

- (d) the use of compost fertilizer from ipil-ipil leaves sold in the market that would augment the use of organic fertilizer by farmers.

d. Agro-Forestry and Income

In addition to increased agricultural and wood crop production, agro-forestry affects the income level of the participating shifting cultivator through: (a) increased hired labor income; and (b) increased income from nonfarm activities, such as from cottage industries, orchid selling, etc. A marked increase in the income of shifting cultivator-project cooperators may then be expected to diminish the wide income gap between upland and lowland farmers.

Some balance between the desire for conservation and the need for increasing incomes may be achieved with the right choice of crops. Care must be taken to avoid overproduction of particular commodities which could result in depressed prices for both the upland and lowland farmers. This is where impact projection is necessary: it must take into account future supply and demand for crops, expected productivities (given some allowances for risk due to typhoons and the like) and expected price control/support measures.

While these impacts may be considered direct, the impact on the income of nonparticipating farmers and communities tends to be indirect. For nonshifting cultivators living nearby, income levels may also rise as forestry activities — orchid-gathering, fuelwood gathering, and the like — increase because of the availability of more forests. For communities nearby, incomes are indirectly increased due to: (a) decreases in expenditures on property damage because of flash flooding or drought, and (b) the enhancement of other economic activities through higher agricultural and timber outputs.

e. Agro-Forestry and Labor Use

The impact of agro-forestry on labor use is both direct and indirect. Since most agro-forestry schemes aim to stabilize labor use throughout the year, farm activities would also be designed for this purpose. In addition, the labor-intensive building of bench terraces, contour terraces, roads and trails would result in a higher demand

for labor. Land clearing without burning would also require more labor than otherwise. The hiring of kaingeros in reforestation activities would similarly result in increased employment. In the long run, indirect employment effects would arise as more wood-based industries are set up and expanded.

f. Impact on Other Areas of Concern

Because agro-forestation is more labor-intensive (kaingin making saves on labor by burning), the cooperators are more exposed to the adverse work conditions in the farm. Thus, it may cause negative effects on *health* in the short run. However, such impacts may be negated by the positive impacts on nutrition (and health) brought about by improved diets composed more of rich protein (from animal raising) and vitamins (vegetable raising) rather than of traditional rootcrops which produce a carbohydrate-biased diet. This would entail a reeducation in eating habits as well. In the long run, income increases, which allow farmers to build better farm quarters and to gain more access to health/nutrition facilities, together with improved environmental conditions, may be expected to improve health conditions.

Such potential impacts, however, would interact with other factors affecting the health conditions of the community, such as the water and sewerage systems. The proper disposal of waste, water quality, and amount of available water are important especially for growing communities.

The provision of *informal education* would also affect health and nutrition as well as population and participation. This would be reinforced by the effects of changes in income levels and their attendant influence on household structures and decision-making. Also, children would be spared from farm activities and increases in income would allow them to continue their schooling. The impact of agro-forestation on these areas would thus work in a similar fashion with other projects, i.e., via income.

Agro-forestry has, for its direct products, ipil-ipil trees and other tree crops. Known ipil-ipil products are pulpwood, fuelwood, organic fertilizer inputs (leaves for compost), charcoal, and animal feeds. Another direct impact of agro-forestation would then be an increase in the nonoil based energy source such as dendro-energy. A substi-

tution of compost fertilizer for inorganic fertilizer would thus decrease imports of the latter.

Other indirect impacts of agro-forestation on energy use and on the balance of payments would be through: (a) the restoration of the vegetative cover, providing ample protection to watersheds, through which hydroenergy may be generated; (b) the prevention of flooding, thus averting expenses on infrastructure repairs, many of which have a high import content; (c) increased export of forest-based products; and (d) reduced import of pulp and paper products.

Progress and Impact Assessment: Time Frame and Indicators

Pilot agro-forestry projects are still at an early stage of implementation and are still experimental. Moreover, the literature indicates that it takes time for the impact on several areas of concern, such as the environmental services provided for by forestry and the increase in income of cooperators from forest products, to set in. Thus, a longer time frame for analysis is needed when a before-after framework is employed for an impact study; this is presented in Figure 1.

