermeasurement of the early impacts of mangrove rehabilitation in terms of non-coverage/non-reporting of household consumption of gathered products (such as crustaceans and bivalves).

#### IV. QUALITATIVE ASSESSMENT

##### A. *Perceptions on the Quality of Life*

Despite the persistent poverty among them, the respondents' perception on their quality of life tend to be more optimistic, perhaps reflective of the general increase in their fishing incomes, as reported in Table 14. There is a dominant perception of improvements in socio-economic conditions. A most often cited form of improvement expressed by the cooperators during the interview is the increased availability of fish for home consumption.

When asked to compare their present socioeconomic condition to that prior to CVRP intervention or 5 years ago, more cooperators believed they were better off now (43-48%) than the non-cooperators did (17-23%). About the same proportion of the two groups thought their socioeconomic status did not change (Table 15, Figure 9a). A fairly good number (35%) of the cooperators attributed their improved conditions to their participation in CVRP (Figure 9b). The most frequently mentioned factors that brought about this change were increased catch, minimized illegal fishing and the CVRP activities such as AR, FAD, fish sanctuary establishment, and mangrove reforestation (Table 16). Those who perceived there was no change in their status mainly cited the increase in the number of fishermen and fishing methods.



**Table 12**  
**FAMILY INCOME, VARIOUS YEARS**  
**In 1985 pesos**

Year	Level		Gross Income, 1985 pesos	Data Source
<b>1. Gross income from all sources</b>				
1985	Region 7	P	20,756	Phil. Statistical Yearbook
	Region 6	P	24,807	Phil. Statistical Yearbook
1988	Region 7	P	25,581	Phil. Statistical Yearbook
	Region 6	P	28,799	Phil. Statistical Yearbook
Annual growth rate				
	Region 7		7.2%	Computed from figures above
	Region 6		5.1%	Computed from figures above
<b>2. Gross income from fishing</b>				
1988	CVRP Adoptors	P	9,496	1989 Benefit Monitoring Study
	CVRP Non-Adoptors	P	9,219	1989 Benefit Monitoring Study
1991	CVRP Adoptors	P	12,618	1992 Impact Evaluation Study
	CVRP Non-Adoptors	P	17,009	1992 Impact Evaluation Study
Annual growth rate				
	CVRP Adoptors		9.9%	Computed from figures above
	CVRP Non-Adoptors		22.6%	Computed from figures above
<b>3. Poverty Threshold level (annual)</b>				
1985	Region 7	P	23,844.00	NSO, FIES Data
	Region 6		29,436.00	NSO, FIES Data
1988	Region 7		24,847.71	NSO, FIES Data
	Region 6		30,451.38	NSO, FIES Data

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Table 13  
**SOCIOECONOMIC INDICATORS OF FISHING HOUSEHOLDS**  
**CVRP Cooperators and Non-Cooperators, All Sites, 1992**

INDICATOR	COOPERATORS		NON-COOP.	
	N = 40	%	N = 35	%
<b>1. OWNERSHIP OF HOMELOT</b>				
Owned	26	65%	22	63%
Leased	6	15%	7	20%
Squatter	4	10%	2	6%
Others	3	8%	4	11%
No answer	1	3%	0	0%
<b>2. OWNERSHIP OF HOUSE</b>				
Owned	38	95%	35	100%
Rented	0	0%	0	0%
Shared with parents	0	0%	0	0%
Others	2	5%	0	0%
<b>3. HOUSING MATERIALS</b>				
Light	29	73%	32	91%
Strong	5	13%	2	6%
Mixed	5	13%	1	3%
No answer	1	3%	0	0%
<b>4. LOT OWNERSHIP BESIDES HOMELOT</b>				
Owned	8	20%	4	11%
Leased	1	3%	0	0%
Others	1	3%	0	0%
None	28	70%	31	89%
No answer	1	3%	0	0%
<b>5. SOURCE OF DRINKING WATER</b>				
Artesian well	6	15%	5	14%
Deep well	12	30%	10	29%
Creeks/springs	4	10%	5	14%
Local water utilities	16	40%	15	43%
Others (bought)	1	3%	0	0%
No answer	1	3%	0	0%
<b>6. SOURCE OF POWER IN THE HOUSE</b>				
Electricity	11	28%	8	23%
Kerosene lamps	27	68%	27	77%
Battery (for radio)	28	70%	18	51%
Others	1	3%	0	0%
No answer	1	3%	0	0%

Table 13 (continued)

INDICATOR	COOPERATORS		NON-COOP.	
	N = 40	%	N = 35	%
<b>7. COMMUNITY HEALTH SERVICES</b>				
DOH workers	30	75%	28	80%
DOH-trained local people	10	25%	11	31%
Quack doctors	15	38%	13	37%
Others	0	0%	0	0%
None	3	8%	3	9%
<b>8. TYPE OF HEALTH FACILITIES IN THE PLACE</b>				
Barangay health center	28	70%	23	66%
Hospital	1	3%	0	0%
Others	0	0%	0	0%
None	9	23%	12	34%
No answer	2	5%	0	0%
<b>9. APPLIANCES OWNED</b>				
Radio	28	70%	18	51%
Television	2	5%	2	6%
Refrigerator	0	0%	1	3%
Sala set	7	18%	8	23%
Gas stove	0	0%	1	3%
Motor vehicle	0	0%	0	0%
Farm implements	8	20%	2	6%
Chain saw	0	0%	0	0%
None	6	15%	11	31%
No answer	1	3%	0	0%
<b>10. FISHING CRAFT OWNED</b>				
Motor Boat	2	5%	2	6%
Banca	32	80%	27	77%
None	6	15%	6	17%
<b>11. FISHING GEAR OWNED</b>				
Gill net	16	40%	13	37%
Danish seine	0	0%	2	6%
Ring net	1	3%	0	0%
Drive-in net	1	3%	0	0%
Beach seine	3	8%	2	6%
Fish corral	2	5%	3	9%
Fish trap	2	5%	1	3%
Crab pot	1	3%	1	3%
Hook & line	9	23%	8	23%
Spear gun	4	10%	2	6%
Scoop net	1	3%	1	3%
None	4	10%	2	6%

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

**Table 14**  
**PERCEIVED EFFECT OF CVRP ON RESPONDENT'S INCOME,**  
**LIVING STANDARD, ETC., 1992**

COOPERATORS	X	NON-COOPERATORS	X
Increased catch and income, improved livelihood, other beneficial effects	14	Not affected, projects not feasible, etc.	7
No effect on cash income yet; mangrove plants are still young	6	Increased fish catch, better off now, etc.	5
Control of illegal fishing	3	None yet	1
Not affected	9	No answer	23
No answer	9		

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

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**Table 15**  
**PERCEIVED CHANGES IN SOCIOECONOMIC CONDITIONS, 1992**  
**ALL NSF SITES**

1. PERCEPTION ON RESPONDENT'S PRESENT SOCIOECONOMIC CONDITION COMPARED WITH THAT PRIOR TO CVRP ACTIVITIES	COOPERATORS		NON-COOP.	
	N = 40	%	N = 35	%
Poorer	2	5%	2	6%
Same	17	43%	19	54%
Better off	19	48%	8	23%
No answer	2	5%	6	17%
<b>2. PERCEPTION ON RESPONDENT'S PRESENT SOCIOECONOMIC CONDITION COMPARED WITH THAT OF 5 YEARS AGO</b>				
Poorer	1	3%	2	6%
Same	16	40%	14	40%
Better off	17	43%	6	17%
No answer	6	15%	13	37%
<b>3. PERCEPTION ON RESPONDENT'S PRESENT SOCIOECONOMIC STATUS COMPARED WITH THAT OF THE OTHER MEMBERS OF THE COMMUNITY</b>				
Poorer	4	10%	3	9%
Same	17	43%	13	37%
Better	16	40%	6	17%
No answer	3	8%	13	37%
<b>4. IF THERE IS AN IMPROVEMENT IN YOUR SOCIOECONOMIC STATUS, WOULD YOU ATTRIBUTE THAT CHANGE TO PARTICIPATION IN CVRP?</b>				
Yes	14	35%	2	6%
No	0	0%	0	0%
No answer	26	65%	33	94%

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

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Figure 9a. PERCEIVED CHANGE IN SOCIO-ECONOMIC CONDITIONS AFTER CVRP

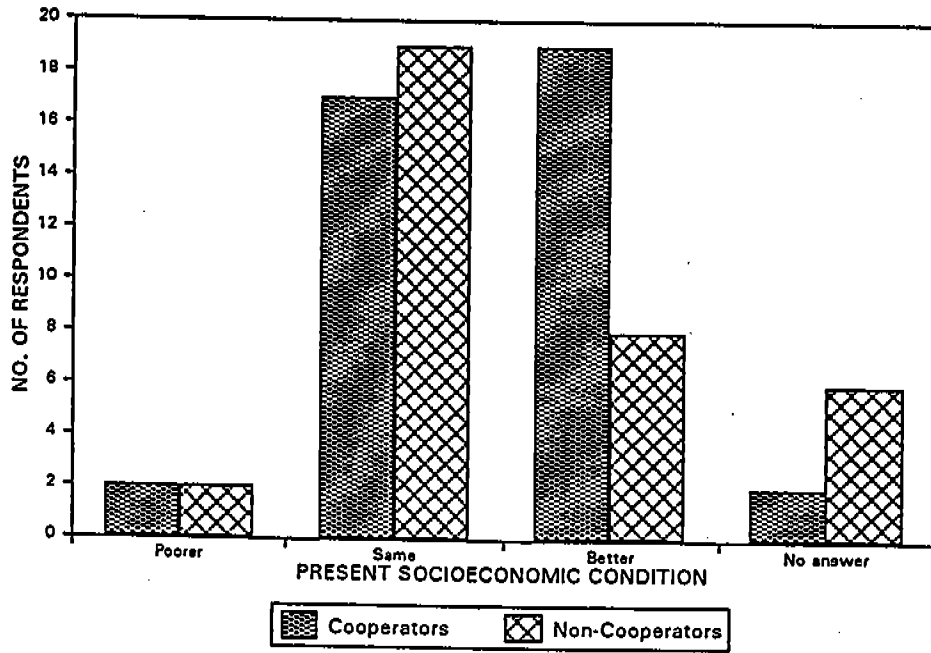
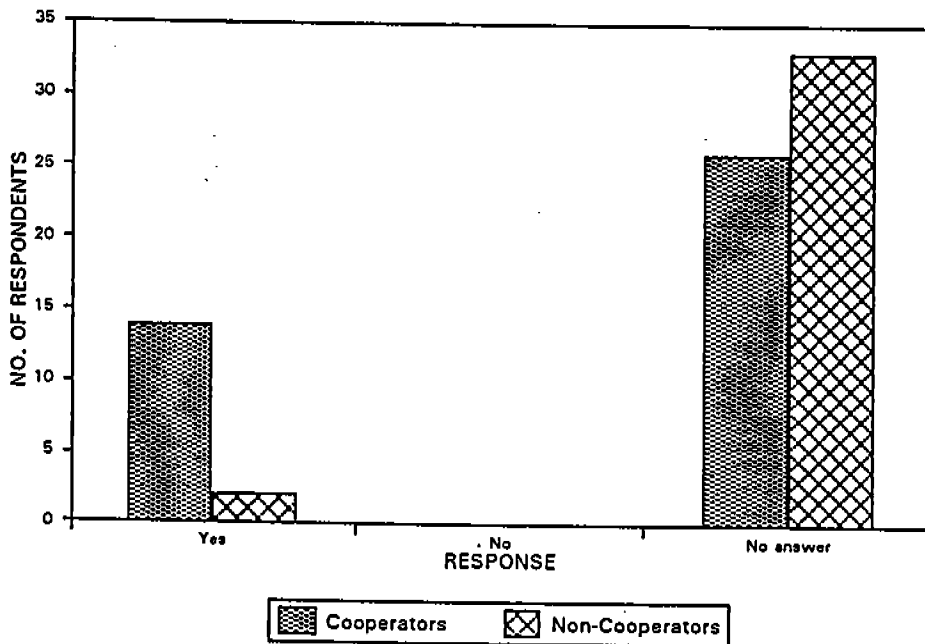


