INTRODUCTION

The Philippines experienced a severe drought from late 1982 through mid-1983. The Visayan Islands and Mindanao were particularly hard hit. Numerous newspapers vividly documented widespread crop failures, water shortages and declining hydroelectric generation during the early months of 1983. While the general effects of the drought are well known, its impacts on specific communities and households, and the ways in which households responded to the adverse conditions, are rarely given more than cursory attention.

This article describes and compares the responses of two low-income, subsistence Leyte villages to the drought. In particular, it explores the effects of household responses to drought conditions and the importance of forest resources to subsistence households during times of drought stress.

Two case study villages, Karila and San Pablo, were selected for their similar socioeconomic backgrounds, but different physical characteristics, specifically the presence or absence of forest cover. The data for this study are based upon two week-long visits to each area. The first visit to each area in January 1983 provided general information concerning livelihood activities and farming practices, while the second visit in July dealt specifically with the effects and problems caused by the drought. During both visits, interviews and discussions were held with barangay captains, village leaders, and groups of residents. In late July, a survey was randomly administered to approximately 25 percent of the households in Karila and 20 percent in San Pablo. The survey explored the effects of the drought and people’s responses to it in the following areas: 1) water quality and quantity; 2) crop yields, patterns and problems; 3) food consumption (source and quantity); 4) household labor allocation and sources of income; 5) farm assets (particularly savings and livestock); and 6) loans and sources of assistance. Conversations with

1The authors are both Fulbright Student Researchers from Cornell University, Ithaca, New York. They would like to acknowledge Tony Abamo, Visayas State College of Agriculture, for his assistance in collecting the San Pablo field data; Dr. Joseph Metz, Cornell University, for editorial assistance; and the Philippine-American Educational Foundation for funding the research.

2The two village names used in this article are fictitious. All other names and information presented have not been changed.
resident development project personnel in San Pablo provided additional information, as did the authors’ six-month residence and ongoing research in Karila.

BACKGROUND DESCRIPTION OF THE CASE STUDY VILLAGES

Physical Setting

Karila

The village of Karila is located at the base of Mt. Tabaan in west-central Leyte, approximately 3 km east of the Camotes Sea and coastal highway and 8 km northeast of the municipal seat and market center of Baybay. The village is comprised of 63 households with 319 residents. An unimproved dirt road links Karila with the coastal highway and jeepneys provide irregular transport to and from Baybay.

The topography of the region is varied and dramatic. A narrow, flat, alluvial plain devoted almost exclusively to the cultivation of irrigated and rainfed rice extends 2-3 km inland from the coastline. Gently rolling hills and ridges, planted principally to coconut, bisect the plains. Further eastward, the ridges become higher and broader, while the flat rice lands become narrower; 1-2 km east of Karila rise steep mountain ridges.

Secondary lowland rainforest vegetation covers the valleys and slopes east of the village. Hillside farms, including both swiddens and permanent fields, are located throughout the forest, particularly on the more accessible and less steeply sloping ridges and basins. The number of hillside farms decreases as one moves inland and most cultivation ceases approximately 3 km east of the village.

The entire Karila watershed is forested and due to relatively low land use pressures, there are no large areas of bare ground or grassland. The forest cover is generally young, densely stocked reproductive growth, although there are numerous trees of commercial size and value, especially narra (Pterocarpus indicus) and lauan (Dipterocarpus sp.). The upper watershed is bounded by ridges and peaks at approximately 1000 m and is covered with dense montane forest growth. To the east of the watershed is a large basin of undisturbed primary forest, which contains stands of rattan (principally Calamus ssp.).

The soils of the Karila region are Orthic Acrisols overlying consolidated clastic sediments and are moderately acidic (pH 5.8-6.4). The climate is everwet; rainfall is normally distributed evenly throughout the year, although there tends to be a precipitation peak in July and August and a relatively dry period in April and May (See Fig. 1).