At this stage, only base line information may be gathered for the long-run impacts; such information may provide the "pre" or initial project conditions for the long-run impact study which looks into project cooperators and noncooperators, or into the project site and control sites, before and after a development project. The use of progress indicators (Table 1), however, may already be employed in looking at the potential ability of the project to achieve impacts.

Impact indicators suggested for analyzing the long-run impacts are presented elsewhere (de los Angeles 1983), together with a discussion of data sources and availability. They are discussed within the present study in the subsequent sections only when their roles are crucial in the initial conditions influencing the AFDP.

In the case of the short-run impacts, a look into differences between project cooperators and noncooperators in the same project site would be useful for: (a) determining whether the project already has a spread effect, in which case one may initially conclude that it is progressing considerably; and (b) looking into the differences and interrelationships in the impacts of various development projects in the uplands. The latter is particularly important when such development projects purportedly have the same general objective, i.e.,

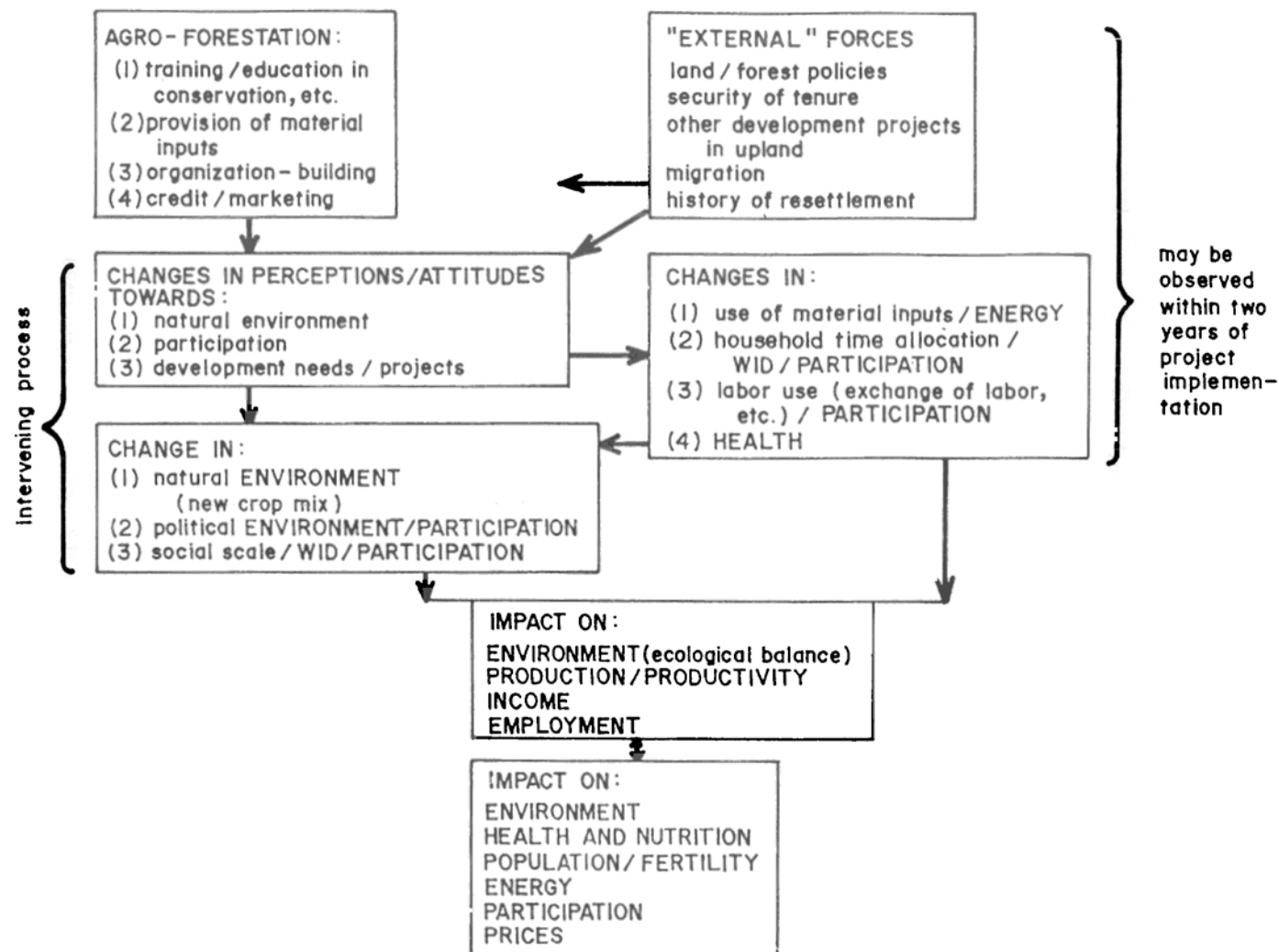


FIGURE 1
AGRO-FORESTATION AND ITS DIRECT IMPACT ON FARMER-COOPERATORS

TABLE I
PROGRESS INDICATORS

<i>Indicator</i>	<i>Direction of Change</i>	<i>Data base</i>
1. <i>On extent of agro-forestation or reforestation:</i>		
(a) proportion of land contour farmed or bench terraced	increase	farm
(b) proportion of land interplanted with agro-forestry crops, by type of crops	increase	farm
(c) proportion of land reforested with trees, by tree species	increase	farm and contiguous areas
(d) hectarage devoted to upland rice	decrease	farm
2. <i>On wood production by farm operators:</i>		
(a) area reforested, by species type	increase	farm
(b) survival rate of tree planted, by type of tree	increase	farm
3. <i>On agricultural production:</i>		
(a) volume of production, by type of product	increase	farm
(b) animals/poultry raised	increase	farm