Figure 9b. WOULD YOU ATTRIBUTE IMPROVED STATUS TO PARTICIPATION IN CVRP?



**Table 16**  
**FACTORS CAUSING PERCEIVED CHANGE IN SOCIOECONOMIC STATUS, 1992**

STATUS	COOPERATORS	X	NON-COOPERATORS	X
Poorer	More kinds of fishing gear operating now	1	Outsiders fishing in our waters	2
	Use of (illegal) fine-meshed nets, presence of big-time fishermen	1		
No change (Same)	Increase in fishermen and fishing methods	5	Illegal fishing	3
	CVRP projects useless, ineffective or failed	4	- Fishery laws not enforced	
	- ARs destroyed by typhoons		- Illegal fishing nets	
	- Lack of appropriate gear		- Compressors destroy corals	
	- Mussel culture unsuccessful		So many fishermen now	2
	No increase in catch	1	Non-cooperators cannot fish in ARs	1
Better off			ARs destroyed by typhoon	1
	Due to CVRP projects (AR, FAD, sanctuary, mangrove reforestation)	6	Most CVRP members are lazy	1
	Increased catch	6	Other reasons	3
	Illegal fishing minimized	6	More abundant fish, increased catch	3
	Other reasons	1	Because of CVRP projects, fish sanctuaries, mangroves	3
No answer			Illegal fishing minimized	1
		11		16

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

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The CVRP may also be credited for introducing activities and developing conservation-awareness among the fishermen that would benefit them and the resource they depend on in the long run (Table 17).

The same favorable self-assessment was evident among the cooperators when comparing their status with other members of the community: 40% of them perceived themselves as better off, while only 17% of the non-cooperators believed the same (Table 15, Figure 9c). The economically better-off members attained such status because they have other sources of income, such as fish buy-and-sell, sari-sari store and farming (Table 18). If a trend of shifting their livelihood from fishing to other activities is established over time, and new entries to the fishery are limited, such developments will certainly relieve the pressure on the resource, improve their household incomes as well as ensure sustained yields for those who remain in the fishery.

#### B. *Perceptions on the CVRP*

The opinions expressed by the respondents on the most important contributions and weaknesses of the CVRP are instructive for planners and implementors of similar projects (Table 19 and 20). Both the cooperator and non-cooperator groups cited as CVRP's most important contributions the mangrove reforestation and artificial reefs project activities. This perception undoubtedly resulted from their actual experience of better catches in AR areas and increase in fish abundance attributed to mangrove reforestation, as well as the promise of greater income from the mangrove resources as these grow in time.

The responses regarding the weaknesses of CVRP do not pinpoint a singularly common attribute. It is worth noting, nevertheless, that there is dissatisfaction on the effectiveness and durability of the ARs and disappointment on some aspects of CVRP management like inadequate information dissemination and lack of follow-up. This last comment was encountered quite frequently in informal interviews, indicating that CVRP management abandoned some areas or some projects after the initial activities, or failed to sustain the crucial aspect of community organizing work.

### V. CONCLUSION

The positive contribution of CVRP in increasing incomes of the poor fishing households warrant continued efforts in its resource schemes into the future. There is a need, however, to guarantee exclusion in access to the project's gains through a well-defined system of property rights for the cooperators, and a system of payments by the non-cooperators who also benefit from the project activities. Ideally, efforts should be made to persuade or require all fishermen in an area to participate in planning and implementing a consensual management plan.



**Table 17**  
**WHAT RESPONDENT IS DOING NOW WHICH HE DID NOT DO**  
**BEFORE CVRP STARTED, 1992**

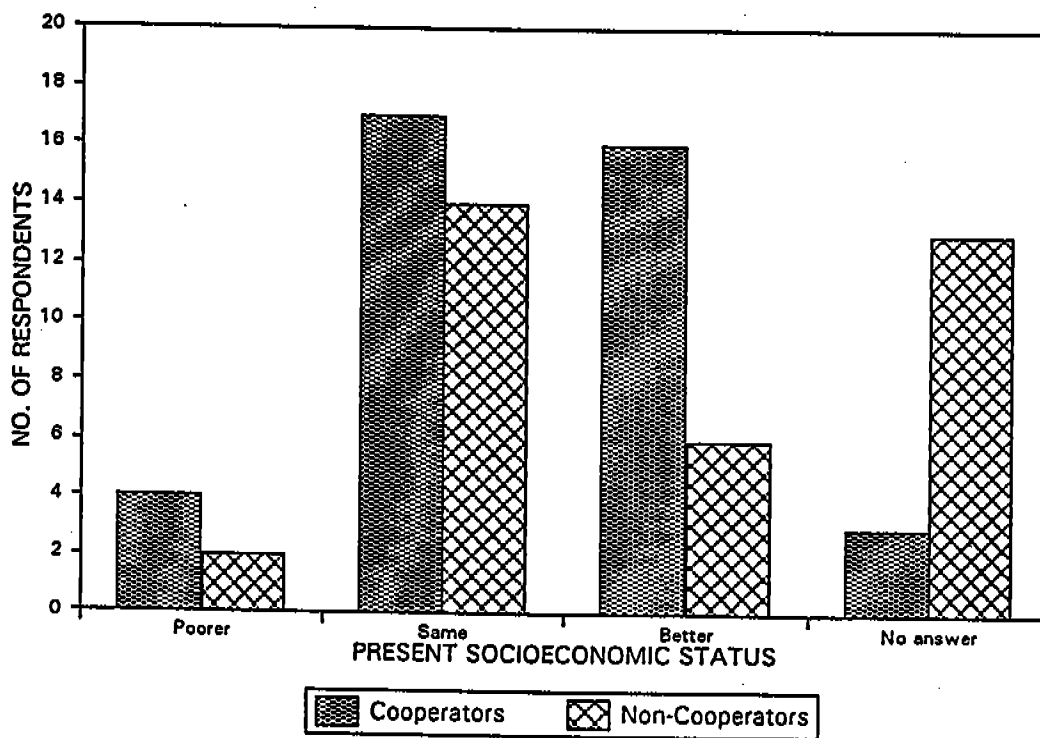
COOPERATORS	X	NON-COOPERATORS	X
Construction of ARs, FADs	10	Realized the importance of natural resources	1
Mangrove plantation and maintenance	7	Seminars on AR construction, mangrove plantation	1
Construction/operation of new fishing gear (fish traps, beach seine, gill net, fish cage)	6	Gill net construction	1
Help in controlling illegal fishing and guarding the fish sanctuary	3	Planting of forest trees	1
Seaweed culture	3	Same activities	4
Miracle hole	2	No answer	27
Involvement in different projects	1		
Sustain the project until it grows big	1		
Wood gathering for fuel	1		
Same activities	8		
No answer	8		

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

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Figure 9c. PRESENT STATUS COMPARED WITH OTHER COMMUNITY MEMBERS



**Table 18**  
**CHARACTERISTICS OF ECONOMICALLY BETTER OFF MEMBERS OF THE COMMUNITY**  
**1992**

COOPERATORS	X	NON-COOPERATORS	X
Have other sources of income (fish buy-and-sell, crops, sari-sari store, etc.)	3	Have other business (fish drying, buy-and-sell, sari-sari store, cattle raising, etc.)	5
Have either two kinds of gear or better fishing methods	2	Commercial fishing operations	1
Have salaried family members	1	More fish catch	1
Have better knowledge, are lucky	1		
ARs are open to fishermen	1		
CVRP benefits and privileges	1		

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

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**Table 19**  
**PERCEPTION/OPINION ON THE MOST IMPORTANT CONTRIBUTION OF CVRP**  
**IN THE COMMUNITY, 1992**

COOPERATORS	X	NON-COOPERATORS	X
Mangrove reforestation	17	Artificial reefs (ARs)	6
Artificial reefs (ARs)	12	Mangrove reforestation	3
Fish sanctuaries	8	Minimization or control of illegal fishing	3
Fish aggregating device (FAD)	6	Fish sanctuaries	2
Other CVRP activities (not specified)	3	Fish aggregating device (FAD)	2
Minimization or control of illegal fishing	3	CVRP projects (not specified)	1
Road construction	2	Road construction	1
CVRP seminars and training	2	Eucheuma (seaweed) culture	1
Introduction of new fishing methods	2	Livestock dispersal	1
Technical assistance	1	None	1
Eucheuma (seaweed) culture	1	No comment	1
Livestock dispersal	1	No answer	19
Miracle hole	1		
Mobilization and organization of fishermen	1		
Dole-outs	1		
Really help the poor	1		
None	2		
No answer	6		

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

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**Table 20**  
**PERCEPTION/OPINION ON THE WEAKNESSES OF CVRP, 1992**

COOPERATORS	X	NON-COOPERATORS	X
<b>On Artificial Reefs (ARs):</b>		<b>On Artificial Reefs (ARs):</b>	
Not effective, introduced without studies, waste of money	2	ARs collapsed, not guaranteed, not suitable in area, are waste of money, useless	4
Bamboo ARs good only for 6 months, no follow-up	2	Cement ARs will just sink deeper and deeper	1
Some ARs not installed, left on shore	1		
<b>On other CVRP projects:</b>			
No follow-up after first year	1		
Have no effect	1		
No feasibility study for mussel culture project	1		
<b>On CVRP management:</b>		<b>On CVRP management:</b>	
No proper information dissemination to the community	1	CVRP abandoned the projects after the typhoon	1
Agreement on the use of only hook-and-line in AR area is not followed	1	Projects always voluntary (walang pangbigas)	1
Always voluntary labor	1	Projects are not properly managed	1
No support for acquiring better fishing equipment	1	Our community did not receive any benefits/projects except mangrove seedlings	1
Fishing gear not distributed to individuals	1	Am not a member because they did not call me	1
Distribution of goods did not benefit me	1		
Beneficiaries not loyal	1		
None	10	None	1
No comment	11	No comment	6
No answer	6	No answer	19

Note: X = no. of times mentioned

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992.