San Pablo

San Pablo is located in Barangay Hacienda Maria in northwestern Leyte, approximately 3 km from both the coast and the regional market center of San Isidro. The village contains approximately 60 households, totaling 300 individuals.
Fig. 1. Precipitation in Karila and San Pablo 1976-83 (in mm).
As in Karila, an unimproved dirt road connects San Pablo with the municipal center; however, the San Pablo road is impassable during rainy periods. During these times, access to and from the community is limited to foot and animal travel.

The topography of the San Pablo region is gently rolling hilly land. Narrow valleys, eight to ten meters above sea level, alternate with rounded hills 40 to 60 meters high. Slopes average about 25 degrees. The San Pablo watershed is almost completely deforested. Small stands of ipil-ipil (Leucaena leucocephala) dot the upper slopes and ridges and scattered acacia (Acacia sp.) can be found in the streambeds. However, the largest part of the watershed is covered by annual or perennial crops and wild grasses. Cogon (Imperata cylindrica) and to a lesser extent tigbau (Saccharum sp.) form extensive stands, particularly in the upper, "farmed out" portions of the watershed. In addition, there are scattered areas of bare ground or exposed rock that elderly residents recall cultivating in the 1950s and 60s, but abandoning later due to erosion and declining yields.

The soils of the San Pablo area are Medellin clays overlying a limestone sub-stratum. Consequently, the soil is alkaline (pH 7.2-7.8) and high in calcium. The climate of the area is monsoonal, characterized by a usually wet season from June through February and a relatively dry period from March through May (see Fig. 1).

Socioeconomic Setting

Karila

The Karila region was originally settled in the early 1900s by immigrants from Bohol and Cebu. In the post-war period, through in-migration and natural population growth there was a rapid increase both in the number of households and the intensity of cultivation in the area.

At present, Karila is comprised of predominantly low income, subsistence households. Cultivation of irrigated rice is the central economic activity. Modern high yield varieties, in conjunction with a reliable irrigation system, assure three rice harvests each year; however, most residents are either tenants or ambos and cannot produce enough rice to meet their household food requirements.3 Coconuts,
principally in the form of copra, but also through the production of tuba (an alcoholic beverage made from the sap of coconut spathe) provide another source of subsistence income. In addition to these livelihood activities, abaca (Musa textilis) production, rattan and timber harvesting, wage labor and hillside farming are also important to Karila's household economies.  

Hillside farming, whether in swiddens or permanent fields, typically follows two major cropping patterns: either two monocrops of corn followed by sweet potato or one corn crop intercropped with and succeeded by sweet potato. Both systems have peak planting periods in February-March, June, and October-November and usually include the cultivation of vegetables and fruits in small patches within the hillside farms. Pakodo (Xanthosoma sagittifolium) and cassava are also grown on hillside farms for both human and animal food. In addition to agricultural activities and minor forest product collecting, a small proportion of households supplement their food and income needs by both fresh and saltwater fishing.

The specific mix of and reliance upon the above mentioned livelihood activities vary among Karila's households and depend upon the household's total available resources. For example, preliminary conclusions based upon an ongoing study by the authors suggest that hillside farming and minor forest products are more important to households who are unable to produce enough rice to meet their household needs. Alternately, households that own either rice or coconut lands rely less upon forest resources for acquiring their daily food or income.

Labor sharing and mutual assistance are widespread and important in Karila. For example, clearing of new swiddens and plowing of rice paddies are often performed on the basis of exchange labor (bayanihan, locally allayon). Government sponsored agricultural and health-care services are available in Baybay and the barangay center located along the coast. However, agricultural and health care extension workers rarely visit the village and few village residents utilize the services in either Baybay or the barangay. Thus, the residents of Karila generally rely upon themselves and available local resources for assistance.

San Pablo

The San Pablo region was first settled in the early 1900s by immigrants from northern Cebu. The number of households and intensity of land use in the area during the early 1900s were low. However, continued in-migration of Cebuanos

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4 Abaca (or manila hemp) is a close relative of the banana; its strong, flexible fibers are used in the production of rope and handicrafts. Rattan is the common name of a large group of climbing palm used principally in furniture making.