(c) proportion of marketable surplus	increase	farm
4. <i>On stabilization of forest occupancy:</i>		
(a) number of kaingero-participants	increase	project area
(b) proportion of <i>kaingero</i> -participants awarded with forest occupancy permits/leasehold	increase	project area
(c) proportion of those with permits actually implementing prescribed agro-forestry systems	increase	project area
(d) kaingin-making, by area and frequency	decrease not sure	project area contiguous areas
5. <i>On access trails or roads constructed:</i>		
(a) number and length of trails constructed; trail density	increase	project area to existing transport systems
(b) length of road constructed; road density	increase	project area to existing transport systems

making the uplands productive and ecologically stable. Thus a cross-section type of analysis was conducted based on a survey of a representative sample of Pantabangan residents.

The indicators used for the short-run impact study are presented in Table 2.

TABLE 2
INDICATORS FOR ANALYZING THE SHORT-RUN IMPACTS OF AFDPs .

IMPACT ON THE ENVIRONMENT

- (1) attitude, knowledge, practice related to the environment: contour farming, bench terracing, crop diversity
- (2) control of fire: (a) fire-fighting activities; (b) actual slash-and-burn practices
- (3) land clearing by non-AFDP cooperators

PARTICIPATION/WOMEN IN DEVELOPMENT

- (4) participation in AFDP implementing organizations by sex
- (5) extent of cooperation in AFDP activities, by sex
- (6) attitudes towards and interaction with government efforts at developing the community
- (7) participation in other development projects

PRODUCTION/PRODUCTIVITY/INCOME

- (8) land productivity
- (9) animal raising
- (10) income from agricultural crops, animal raising, and tree crops
- (11) use of inputs: labor, fertilizer, land

OTHER AREAS OF CONCERN

- (12) use of compost fertilizer
-

III. THE VILLARICA PILOT AFDP: PROGRESS AND IMPACT STUDIES

Villarica: Historical Background

Villarica is one of the five barrios in new Pantabangan, which is a resettlement site of households displaced during the building

of the Pantabangan Dam. Unlike other Pantabangan communities, it is composed mostly of kaingeros.