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- National Statistical Office (NSO). 1985 and 1988. Family Income and Expenditures Survey (FIES).

## **ANNEX TABLES**

**Annex Table 1**  
**INCIDENCE OF HOUSEHOLD PARTICIPATION IN CVRP ACTIVITIES**  
**By Province and Municipality, 1984 - 1991**

Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>BOHOL</b>										
BIEN UNIDO	CO1	7	11	78	214	369	327	312	305	
	CO2	2	2	2	4	38	19	19	19	
	CO3	0	0	0	7	34	13	13	14	
	CO4	69	69	105	240	358	227	226	206	
	Sub-total	78	82	185	465	799	586	570	544	
	IN1	0	0	0	0	0	0	0	0	
	IN3	0	0	0	2	2	22	22	22	
	IN4	0	0	0	12	43	77	89	129	
	Sub-total	0	0	0	14	45	99	111	151	
	NF1	0	9	48	95	222	270	260	213	
	NF2	3	10	43	125	245	228	208	174	
	NF3	5	12	33	56	210	260	279	213	
	NF4	0	0	0	14	3	42	45	36	
	NF5	0	0	0	0	0	0	1	0	
	NF6	0	0	24	34	70	47	47	47	
	NF7	0	0	0	3	30	69	46	38	
	Sub-total	8	31	148	327	780	916	886	721	
	Mun. Sub-total		86	113	333	806	1624	1601	1567	1416
	PRES. C. P. GARCIA	CO1	0	0	0	4	49	33	29	29
		CO2	0	0	0	3	35	14	13	13
CO3		0	0	0	3	37	14	14	13	
CO4		0	0	0	6	45	25	24	24	
Sub-total		0	0	0	16	166	86	80	79	
IN1		0	0	0	0	0	2	2	4	
IN3		0	0	0	0	0	2	2	5	
IN4		0	0	0	0	3	12	24	29	
Sub-total		0	0	0	0	3	16	28	38	
NF1		0	0	0	6	45	45	32	38	
NF2		0	0	0	0	27	27	28	28	
NF3		3	3	3	4	15	18	17	10	
NF4		0	0	0	0	1	1	1	1	
NF6		0	0	0	0	0	5	5	7	
NF7		0	0	0	0	26	30	25	14	
Sub-total		3	3	3	10	114	126	108	98	
Mun. Sub-total			3	3	3	26	283	228	216	215

AXT1-BOHOL, P1/3



Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>BOHOL (continued)</b>										
JETAFE	CO1	0	0	0	0	1	0	0	0	
	CO2	0	0	0	0	2	1	1	1	
	CO3	0	0	0	0	2	1	1	1	
	CO4	0	0	0	0	2	1	1	1	
	Sub-total	0	0	0	0	7	3	3	3	
	NF1	0	0	0	0	1	1	0	1	
	NF2	0	0	0	0	1	2	2	2	
	Sub-total	0	0	0	0	2	3	2	3	
	Mun. Sub-total	0	0	0	0	9	6	5	3	
	TALIBON	CO1	22	143	243	285	429	342	328	274
CO2		2	5	11	13	49	28	27	35	
CO3		1	24	12	8	40	32	33	32	
CO4		38	147	171	165	331	207	208	137	
Sub-total		63	319	437	471	849	609	596	519	
IN3		0	0	4	3	0	4	4	4	
IN4		0	0	0	4	27	40	49	59	
Sub-total		0	0	4	7	27	44	53	63	
NF1		18	132	165	181	330	322	313	246	
NF2		20	48	132	161	190	214	208	176	
NF3		6	105	152	226	377	367	367	259	
NF4		0	0	9	23	38	52	55	52	
NF5		0	0	0	4	6	6	6	5	
NF6		0	51	15	13	49	53	53	53	
NF7		0	0	0	0	69	82	83	84	
Sub-total		44	336	473	608	1059	1096	1085	875	
Mun. Sub-total		107	655	914	1086	1935	1749	1734	1457	
UBAY		CO1	31	70	94	149	453	313	303	285
		CO2	5	7	11	14	132	65	64	63
		CO3	2	3	5	16	156	66	65	65
	CO4	78	88	93	144	409	211	207	192	
	Sub-total	116	168	203	323	1150	655	639	605	
	IN3	0	0	0	0	0	8	8	9	
	IN4	0	0	0	34	68	114	136	184	
	Sub-total	0	0	0	34	68	122	144	193	
	NF1	11	60	49	82	204	256	262	256	
	NF2	15	25	54	76	166	166	164	138	
	NF3	19	27	36	76	158	168	172	153	
	NF4	0	0	0	8	33	31	39	30	
	NF5	0	0	0	3	6	5	6	4	
	NF6	3	7	3	2	26	28	28	28	
	NF7	1	1	0	3	67	139	148	121	
	Sub-total	49	120	142	250	660	793	819	730	
	Mun. Sub-total	165	288	345	607	1878	1570	1602	1528	

Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>BOHOL (continued)</b>										
<b>SITE TOTALS</b>	CO1	60	224	415	652	1301	1015	972	893	
	CO2	9	14	24	34	256	127	124	122	
	CO3	3	27	17	34	269	126	126	125	
	CO4	185	304	369	555	1145	671	666	610	
	Sub-total	257	569	825	1275	2971	1939	1888	1750	
	IN1	0	0	0	0	0	2	2	4	
	IN3	0	0	4	5	2	36	36	40	
	IN4	0	0	0	50	141	243	298	401	
	Sub-total	0	0	4	55	143	281	336	445	
	NF1	29	201	262	364	802	894	867	754	
	NF2	38	83	229	362	629	637	610	518	
	NF3	33	147	224	362	760	813	835	635	
	NF4	0	0	9	45	75	126	140	119	
	NF5	0	0	0	7	12	11	13	9	
	NF6	3	58	42	49	145	133	133	135	
	NF7	1	1	0	6	192	320	302	257	
	Sub-total	104	490	766	1195	2615	2934	2900	2427	
	<b>GRAND TOTAL</b>		<b>361</b>	<b>1059</b>	<b>1595</b>	<b>2525</b>	<b>5729</b>	<b>5154</b>	<b>5124</b>	<b>4622</b>

AXT1-BOHOL, P3/3

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**Annex Table 1**  
**INCIDENCE OF HOUSEHOLD PARTICIPATION IN CVRP ACTIVITIES**  
**By Province and Municipality, 1984 – 1991**

Province/ Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>CEBU</b>										
ALCANTARA	CO1	4	13	62	78	121	77	70	70	
	CO2	0	0	0	0	2	1	1	1	
	CO3	0	0	0	1	3	1	2	2	
	CO4	18	18	32	47	90	44	40	40	
	Sub-total	22	31	94	126	216	123	113	113	
	IN3	0	0	0	1	5	8	9	9	
	IN4	0	0	0	0	3	4	4	4	
	Sub-total	0	0	0	1	8	12	13	13	
	NF1	0	14	39	49	94	93	86	64	
	NF2	1	2	18	31	43	45	47	33	
	NF3	2	5	18	27	79	88	91	64	
	NF4	0	0	0	1	3	17	17	10	
	NF5	0	0	0	0	0	0	0	1	
	NF6	0	4	6	4	6	7	7	7	
	NF7	0	0	0	0	4	16	12	11	
	Sub-total	3	25	81	112	229	266	260	190	
	Mun. Sub-total		25	56	175	239	453	401	386	316
	ALEGRIA	CO1	2	74	87	94	99	81	73	63
		CO2	0	1	3	3	3	2	2	2
		CO3	0	0	0	0	0	2	3	1
CO4		9	63	41	38	58	45	45	41	
Sub-total		11	138	131	135	160	130	123	107	
IN4		0	0	0	1	8	8	8	8	
NF1		4	42	48	39	50	52	47	33	
NF2		3	26	44	37	33	41	42	35	
NF3		2	43	50	47	78	82	81	46	
NF4		0	0	6	9	0	13	13	14	
NF6		0	7	2	12	8	10	10	10	
NF7		0	0	0	0	1	10	9	8	
Sub-total		9	118	150	144	170	208	202	146	
Mun. Sub-total			20	256	281	280	338	346	333	261

AXT1-CEBU, P1/4

Province/ Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>CEBU (continued)</b>										
<b>BADIAN</b>	CO1	23	34	115	226	489	366	344	323	
	CO2	3	7	11	22	138	69	69	69	
	CO3	5	5	8	17	124	61	62	61	
	CO4	58	63	107	187	467	233	231	229	
	Sub--total	89	109	241	452	1218	729	706	682	
	IN3	0	0	0	12	15	21	21	22	
	IN4	1	0	0	30	66	143	192	267	
	Sub--total	1	0	0	42	81	164	213	289	
	NF1	12	26	52	92	218	295	303	283	
	NF2	29	40	113	178	271	253	242	206	
	NF3	13	17	60	96	200	219	222	179	
	NF4	0	0	1	8	84	54	61	55	
	NF5	0	0	1	2	8	7	7	6	
	NF6	1	8	0	14	88	60	60	60	
	NF7	0	0	0	5	65	151	174	142	
	Sub--total	55	91	227	395	934	1039	1069	931	
	Mun. Sub--total	145	200	468	889	2233	1932	1988	1902	
	<b>BARILI</b>	CO1	0	0	0	2	6	3	3	3
		CO2	0	0	0	0	1	0	0	0
		CO3	0	0	0	0	1	0	0	0
CO4		0	0	0	2	5	2	2	2	
Sub--total		0	0	0	4	13	5	5	5	
IN3		0	0	0	1	1	1	1	1	
NF2		0	0	0	1	4	4	4	3	
NF3		0	0	0	0	3	3	3	2	
NF4		0	0	0	0	1	0	0	0	
NF6		0	0	0	1	0	1	1	1	
NF7		0	0	0	0	1	1	1	1	
Sub--total		0	0	0	2	9	9	9	7	
Mun. Sub--total		0	0	0	7	23	15	15	13	
<b>DUMANJUG</b>	CO1	0	0	0	2	9	4	4	5	
	CO2	0	0	0	0	1	1	1	0	
	CO4	0	0	0	3	11	4	4	4	
	Sub--total	0	0	0	5	21	9	9	9	
	IN3	0	0	0	4	4	4	4	4	
	NF1	0	0	0	0	5	4	2	2	
	NF2	0	0	0	4	7	7	7	6	
	NF3	1	1	1	1	3	4	4	2	
	NF4	0	0	0	0	2	1	1	1	
	NF6	0	0	0	3	0	2	2	3	
	NF7	0	0	0	0	2	2	2	2	
	Sub--total	1	1	1	8	19	20	18	16	
	Mun. Sub--total	1	1	1	17	44	33	31	29	

AXT1--CEBU, P2/4

Province/ Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>CEBU (continued)</b>										
MALABUYOC	CO1	0	12	13	20	31	22	24	24	
	CO2	0	0	0	1	1	1	1	1	
	CO3	0	0	0	0	1	0	0	0	
	CO4	13	13	13	20	27	20	19	15	
	Sub-total	13	25	26	41	60	43	44	40	
	IN3	0	0	0	4	4	4	4	4	
	IN4	0	0	0	2	2	2	2	2	
	Sub-total	0	0	0	6	6	6	6	6	
	NF1	1	14	10	11	17	14	14	13	
	NF2	1	1	1	6	7	10	13	14	
	NF3	0	0	0	2	9	12	14	12	
	NF4	0	0	0	0	1	0	0	0	
	NF6	0	0	0	3	0	1	1	1	
	NF7	0	0	0	0	1	4	6	7	
	Sub-total	2	15	11	22	35	41	48	47	
	Mun. Sub-total		15	40	37	69	101	90	98	93
	MOALBOAL	CO1	35	71	96	207	272	230	201	190
		CO2	3	10	11	12	28	18	18	17
		CO3	4	5	6	12	10	18	18	15
		CO4	75	79	100	183	221	136	132	112
Sub-total		117	165	213	414	531	402	369	334	
IN3		0	0	5	3	2	10	10	10	
IN4		0	0	0	3	20	19	21	23	
Sub-total		0	0	5	6	22	29	31	33	
NF1		18	39	51	59	90	131	126	131	
NF2		26	53	69	141	169	177	164	154	
NF3		0	5	9	65	91	114	116	108	
NF4		0	0	1	22	11	25	29	27	
NF5		0	0	0	1	3	1	1	1	
NF6		0	13	14	24	22	29	29	29	
NF7		0	0	1	2	10	42	37	52	
Sub-total		44	110	145	314	396	519	502	502	
Mun. Sub-total			161	275	363	734	949	950	902	869

AXT1-CEBU, P3/4

Province/ Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>CEBU (continued)</b>										
RONDA	CO1	0	0	1	34	58	39	40	39	
	CO2	0	0	1	1	9	5	5	4	
	CO3	0	0	0	0	11	6	7	5	
	CO4	0	0	1	28	53	18	18	18	
	Sub-total	0	0	3	63	131	68	70	66	
	IN3	0	0	0	20	22	24	24	24	
	IN4	0	0	1	2	7	6	6	6	
	Sub-total	0	0	1	22	29	30	30	30	
	NF1	0	0	1	6	24	26	20	19	
	NF2	0	0	1	20	28	28	28	25	
	NF3	0	0	0	0	13	13	13	8	
	NF4	0	0	0	0	3	2	3	2	
	NF5	0	0	0	0	0	1	4	4	
	NF6	0	0	0	18	1	8	8	9	
	NF7	0	0	0	1	7	11	13	12	
	Sub-total	0	0	2	45	76	89	89	79	
	Mun. Sub-total		0	0	6	130	236	187	189	175
	SITE TOTALS	CO1	64	204	374	663	1085	822	759	717
		CO2	6	18	26	39	183	97	97	94
		CO3	9	10	14	30	150	88	92	84
		CO4	173	236	294	508	932	502	491	461
Sub-total		252	468	708	1240	2350	1509	1439	1356	
IN3		0	0	5	45	53	72	73	74	
IN4		1	0	1	38	106	182	233	310	
Sub-total		1	0	6	83	159	254	306	384	
NF1		35	135	201	256	498	615	598	545	
NF2		60	122	246	418	562	565	547	476	
NF3		18	71	138	238	476	535	544	421	
NF4		0	0	8	40	105	112	124	109	
NF5		0	0	1	3	11	9	12	12	
NF6		1	32	22	79	125	118	118	120	
NF7		0	0	1	8	91	237	254	235	
Sub-total		114	360	617	1042	1868	2191	2197	1918	
GRAND TOTAL			367	828	1331	2365	4377	3954	3942	3658

AXT1-CEBU, P4/4

**Annex Table 1**  
**INCIDENCE OF HOUSEHOLD PARTICIPATION IN CVRP ACTIVITIES**  
**By Province and Municipality, 1984 – 1991**

Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>NEGROS ORIENTAL</b>										
<b>NEGROS-BINDOY</b>										
<b>AYUNGON</b>	CO1	16	17	56	118	179	126	118	117	
	CO2	1	1	6	11	37	22	21	19	
	CO3	0	0	4	8	32	18	19	18	
	CO4	20	25	46	77	136	64	64	63	
	Sub-total	37	43	112	214	384	230	222	217	
	IN1	0	0	0	0	0	0	0	0	
	IN3	0	0	2	15	16	22	22	22	
	IN4	0	0	0	6	23	31	38	44	
	Sub-total	0	0	2	21	39	53	60	66	
	NF1	5	9	16	29	73	83	85	76	
	NF2	13	13	51	89	109	100	97	90	
	NF3	4	5	29	50	77	85	88	72	
	NF4	0	0	0	3	41	26	29	31	
	NF5	0	0	1	1	0	3	4	4	
	NF6	0	9	1	10	39	25	25	26	
	NF7	0	0	0	0	29	51	56	51	
	Sub-total	22	36	98	182	368	373	384	350	
	Mun. Sub-total		59	79	212	417	791	656	666	633
	<b>BINDOY</b>	CO1	25	115	155	263	348	282	269	249
		CO2	6	15	22	26	46	34	34	32
CO3		0	0	5	20	41	39	39	36	
CO4		70	109	139	219	318	182	178	169	
Sub-total		101	239	321	528	753	537	520	486	
IN3		0	0	2	2	1	2	2	2	
IN4		0	0	0	1	23	31	33	43	
Sub-total		0	0	2	3	24	33	35	45	
NF1		23	76	101	104	139	197	208	208	
NF2		34	102	139	230	254	236	221	206	
NF3		0	19	52	116	169	181	183	153	
NF4		0	0	1	50	31	37	40	39	
NF5		0	0	3	8	6	8	6	6	
NF6		2	8	19	25	52	43	43	43	
NF7		0	0	0	2	11	75	94	112	
Sub-total		59	205	315	535	662	777	795	767	
Mun. Sub-total			160	444	638	1066	1439	1347	1350	1298

Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>NEGROS-BINDOY (continued)</b>										
MANJUYOD	CO1	18	103	142	203	375	392	366	325	
	CO2	3	3	2	6	68	43	43	43	
	CO3	1	4	5	8	34	19	20	21	
	CO4	96	169	126	177	359	245	244	196	
	Sub-total	118	279	275	394	836	699	673	585	
	IN3	0	0	0	7	7	28	28	28	
	IN4	0	0	2	15	72	73	80	79	
	Sub-total	0	0	2	22	79	101	108	107	
	NF1	0	77	92	133	278	296	289	247	
	NF2	5	23	46	75	219	271	258	219	
	NF3	2	78	81	102	269	307	316	241	
	NF4	0	0	3	1	20	44	48	50	
	NF5	0	0	0	1	1	0	0	0	
	NF6	3	3	16	35	46	48	49	47	
	NF7	0	0	0	1	27	67	59	56	
	Sub-total	10	181	238	348	860	1033	1019	860	
	Mun. Sub-total		128	460	515	764	1775	1833	1800	1552
	TAYASAN	CO1	9	17	39	83	148	123	121	114
		CO2	0	0	0	3	26	16	16	16
		CO3	2	2	2	7	29	20	20	19
		CO4	15	19	29	69	103	65	65	65
Sub-total		26	38	70	162	306	224	222	214	
IN3		0	0	4	0	0	6	6	7	
IN4		0	0	0	20	22	43	52	76	
Sub-total		0	0	4	20	22	49	58	83	
NF1		4	11	15	43	69	94	97	93	
NF2		6	11	26	40	55	58	56	53	
NF3		5	6	6	41	56	57	57	53	
NF4		1	1	2	2	11	17	22	17	
NF5		0	0	0	0	2	2	2	2	
NF6		1	6	2	2	16	12	12	11	
NF7		0	0	0	5	14	48	57	33	
Sub-total		17	35	51	133	223	288	303	262	
Mun. Sub-total			43	73	125	315	551	561	583	559