According to Baguinon's (1981) historical background of the barrio, the Villarica farm area, like most upland grasslands, was once covered by gregarious growth of virgin dipterocarp forest. Eyewitnesses to this forest describe the abundance of Yakal (*Hopea spp.*), Guijo (*Shorea guiso*) and Molave (*Vitex parviflora*). Today, remnants of the original forest cover are now confined to isolated spots usually along gullies and rarely along hill slopes and ridges.

Intensive logging during the mid-1950's onwards to the late 1960's gave swidden farmers or kaingeros easy access to logged-over areas and, hence, upland farms of the slash-and-burn type spread in the area. During the early 1970's, the majority of these farms, especially those along ridges and slopes, were abandoned, and in their place cogon (*Imperata cylindrica*) and talahib (*Saccharum spontaneum*) grasses became the dominant vegetative cover with alibangbang (*Piliostigma malabarica*), Binayuyo (*Antidesma, sp.*) and banana (*Lagerstroemia speciosa*) as the dominant isolated tree species.

The overall appearance of the area has since then resembled the savannah rather than the classic grassland. The savannah transformation has attracted ranchers to use the area as grazing land. Thus, for a few years, the area succumbed to uncontrolled burning with the ranchers aiming to maintain the area for pasture purposes.

By the mid-1970's, a group of Villarica farmers had driven the ranchers away and planted agricultural crops. It was in this setting that the Upland Hydroecology Research Program (UHP) of the University of the Philippines at Los Baños came in to launch the research on and implementation of a pilot agro-forestry development project.

The UHP-implemented pilot agro-forestation project at Villarica is one of the various attempts at development being implemented against a backdrop of generally poor conditions of the resettlement area.

To solve the interrelated problems of deteriorating watershed conditions, increasing poverty, and insufficient resettlement strategy, the following projects are being conducted: the R.P.-Japan Reforestation Project (at the Canili area); the BFD Communal Tree Farming Project (at Villarica); the human resource development project of the Action Research Group for Social Development

Foundation, Inc. (ARGSOD) at Malbang, East Poblacion, and West Poblacion; and other community-based projects of private groups such as World Vision. Numerous skill and training seminars have also been held for the Pantabangeños by the Ministry of Agrarian Reform, the Bureau of Fisheries and Aquatic Resources, and other government agencies. In addition, a larger project, that of the World Bank-financed Watershed Management and Erosion Control Project is being prepared for implementation on a major portion of some 24,600 hectares of the whole watershed.

The AFDP Project Implementor: The UHP

The UPLB Upland Hydroecology Program, a multidisciplinary research group, seeks to identify alternative means of regenerating various upland ecosystems by investigating the sociological, economic, climatic, soil, biotic, and hydrologic conditions prevailing in such ecosystems. UHP started implementing its research, training and outreach components in Villarica in March 1979. Its directly influenced farmers are members of the "Samahan ng mga Mag-sasaka sa Mataas na Bundok ng Bagong Pamayanan, Villarica, Pantabangan, Nueva Ecija" (SAMABUN), which is composed of 61-65 Christian farmers and 21 Igorots.

The UHP agro-forestry scheme for Villarica (Figure 2) was initially planned and was to be eventually implemented in the other barangays of Pantabangan. The upper portion of the diagram (above the broken lines) represents the means through which the Upland Hydroecology Program conducts agro-forestry activities. The lower portion of the diagram (below the broken lines) indicates the involvement of the Action Research Group for Social Development (ARGSOD) in human resource development at the areas of Malbang, East Poblacion, and West Poblacion, also of Pantabangan.

The ARGSOD has already been conducting organization and human resource activities at the Pantabangan resettlement; it facilitated UHP's entry into the agro-forestry project at Villarica. Both groups had planned to integrate their activities and to work for an expanded coverage of the pilot project, eventually to include some 4,000 hectares of the total area (24,600 hectares) which has been earmarked for the World Bank-NIA Watershed Management and Erosion Control Project for the Pantabangan-Canili-Diayo Watershed.