AXT1-NEGROS, P2/5



Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>NEGROS-BINDOY (continued)</b>										
SITE TOTALS (BINDOY)	CO1	68	252	392	667	1050	923	874	805	
	CO2	10	19	30	46	177	115	114	110	
	CO3	3	6	16	43	136	96	98	94	
	CO4	201	322	340	542	916	556	551	493	
	Sub-total	282	599	778	1298	2279	1690	1637	1502	
	IN1	0	0	0	0	0	0	0	0	
	IN3	0	0	8	24	24	58	58	59	
	IN4	0	0	2	42	140	178	203	242	
	Sub-total	0	0	10	66	164	236	261	301	
	NF1	32	173	224	309	559	670	679	624	
	NF2	58	149	262	434	637	665	632	568	
	NF3	11	108	168	309	571	630	644	519	
	NF4	1	1	6	56	103	124	139	137	
	NF5	0	0	4	10	9	13	12	12	
	NF6	6	26	38	72	153	128	129	127	
	NF7	0	0	0	8	81	241	266	252	
	Sub-total	108	457	702	1198	2113	2471	2501	2239	
	<b>GRAND TOTAL</b>		<b>390</b>	<b>1056</b>	<b>1490</b>	<b>2562</b>	<b>4556</b>	<b>4397</b>	<b>4399</b>	<b>4042</b>
	<b>NEGROS-BAYAWAN</b>									
	BASAY	CO1	23	53	96	176	282	219	207	179
		CO2	1	8	16	19	59	42	43	43
		CO3	1	3	5	16	40	43	45	46
		CO4	44	57	93	152	243	115	115	115
Sub-total		69	121	210	363	624	419	410	383	
IN3		0	0	7	0	0	3	3	3	
IN4		1	0	0	6	22	31	32	49	
Sub-total		1	0	7	6	22	34	35	52	
NF1		8	24	35	53	79	121	134	120	
NF2		13	38	79	153	209	178	165	150	
NF3		2	9	45	130	197	195	200	187	
NF4		0	0	0	2	33	25	26	27	
NF5		0	0	0	3	5	5	5	5	
NF6		1	21	6	3	36	41	41	40	
NF7		0	0	0	0	11	55	82	77	
Sub-total		24	92	165	344	570	620	653	606	
<b>Mun. Sub-total</b>		<b>94</b>	<b>213</b>	<b>382</b>	<b>713</b>	<b>1216</b>	<b>1073</b>	<b>1098</b>	<b>1041</b>	

Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>NEGROS-BAYAWAN (continued)</b>										
BAYAWAN	CO1	3	10	28	103	208	181	172	173	
	CO2	1	2	3	5	46	29	28	28	
	CO3	1	1	1	5	48	22	22	22	
	CO4	24	25	29	100	156	94	94	95	
	Sub-total	29	38	61	213	458	326	316	318	
	IN3	0	0	0	5	5	12	12	13	
	IN4	0	0	0	23	32	78	116	156	
	Sub-total	0	0	0	28	37	90	128	169	
	NF1	1	8	12	41	96	111	102	102	
	NF2	3	4	20	71	117	127	119	115	
	NF3	3	7	7	29	76	84	86	64	
	NF4	0	0	0	6	23	21	22	19	
	NF5	0	0	0	2	3	2	2	1	
	NF6	3	2	2	8	52	32	32	32	
	NF7	0	0	0	4	38	52	41	30	
	Sub-total	10	21	41	161	405	429	404	363	
	Mun. Sub-total		39	59	102	402	900	845	848	850
	SANTA CATALINA	CO1	16	31	47	62	60	68	62	74
		CO2	1	3	5	5	5	5	4	4
		CO3	1	1	3	4	3	4	4	3
		CO4	25	28	38	45	43	40	40	38
		Sub-total	43	63	93	116	111	117	110	119
IN3		0	0	0	2	1	1	1	1	
IN4		0	0	0	1	1	1	1	1	
Sub-total		0	0	0	3	2	2	2	2	
NF1		8	15	28	28	28	49	41	73	
NF2		26	33	36	57	55	59	55	60	
NF3		0	0	5	26	21	26	24	23	
NF4		0	0	0	12	0	7	9	8	
NF5		0	0	1	7	1	3	3	3	
NF6		0	12	5	3	14	11	11	11	
NF7		0	0	2	0	2	22	22	50	
Sub-total		34	60	77	133	121	177	165	228	
Mun. Sub-total			77	123	170	252	234	296	277	349

AXT1-NEGROS, P4/5

Province / Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991
<b>NEGROS-BAYAWAN (continued)</b>									
<b>SITE TOTALS (BAYAWAN)</b>	CO1	42	94	171	341	550	468	441	426
	CO2	3	13	24	29	110	76	75	75
	CO3	3	5	9	25	91	69	71	71
	CO4	93	110	160	297	442	249	249	248
	Sub-total	141	222	364	692	1193	862	836	820
	IN3	0	0	7	7	6	16	16	17
	IN4	1	0	0	30	55	110	149	206
	Sub-total	1	0	7	37	61	126	165	223
	NF1	17	47	75	122	203	281	277	295
	NF2	42	75	135	281	381	364	339	325
	NF3	5	16	57	185	294	305	310	274
	NF4	0	0	0	20	56	53	57	54
	NF5	0	0	1	12	9	10	10	9
	NF6	4	35	13	14	102	84	84	83
	NF7	0	0	2	4	51	129	145	157
Sub-total	68	173	283	638	1096	1226	1222	1197	
<b>GRAND TOTAL</b>		<b>210</b>	<b>395</b>	<b>654</b>	<b>1367</b>	<b>2350</b>	<b>2214</b>	<b>2223</b>	<b>2240</b>

AXT1-NEGROS, P5/5

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**Annex Table 1**  
**INCIDENCE OF HOUSEHOLD PARTICIPATION IN CVRP ACTIVITIES**  
**By Province and Municipality, 1984 - 1991**

Province/ Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>SIQUIJOR</b>										
E. VILLANUEVA	CO1	0	0	3	44	42	40	41	40	
	CO2	0	0	0	0	2	2	1	2	
	CO3	0	0	0	6	7	5	6	5	
	CO4	0	0	1	41	34	23	23	23	
	Sub-total	0	0	4	91	85	70	71	70	
	IN3	0	0	0	0	0	1	1	1	
	IN4	0	0	0	2	24	33	42	46	
	Sub-total	0	0	0	2	24	34	43	47	
	NF1	0	0	1	21	21	27	28	22	
	NF2	0	0	1	22	21	24	25	28	
	NF3	0	0	0	5	11	17	18	13	
	NF4	0	0	0	1	0	3	3	2	
	NF5	0	0	0	1	0	1	1	1	
	NF6	0	0	0	1	0	0	0	0	
	NF7	0	0	0	0	1	10	11	12	
	Sub-total	0	0	2	51	54	82	86	78	
	Mun. Sub-total		0	0	6	144	163	186	200	195
	LARENA	CO1	0	0	1	24	33	22	21	21
		CO2	0	0	1	5	10	5	6	5
		CO3	0	0	0	0	4	3	3	3
CO4		0	0	1	15	26	12	13	12	
Sub-total		0	0	3	44	73	42	43	41	
IN1		0	0	0	0	0	1	1	1	
IN3		0	0	0	18	18	20	20	21	
IN4		0	0	0	0	2	3	4	5	
Sub-total		0	0	0	18	20	24	25	27	
NF1		0	0	1	12	25	25	20	20	
NF2		0	0	1	23	33	33	31	31	
NF3		0	0	0	1	12	12	12	6	
NF4		0	0	0	0	1	2	3	2	
NF5		0	0	0	0	0	2	6	6	
NF6		0	0	1	14	0	7	7	7	
NF7		0	0	0	0	17	15	17	9	
Sub-total		0	0	3	50	88	96	96	81	
Mun. Sub-total			0	0	6	112	181	162	164	149

AXT1-SIQUIJOR, P1/3

Province/ Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>SIQUIJOR (continued)</b>										
LAZI	CO1	0	0	0	22	17	17	17	17	
	CO2	0	0	0	1	1	1	0	0	
	CO3	0	0	0	2	2	2	2	2	
	CO4	0	0	0	20	15	10	10	10	
	Sub-total	0	0	0	45	35	30	29	29	
	IN3	0	0	0	0	0	1	1	1	
	IN4	0	0	0	2	4	4	4	4	
	Sub-total	0	0	0	2	4	5	5	5	
	NF1	0	0	0	6	3	5	6	5	
	NF2	0	0	0	12	13	13	13	13	
	NF3	0	0	0	3	3	3	4	2	
	NF4	0	0	0	0	0	2	3	2	
	NF5	0	0	0	0	1	0	0	0	
	NF6	0	0	0	1	0	1	1	1	
	NF7	0	0	0	0	0	2	1	1	
	Sub-total	0	0	0	22	20	26	28	24	
	Mun. Sub-total		0	0	0	69	59	61	62	58
MARIA	CO1	0	0	0	35	33	30	27	29	
	CO2	0	0	0	4	5	3	3	3	
	CO3	0	0	0	2	2	3	3	2	
	CO4	0	0	0	29	23	13	13	13	
	Sub-total	0	0	0	70	63	49	46	47	
	IN3	0	0	0	2	2	4	4	4	
	IN4	0	0	0	4	13	13	13	13	
	Sub-total	0	0	0	6	15	17	17	17	
	NF1	0	0	0	12	11	15	13	12	
	NF2	0	0	0	33	34	37	36	35	
	NF3	0	0	0	6	9	11	11	6	
	NF4	0	0	0	2	4	3	4	3	
	NF6	0	0	0	4	1	3	3	3	
	NF7	0	0	0	1	1	7	6	6	
	Sub-total	0	0	0	58	60	76	73	65	
	Mun. Sub-total		0	0	0	134	138	142	136	129
	SAN JUAN	CO1	0	0	9	39	55	48	46	50
CO2		0	0	3	4	5	3	4	4	
CO3		1	1	1	4	5	4	6	4	
CO4		0	0	3	33	42	23	23	23	
Sub-total		1	1	16	80	107	78	79	81	
IN4		0	0	0	0	7	15	26	30	
NF1		0	0	3	34	46	44	38	36	
NF2		0	0	3	3	3	4	5	6	
NF3		1	1	4	5	18	26	23	18	
NF4		0	0	1	3	1	2	3	2	
NF5		0	0	0	3	6	6	6	6	
NF7		0	0	0	0	4	14	17	22	
Sub-total		1	1	11	48	78	96	92	90	
Mun. Sub-total			2	2	27	128	192	189	197	201

Province/ Municipality	ACTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	
<b>SIQUIJOR (continued)</b>										
SIQUIJOR	CO1	5	6	23	40	70	70	80	84	
	CO2	0	0	7	6	40	16	14	14	
	CO3	0	0	4	5	36	15	14	13	
	CO4	0	5	10	26	53	42	41	43	
	Sub-total	5	11	44	77	199	143	149	154	
	IN3	0	0	0	9	3	5	5	5	
	IN4	0	0	0	2	9	13	19	21	
	Sub-total	0	0	0	11	12	18	24	26	
	NF1	5	5	17	24	55	70	75	75	
	NF2	1	2	10	22	28	25	22	20	
	NF3	6	6	7	11	13	32	31	47	
	NF4	0	0	0	0	0	1	1	1	
	NF5	0	0	3	4	5	3	3	2	
	NF6	1	1	2	5	3	4	3	2	
	NF7	0	0	0	0	35	47	44	42	
	Sub-total	13	14	39	66	139	182	179	189	
	Mun. Sub-total		18	25	83	154	350	343	352	369
	SITE TOTALS	CO1	5	6	36	204	250	227	232	241
		CO2	0	0	11	20	63	30	28	28
		CO3	1	1	5	19	56	32	34	29
CO4		0	5	15	164	193	123	123	124	
Sub-total		6	12	67	407	562	412	417	422	
IN1		0	0	0	0	0	1	1	1	
IN3		0	0	0	29	23	31	31	32	
IN4		0	0	0	10	59	81	108	119	
Sub-total		0	0	0	39	82	113	140	152	
NF1		5	5	22	109	161	186	180	170	
NF2		1	2	15	115	132	136	132	133	
NF3		7	7	11	31	66	101	99	92	
NF4		0	0	1	6	6	13	17	12	
NF5		0	0	3	8	12	12	16	15	
NF6		1	1	3	25	4	15	14	13	
NF7		0	0	0	1	58	95	96	92	
Sub-total		14	15	55	295	439	558	554	527	
<b>GRAND TOTAL</b>		<b>20</b>	<b>27</b>	<b>122</b>	<b>741</b>	<b>1083</b>	<b>1083</b>	<b>1111</b>	<b>1101</b>	

**LEGEND:**

CO1 = Barangay Association Meeting Attended  
CO2 = Barangay Committee Meeting Attended  
CO3 = Barangay Dev't Council Meeting Attended  
CO4 = Barangay Assembly Meeting Attended  
IN1 = Road Construction  
IN2 = Road Maintenance  
IN3 = Trails Construction  
IN4 = Water Supply

NF1 = Artificial Reef  
NF2 = Mangrove Reforestation & Management  
NF3 = Coral Reef Area Management Activities  
NF4 = Mariculture Activities  
NF5 = Livestock Redispersed  
NF6 = Stewardship Contract(s) Received  
NF7 = Fish Attracting Device Activities

AXT1-SIQUIJOR, P3/3

Source: CVRPO, 1991. Barangay Household/Adoption Profiles, Nearshore Fisheries, As of December 1991.

**Annex Table 2**  
**SOCIOECONOMIC INDICATORS: NEARSHORE FISHERIES HOUSEHOLDS**  
**Cooperators and Non-Cooperators, 1992**

	NSF-BOHOL		NSF-CEBU		NSF-NEGROS (BIDOY)		NSF-SIQUIJOR									
	COOP	NON-COOP	COOP	NON-COOP	COOP	NON-COOP	COOP	NON-COOP								
<b>1. OWNERSHIP OF HOMELOT</b>																
Owned	11	85%	8	62%	6	60%	6	75%	3	38%	3	38%	6	67%	5	83%
Leased	1	8%	1	8%	1	10%	1	13%	2	25%	4	50%	2	22%	1	17%
Squatter	1	8%	2	15%	1	10%	0	0%	2	25%	0	0%	0	0%	0	0%
Others	0	0%	2	15%	2	20%	1	13%	1	13%	1	13%	0	0%	0	0%
No answer	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%
	13	100%	13	100%	10	100%	8	100%	8	100%	8	100%	9	100%	6	100%
<b>2. OWNERSHIP OF HOUSE</b>																
Owned	13	100%	13	100%	10	100%	8	100%	7	88%	8	100%	8	89%	6	100%
Rented	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Shared with parents	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Others	0	0%	0	0%	0	0%	0	0%	1	13%	0	0%	1	11%	0	0%
	13	100%	13	100%	10	100%	8	100%	8	100%	8	100%	9	100%	6	100%
<b>3. HOUSING MATERIALS</b>																
Light	7	54%	12	92%	8	80%	6	75%	8	100%	8	100%	6	67%	6	100%
Strong	3	23%	1	8%	0	0%	1	13%	0	0%	0	0%	2	22%	0	0%
Mixed	3	23%	0	0%	2	20%	1	13%	0	0%	0	0%	0	0%	0	0%
No answer	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%
	13	100%	13	100%	10	100%	8	100%	8	100%	8	100%	9	100%	6	100%

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	NSF-BOHOL				NSF-CEBU				NSF-NEGROS (BINDOY)				NSF-SIQUIJOR			
	COOP		NON-COOP		COOP		NON-COOP		COOP		NON-COOP		COOP		NON-COOP	
<b>4. OWNERSHIP OF LOT OTHER THAN HOMELOT</b>																
Owned	5	38%	1	8%	0	0%	0	0%	0	0%	1	13%	3	33%	2	33%
Leased	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%
Others	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%
None	8	62%	12	92%	10	100%	8	100%	8	100%	7	88%	2	22%	4	67%
No answer	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%
	13	100%	13	100%	10	100%	8	100%	8	100%	8	100%	9	100%	6	100%
<b>5. SOURCE OF DRINKING WATER</b>																
Artesian well	1	8%	1	8%	1	10%	0	0%	1	13%	2	25%	3	33%	2	33%
Deep well	8	62%	4	31%	0	0%	2	25%	2	25%	3	38%	2	22%	1	17%
Creeks/springs	3	23%	3	23%	0	0%	1	13%	0	0%	0	0%	1	11%	1	17%
Local water utilities	0	0%	5	38%	9	90%	5	63%	5	63%	3	38%	2	22%	2	33%
Others (bought)	1	8%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
No answer	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%
	13	100%	13	100%	10	100%	8	100%	8	100%	8	100%	9	100%	6	100%
<b>6. SOURCE OF POWER IN THE HOUSE</b>																
	N = 13		N = 13		N = 10		N = 8		N = 8		N = 8		N = 9		N = 6	
Electricity	2	15%	2	15%	5	50%	3	38%	2	25%	1	13%	2	22%	2	33%
Kerosene lamps	11	85%	11	85%	4	40%	5	63%	6	75%	7	88%	6	67%	4	67%
Battery (for radio)	12	92%	7	54%	7	70%	5	63%	4	50%	3	38%	5	56%	3	50%
Others	0	0%	0	0%	1	10%	0	0%	0	0%	0	0%	0	0%	0	0%
No answer	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%



	NSF-BOHOL				NSF-CEBU				NSF-NEGROS (BINDOY)				NSF-SIQUIJOR			
	COOP		NON-COOP		COOP		NON-COOP		COOP		NON-COOP		COOP		NON-COOP	
	N = 13	N = 13	N = 10	N = 8	N = 8	N = 8	N = 8	N = 8	N = 9	N = 6						
<b>7. TYPE OF HEALTH SERVICES AVAILABLE IN THE COMMUNITY</b>																
DOH workers	9	69%	10	77%	8	80%	7	88%	8	100%	7	88%	5	56%	4	67%
DOH-trained local people	0	0%	2	15%	2	20%	2	25%	3	38%	4	50%	5	56%	3	50%
Quack doctors	4	31%	6	46%	3	30%	2	25%	2	25%	3	38%	6	67%	2	33%
Others	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
None	2	15%	2	15%	0	0%	0	0%	0	0%	0	0%	1	11%	1	17%
<b>8. TYPE OF HEALTH FACILITIES IN THE PLACE</b>																
Barangay health center	8	62%	5	38%	9	90%	7	88%	6	75%	7	88%	5	56%	4	67%
Hospital	0	0%	0	0%	0	0%	0	0%	1	13%	0	0%	0	0%	0	0%
Others	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
None	5	38%	8	62%	1	10%	1	13%	1	13%	1	13%	2	22%	2	33%
No answer	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	2	22%	0	0%
<b>9. APPLIANCES OWNED</b>																
Radio	12	92%	7	54%	7	70%	5	63%	4	50%	3	38%	5	56%	3	50%
Television	1	8%	1	8%	1	10%	0	0%	0	0%	1	13%	0	0%	0	0%
Refrigerator	0	0%	0	0%	0	0%	1	13%	0	0%	0	0%	0	0%	0	0%
Sala set	3	23%	1	8%	2	20%	3	38%	0	0%	2	25%	2	22%	2	33%
Gas stove	0	0%	0	0%	0	0%	1	13%	0	0%	0	0%	0	0%	0	0%
Motor vehicle	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Farm implements	3	23%	0	0%	0	0%	0	0%	1	13%	1	13%	4	44%	1	17%
Chain saw	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
None	1	8%	6	46%	1	10%	1	13%	3	38%	4	50%	1	11%	0	0%
No answer	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%

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	NSF-BOHOL				NSF-CEBU				NSF-NEGROS (BINDOY)				NSF-SIQUIJOR			
	COOP		NON-COOP		COOP		NON-COOP		COOP		NON-COOP		COOP		NON-COOP	
	N = 13	N = 13	N = 10	N = 8	N = 8	N = 8	N = 8	N = 9	N = 6							
<b>10. FISHING CRAFT OWNED</b>																
Motor Boat	2	15%	2	15%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Banca	8	62%	9	69%	10	100%	5	63%	7	88%	7	88%	7	78%	6	100%
None	3	23%	2	15%	0	0%	3	38%	1	13%	1	13%	2	22%	0	0%
<b>11. FISHING GEAR OWNED</b>																
Gill net	2	15%	2	15%	6	60%	4	50%	4	50%	3	38%	4	44%	4	67%
Danish seine	0	0%	2	15%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Ring net	1	8%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Drive-in net	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%	0	0%
Beach seine	1	8%	1	8%	2	20%	0	0%	0	0%	1	13%	0	0%	0	0%
Fish corral	1	8%	1	8%	1	10%	1	13%	0	0%	1	13%	0	0%	0	0%
Fish trap	0	0%	0	0%	0	0%	0	0%	1	13%	0	0%	1	11%	1	17%
Crab pot	1	8%	1	8%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Hook & line	5	38%	3	23%	1	10%	1	13%	2	25%	3	38%	1	11%	1	17%
Spear gun	1	8%	2	15%	0	0%	0	0%	1	13%	0	0%	2	22%	0	0%
Scoop net	0	0%	1	8%	1	10%	0	0%	0	0%	0	0%	0	0%	0	0%
None	3	23%	1	8%	0	0%	0	0%	0	0%	1	13%	1	11%	0	0%

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Source : PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

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**Annex Table 3**  
**PERCEPTIONS ON CERTAIN ISSUES BY NEARSHORE FISHERIES HOUSEHOLDS**  
**Cooperators and Non-Cooperators, 1992**