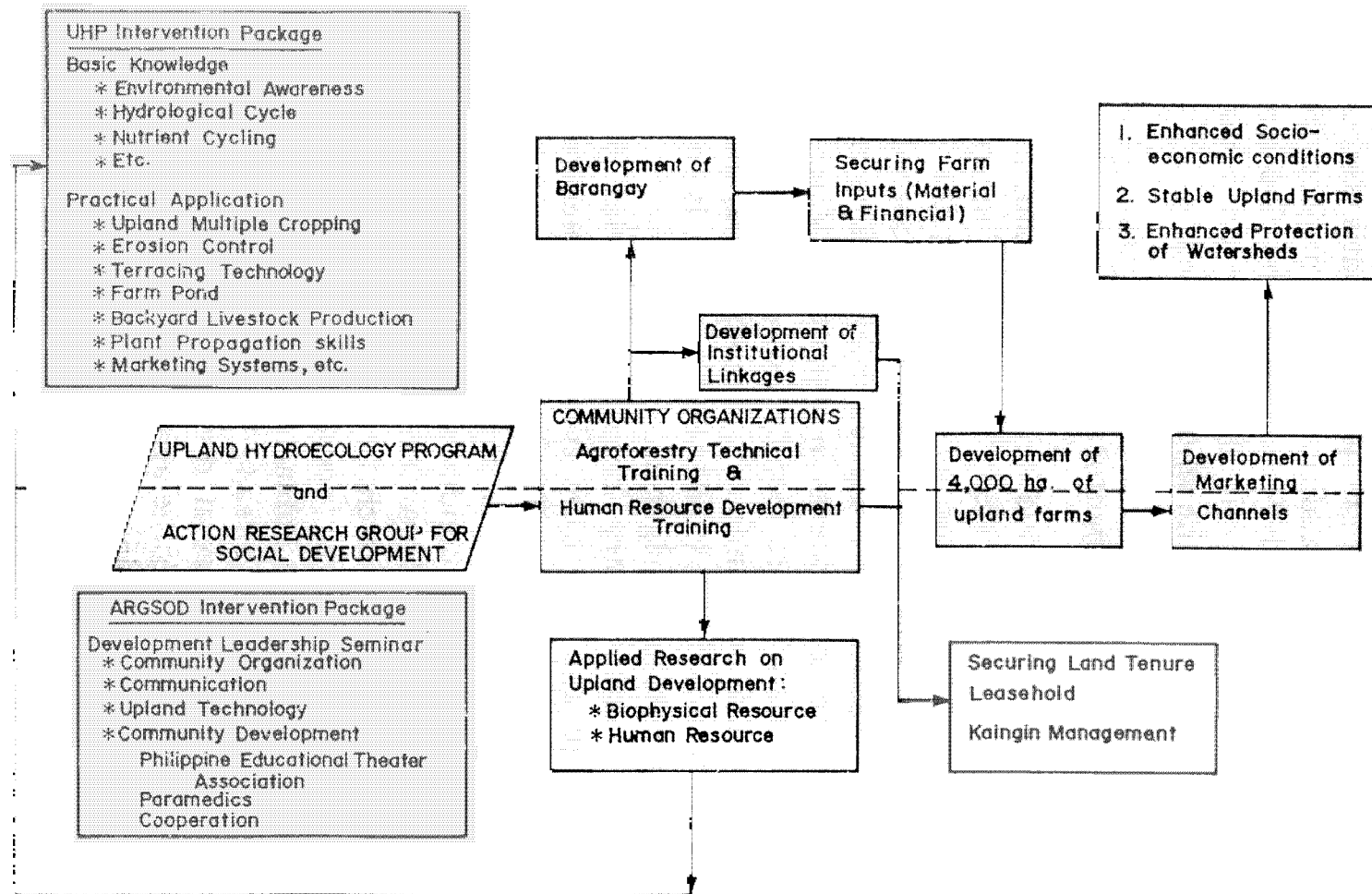


FIGURE 2
INITIAL AGRO-FORESTATION SCHEME FOR
VILLARICA, PANTABANGAN