	NSF-BOHOL		NSF-CEBU		NSF-NEGROS (BINDOY)		NSF-SIQUIJOR					
	COOP	NON-COOP	COOP	NON-COOP	COOP	NON-COOP	COOP	NON-COOP				
	N = 13	N = 13	N = 10	N = 8	N = 8	N = 8	N = 9	N = 6				
<b>1. PERCEPTION ON RESPONDENT'S PRESENT SOCIOECONOMIC CONDITION COMPARED WITH THAT PRIOR TO CVRP ACTIVITIES</b>												
Poorer	0	0%	0	0%	0	0%	0	0%	2	22%	2	33%
Same	8	62%	9	69%	7	70%	5	63%	0	0%	3	38%
Better off	5	38%	3	23%	3	30%	2	25%	7	88%	3	38%
No answer	0	0%	1	8%	0	0%	1	13%	1	13%	2	25%
<b>2. PERCEPTION ON RESPONDENT'S PRESENT SOCIOECONOMIC CONDITION COMPARED TO 5 YEARS AGO</b>												
Poorer	0	0%	0	0%	0	0%	0	0%	0	0%	1	11%
Same	7	54%	5	38%	6	60%	3	38%	0	0%	4	50%
Better off	3	23%	1	8%	3	30%	3	38%	7	88%	2	25%
No answer	3	23%	7	54%	1	10%	2	25%	1	13%	2	25%
<b>3. PERCEPTION ON RESPONDENT'S PRESENT SOCIOECONOMIC STATUS COMPARED WITH THAT OF THE OTHER MEMBERS OF THE COMMUNITY</b>												
Poorer	0	0%	0	0%	2	20%	0	0%	0	0%	1	13%
Same	10	77%	6	46%	5	50%	3	38%	0	0%	2	25%
Better	2	15%	1	8%	3	30%	3	38%	7	88%	2	25%
No answer	1	8%	6	46%	0	0%	2	25%	1	13%	3	38%
<b>4. IF THERE IS AN IMPROVEMENT IN YOUR SOCIOECONOMIC STATUS, WOULD YOU ATTRIBUTE THAT CHANGE TO PARTICIPATION IN CVRP?</b>												
Yes	5	38%	1	8%	2	20%	1	13%	4	50%	0	0%
No	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Irrelevant/No answer	8	62%	12	92%	8	80%	7	88%	4	50%	8	100%

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

**Annex Table 4**  
**FACTORS CAUSING PERCEIVED CHANGE IN SOCIOECONOMIC STATUS**  
**(EXPLANATION FOR PERCEPTIONS 1 AND 2 ANNEX TABLE 3)**

STATUS	NSF-BOHOL		NSF-CEBU	
	COOPERATORS	NON-COOPERATORS	COOPERATORS	NON-COOPERATORS
Poorer				
Same	Because of increase in population 1 ARs damaged by typhoon just one month after dropping 1 Abundant fish in ARs useless because we don't have the fishing gear to catch them 1	There are so many fishermen 1 Lack of implementation of fishery laws 1 ARs destroyed by typhoon 1 Same income 1	Because of the presence of several fishermen and fishing methods 3 CVRP projects don't give much better results 1 CVRP mussel culture project not successful 1	Many fishermen fish in AR area 1 Most CVRP members are lazy 1 Some fishermen are using only one gear like drift gill net 1
Better off	Because of CVRP projects, ARs installed 2 Because of increased catch 1 Can eat better now (may ulam na) 1 Better if illegal fishing is controlled 1	More abundant fish, so I changed my gear from hook & line to drift gill net 1 Because of the fish sanctuary established 1 Certain fish species go to mangroves during high tide 1	Because of CVRP projects, marine fishes became abundant 1 Increase in fish catch 1 Dynamite fishing was minimized 1	Increased catch but no standard price of fish 1 More fish but catch is less, due to more fishermen and commercial fishing operations 1
No answer	5	6	2	4

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STATUS	NSF-NEGROS (BIDOY)		NSF-SIQUIJOR	
	COOPERATORS	NON-COOPERATORS	COOPERATORS	NON-COOPERATORS
Poorer			Because of fine-meshed nets 1 More kinds of fishing gear 1	Some fishermen from other waters 2
Same		Small fishermen (non-cooperators) cannot fish in ARs 1 Don't know about CVRP 1	No increase in fish catch 1 More fishermen in area 1	Because of illegal fish nets 1 Corals are destroyed by fishing with the use of compressor 1
Better off	Because of increased catch 3 Illegal fishing is minimized 2 Because of CVRP projects like ARs, FADs, fish sanctuaries 1 Mangrove protection against typhoons 1	Illegal fishing minimized 1 Because of CVRP projects 1	Due to implementation of fishery laws, illegal fishing is minimized 2 Increased fish population, catch 1 Mangrove reforestation is great help 1	
No answer	3	4	1	2

Source : PIDS Household Survey of CVRP Nearshore Fisheries Sites 1992

Annex Table 5  
OBSERVED CHANGES IN RESOURCE BASE/FISHING ACTIVITIES AFTER CVRP INTERVENTIONS, 1992

	NSF-BOHOL		NSF-CEBU					
	COOPERATORS	NON-COOPERATORS	COOPERATORS	NON-COOPERATORS				
In fishing ground	Increased fish	2	No change	5	Rampant illegal fishing now minimized thru marine rehabilitation and conservation	4	Increased catch	2
	Decreased catch due to more fishermen	2	Minimized or no dynamite fishing now	2	Slight increase in fish abundance	3	Minimized dynamite fishing	2
	More fingerlings, fry now	1	Increased fish due to bamboo ARs	1	No change	3	More fishermen	1
	Abundant fish in ARs	1	Abundant fish since illegal fishing was minimized	1	Less fish catch	1	No change	1
	Used to fish in nearest area, but now farther due to presence of fish sanctuary	1	Fish go to mangrove shaded areas	1				
In fishing time	No change	4	No change	6	No change	5	No change	3
	Fishing used to take the whole day, now only half a day	1						
	A day of fishing got less than a kilo of fish before, now one-hour fishing gets 3 kilos	1						
In fishing gear	No change	5	No change	5	No change	5	No change	2
	More illegal fishing before	1	Changed from lift net ("bintol") to gill net	1			More kinds of fishing gear now	1
	Changed from gill net to ring net fishing operation	1	Changed from hook & line to drift gill net	1			Change from multiple to single hook & line	1
	Illegal (dynamite) and commercial (Danish seine, trawl) fishing are still operating	1						
No answer	1		3		0		2	

	NSF-NEGROS (BINDOY)		NSF-SIQUIJOR					
	COOPERATORS	NON-COOPERATORS	COOPERATORS	NON-COOPERATORS				
In fishing ground	More fish now	6	No change	3	Increased catch	4	Less catch due to use of fine-meshed nets	4
	Rampant illegal fishing now stopped or minimized	2	Increased/more abundant fish	2	More fishermen	2	No change	1
			Minimized cyanide and dynamite fishing	2	Use of fine-meshed nets is now minimized	1		
			Less fish now	1	Less catch now	1		
			Less catch of giant squid now due to many small fishermen	1				
In fishing time	No change	4	No change	5	No change	5	No change	4
				Fishing time decreased from 2 hours to 1 hour	1			
In fishing gear	No change	4	No change	5	No change	5	No change	4
				Changed from hook & line to fish traps	1			
No answer		2		1		1		1

Source : PIDS Household Survey of CVRP Nearshore Fisheries Sites 1992

**Annex Table 6**  
**FACTORS CAUSING OBSERVED CHANGES IN RESOURCE BASE/FISHING ACTIVITIES, 1992**  
**(FOLLOW-UP QUESTION TO OBSERVATIONS IN ANNEX TABLE 5)**

NSF-BOHOL			NSF-CEBU			
COOPERATORS		NON-COOPERATORS	COOPERATORS		NON-COOPERATORS	
Increased catch due to mangrove reforestation	3	Construction of bamboo ARs increased fish population	All forms of illegal fishing minimized	2	Abundant fish due to fish sanctuary	2
Presence of ARs increased fish	3	Cement ARs help drive illegal fish-net operations farther offshore	Abundant fish living in fish sanctuary	2	Due to ARs, FADs, fish traps	2
Law enforcement minimized dynamite fishing	2	No more dynamite fishing	Mangrove plantation	2	Mangrove plantation	1
Less catch due to more fishermen	2	Illegal fishing drove away fish before, but now fish are more abundant	Presence of ARs, FADs enhance fish breeding	2	Illegal fishing minimized	1
Plenty of fish but no appropriate gear for catching them	1	Fish will go to the shade of mangroves	Law enforcement, shore patrols controlled fishermen	1	Less catch due to big-time fishermen	1
Change gear to ring net because of so many fishermen	1	No change because nobody can control/advice those using illegal fishing methods	CVRP initiative and projects	1		
Fishing now in farther grounds due to presence of fish sanctuary	1		Less fish now due to more fishermen, many kinds of fishing gear	1		
Many small fish in mangrove areas	1		None	1		
No change because of rampant illegal fishing	1					
No answer	0	No answer	No answer	2	No answer	1

NSF-NEGROS (BIDOY)			NSF-SIQUIJOR			
COOPERATORS		NON-COOPERATORS	COOPERATORS		NON-COOPERATORS	
Minimized illegal fishing	5	Less catch due to many small fishermen	Less catch due to fine-meshed nets, gill nets and commercial fishing operations	2	Less fish due to more fishermen and compressor fishing	2
AR construction	3	Construction of ARs, FADs; fish now living in them	Less catch due to muro-ami, compressor operations	1	Less catch due to more fishermen and nets	1
Conservation thru fish sanctuary	2	Illegal fishing minimized; shore patrols	Minimized illegal fishing	1	No change due to more fishermen, nets and commercial fishing	1
Mangrove reforestation	1	Mangrove plantation	ARs increased fish population	1		
Source of fish increasing	1	No change				
No answer	1	No answer	No answer	3	No answer	2

Source : PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

**Annex Table 7a**  
**PERCEPTION/OPINION ON THE MOST IMPORTANT CONTRIBUTION OF CVRP**  
**IN THEIR COMMUNITY, 1992**

NSF-BOHOL				NSF-CEBU			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
Mangrove reforestation	4	No answer	9	Mangrove reforestation/ plantation	4	No answer	4
AR construction	3	Mangrove plantation/ reforestation	2	Introduction of ARs, FADs, sanctuaries	4	AR construction	2
No answer	3	Fish sanctuary	1	Control or minimization of illegal fishing	2	Barangay road construction	1
Mangroves, ARs, sanctuaries	2	Construction of AR	1	Miracle hole	1	Introduction of FADs	1
Barangay road	1	Strict implementation, enforcement of fishery laws	1	Road construction	1	Seaweed culture	1
Livestock dispersal	1			None	1	Large cattle dispersal	1
Dole-outs	1			No answer	1		

NSF-NEGROS (BINDOY)				NSF-SIQUIJOR			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
ARs, FADs, mangroves, other activities	2	AR construction	3	Mangrove reforestation, free mangrove seedlings	3	No answer	4
CVRP seminars and training	2	No answer	2	Technical assistance	1	Mangrove seedlings	1
No answer	2	FADs construction	1	Introduction of new fishing gear	1	Control of commercial fishing operations	1
Encourage marine life conservation thru fish sanctuaries	1	Fish sanctuary	1	Artificial reefs (ARs)	1		
Eucheuma (seaweed) culture	1	Seaborne patrol against sanctuary violators/illegal fishers	1	Fish sanctuary	1		
Introduction of fish traps and nets	1	Introduction of different projects	1	More catch	1		
Illegal fishing minimized	1	None	1	Mobilization, organization of fishermen	1		
Really help the poor	1	No comment	1	None	1		

Source : PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

Annex Table 7b  
PERCEPTION/OPINION ON THE WEAKNESSES OF THE CVRP, 1992

NSF-BOHOL				NSF-CEBU			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
No comment	6	No answer	9	None	3	No answer	4
No answer	2	No comment	3	ARs not effective, introduced	2	ARs collapsed, not guaranteed,	3
No follow-up after first year	1	Cement ARs will just sink	1	without studies, waste of		not suitable in area, are	
Always voluntary labor	1	deeper and deeper		money		waste of money	
Beneficiaries not loyal	1	CVRP projects always	1	No comment	2	No comment	1
No support for acquiring	1	voluntary (walang pangbigas)		CVRP mussel culture project	1		
better fishing equipment				without feasibility study			
Agreement on the use of only	1			Projects have no effect	1		
hook-&-line in AR area is				No answer	1		
not followed							
None	1						

NSF-NEGROS (BINDOY)				NSF-SIQUIJOR			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
No answer	2	No answer	4	None	4	No answer	2
No comment	2	No comment	2	Bamboo ARs good only for 6	2	CVRP abandoned the projects	1
None	2	ARs are useless, waste of	1	months, no follow-up		after the typhoon	
ARs not installed, left on	1	money		No proper information	1	Projects are not properly	1
shore		None	1	dissemination to the		managed	
Fishing gear not distributed	1			community		Our community did not receive	1
to individuals				No comment	1	any benefits/projects except	
Distribution of goods did not	1			No answer	1	mangrove seedlings	
benefit me						Am not a member because they	1
						did not call me	

Source : PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992



**Annex Table 8a**  
**WHAT RESPONDENT IS DOING NOW WHICH HE DID NOT DO BEFORE CVRP**  
**CAME INTO HIS BARANGAY, NEARSHORE FISHERIES SURVEY, 1992**

NSF-BOHOL				NSF-CEBU			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
Just the same	6	No answer	9	No answer	3	No answer	6
Mangrove plantation	2	Same	3	Miracle hole	2	Gill net construction,	1
Voluntary activities in construction, maintenance of ARs	2	Planting of forest trees	1	Mangrove reforestation and maintenance	1	formerly using hook-&-line	1
No answer	2			Construction, technology of AR, FAD	1	Realized the importance of natural resources	1
Construction of gill net	1			Construction of beach seine ("baling")	1		
Wood gathering for fuel	1			Fish cage construction	1		
				Fish sanctuary maintenance	1		
				Same	1		

NSF-NEGROS (BINDOY)				NSF-SIQUIJOR			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
AR construction	3	No answer	7	Planting of mangroves	2	No answer	5
Mangrove plantation	2	Seminars on AR construction, mangrove plantation	1	Making of fish traps, ARs	2	None	1
No answer	2			Eucheuma (seaweed) farming	2		
Help in controlling illegal fishing	1			AR, FAD construction	1		
Seaweed culture	1			Bottom-set gill net fishing	1		
FAD construction	1			Sustain the project until it grows big	1		
Involvement in different projects	1			None, same activities	1		
Organization of Bantay Dagat and Fishermen's Association	1			No answer	1		

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

**Annex Table 8b**  
**HOW CVRP HAS AFFECTED RESPONDENT'S LIFE AS TO INCOME, LIVING STANDARDS, ETC.,**  
**NEARSHORE FISHERIES SURVEY, 1992**

NSF-BOHOL				NSF-CEBU			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
Not yet	4	No answer	9	No answer	3	No answer	4
Not affected, same		Helped a little by	1	Minimized, prevented illegal	2	Not affected, but fishing	1
No effect on cash	1	increasing fish catch		(dynamite, poisons) fishing		ground is enhanced	
income yet		Not so big effect, fish	1	Income, living standard still	2	Income not affected	1
Affected by mangrove	1	went in and out of		the same		Not affected because of other	1
plantation and ARs		of sanctuary		Not affected, all CVRP	1	source of income	
Improved knowledge	1	Better off now due to	1	projects are not successful		Projects are useless compared	1
raised standard of living		mangrove reforestation		ARs, FADs slightly increased	1	to our own ARs	
Lumber from mangroves	1	Not yet	1	income			
Mangrove serves as	1			Construction of water system	1		
protection against				provided free to the public			
erosion and wind				Improved by miracle hole	1		
No answer	1			construction			

NSF-NEGROS (BINDOY)				NSF-SIQUIJOR			
COOPERATORS		NON-COOPERATORS		COOPERATORS		NON-COOPERATORS	
No answer	3	No answer	6	No answer	2	No answer	4
Increased fishing income	2	Increased fish catch	1	Same, no effect	2	"Ambalang" culture is good	1
Improved because of AR,	1	Less catch due to prohibited	1	Not affected, due to lack of	1	No additional technology was	1
mangrove rehabilitation		fishing in AR area		information dissemination		introduced	
Improved because we catch	1			Increased fish catch improved	1	Projects not possible because	1
more kinds of fish				our livelihood		of typhoons, weather	
Control of illegal fishing	1			Nothing to say yet, mangrove	1	conditions	
				plants are still young			
				Spear fishing is better now	1		
				"Ambalang" culture a great	1		
				help because it's marketable			
				in only 3 months			

Source: PIDS Household Survey of CVRP Nearshore Fisheries Sites, 1992

**Annex Table 9  
PROVINCIAL AND REGIONAL INCOMES**

<b>1. AVERAGE FAMILY INCOME, 1985</b>					
<b>REGION VI</b>		<b>24,807</b>	<b>REGION VII</b>		<b>20,756</b>
Aklan		28,787	Bohol		17,668
Antique		17,541	Cebu		17,123
Capiz		21,693	Negros Oriental		21,957
Iloilo		21,244	Siquijor		18,589
Negros Occidental		19,874	Cebu City		35,706
Iloilo City		55,537			
Bacolod City		55,834			
<b>2. TOTAL NO. OF FAMILIES, 1985</b>					
<b>REGION VI</b>		<b>881,554</b>	<b>REGION VII</b>		<b>783,846</b>
Aklan		64,779	Bohol		155,510
Antique		72,059	Cebu		343,591
Capiz		97,919	Negros Oriental		165,773
Iloilo		233,994	Siquijor		14,583
Negros Occidental		316,737	Cebu City		104,390
Iloilo City		47,370			
Bacolod City		48,697			
<b>3. NO. OF FAMILIES, AVERAGE FAMILY INCOME, 1985 AND 1988</b>					
Region	1985		1988 (at current prices)		1988 (at 1985 prices)
	No. of Families (thousand)	Average Income	No. of Families (thousand)	Average Income	Average Income
REGION VI	882	24,807	957	31,164	28,799
REGION VII	784	20,756	830	27,972	25,581

Sources: 1985 Family Income and Expenditures Survey, Vol. II, Provincial/Key City Final Report, NEDA, NCSO, Manila.

1990 Philippine Statistical Yearbook, NSCB (NSO, 1985 and 1988 FIES);

**Annex Table 10**  
**POPULATION (thousands), REGIONS VI AND VII, 1980 AND 1990**

1. POPULATION BY REGION/PROVINCE	1990 May 1	1980 May 1
Region VI	5,379	4,526
Aklan	381	325
Antique	406	345
Capiz	584	492
Iloilo (incl. Guimaras)	1,765	1,434
Negros Occidental	2,243	1,930
Region VII	4,593	3,787
Bohol	948	806
Cebu	2,646	2,092
Negros Oriental	925	819
Siquijor	74	70
<b>2. POPULATION BY MUNICIPALITIES (CVRP), 1980</b>		
<b>BOHOL</b> [annual growth rate = 1.2% for 1975-1980]		
Bien Unido (not listed, but part of Trinidad in map)		-
Pres. C.P. Garcia	18,142	
Talibon	46,110	
Ubay	38,289	
<b>CEBU</b> [annual growth rate = 2.84% for 1975-1980]		
Alcantara	7,882	
Alegria	16,351	
Badian	21,512	
Moalboal	16,420	
Ronda	12,939	
<b>NEGROS OR.</b> [annual growth rate = 2.05% for 1975-1980]		
Ayungon	27,656	
Bindoy	23,638	
Manjuyod	26,257	
Tayasan	21,473	
Basay	21,637	
Bayawan	71,153	
<b>SIQUIJOR</b> [annual growth rate = 0.37% for 1975-1980]		
E. Villanueva	4,770	
Larena	10,365	
Lazi	16,149	
Maria	10,951	
San Juan	10,592	
Siquijor	17,533	

Sources: 1990 Philippine Statistical Yearbook, NSCB.

Accomplishment Reports for the Period 1978-1983/84,  
 Provinces of Bohol, Cebu, Negros Oriental and Siquijor,  
 May 1984, Office of the Prime Minister.

**Annex Table 11**  
**DISTRIBUTION OF SAMPLE RESPONDENTS**  
**PIDS-CVRP NEARSHORE FISHERIES SURVEY, 1992**

NSF SITE	COOPERATORS	NON-COOPERATORS	TOTAL
Bohol	13	13	26
Cebu	10	8	18
Negros Or. (Bindoy)	8	8	16
Siquijor	9	6	15
All Sites	40	35	75

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