5 Pakodo is a large herb (to 2m) that produces starchy, edible tubers.
“in search of greener pastures” during the 1920s and 30s led to the adoption of permanent and intensive corn cultivation and complete deforestation by the end of World War II.

San Pablo is comprised of low-income, subsistence households who till farms averaging 1.8 ha in size. Cultivation of corn in either a corn:mongo:corn or corn:corn:fallow pattern is the central economic activity. While three crops are harvested each year (two if the fallow cycle is followed), yields are low and declining because of erosion and the depletion of soil nutrients (e.g. average current yields are ten cavans/ha/harvest in contrast to 15 cavan/ha/harvest on the same sites in the early 1960s). In addition to corn and mongo, a small number of San Pablo households cultivate some vegetables and root crops for home consumption and cash crops of tobacco and peanuts. Most residents also grow bananas around their homes.

Copra production and tuba gathering are important labor and income producing activities for approximately half of the village residents. Most San Pablo households raise pigs and chickens for home consumption and sale, while a few supplement their food and income needs by fishing. Residents also work as temporary wage laborers on neighboring farms and coconut haciendas. Lastly, annual temporary outmigration of young girls seeking employment elsewhere and of adult males during periods of low labor demand is common.

Labor sharing and mutual assistance are much less common in San Pablo than in Karila. For example, labor sharing systems, such as bayanihan, are no longer operating in San Pablo. However, informal labor sharing in such activities as home building, well maintenance, and to a lesser extent, weeding is still practiced.

Agricultural and health extension services are available in San Isidro, but as in Karila, health and agricultural extension workers and programs rarely reach the village. San Pablo is part of the Operation Land Transfer Program, in which the previous tenants receive titles to the land upon fulfillment of amortization payments. A Land Bank sponsored program has recently been established in the area to increase household income in order to expedite repayment of loans. Otherwise, San Pablo residents, like those in Karila, must rely upon themselves and local resources for their livelihood.

**Summary of Background**

The villages of Karila and San Pablo exhibit similarities and differences that influence and explain both the varied effects of the drought, and household responses to it. The most important similarities between Karila and San Pablo include:

1. **Cultural Background** — both were settled by immigrant farmers from Cebu or Bohol;
2. **Socioeconomic Status** — residents in both villages are, even in the best of times, marginal farmers who cultivate both food and cash crops;
3. **Infrastructure and Development** — both villages lack basic services such as electricity, pump water, and roads; and neither receives appreciable or regular agricultural or health extension assistance.

The most important differences between the two villages include:

1. **Settlement and Land Use History** — San Pablo was settled earlier and subjected to more intensive land use pressures than Karila;
2. **Degree of Current Forest Cover** — Karila has access to forest resources and lies within a well-forested watershed, while San Pablo has no forest resources and lies within a largely deforested watershed;
3. **Staple Food** — Karila households depend upon purchase and production of (irrigated) rice for their staple food, while San Pablo households rely primarily upon their own corn production grown under rainfed conditions.

**EFFECTS OF THE DROUGHT AND HOUSEHOLD RESPONSES**

The prolonged drought adversely affected agricultural crops and altered the ways people in both Karila and San Pablo normally meet their subsistence requirements. In this section, effects of the drought and household responses to these conditions are presented.

**Water**

**Karila**

Households in Karila depend upon streams and springs for all of their water needs. Drinking water is obtained from two springs, each located about 300 meters from the center of the two settlement clusters. Residents typically bathe, wash clothes, and water their carabaos in the river that drains the watershed. Water for irrigating ricefields is also diverted from the river. The volume of water in the major river and its tributaries changes with seasonal rainfall variation. During the drought, the two springs continued to provide abundant clean drinking water, while stream levels remained sufficient throughout the drought for all bathing, washing and irrigation needs.

**San Pablo**

In San Pablo, water for all household needs comes from five dug wells (each approximately three meters deep) scattered over the valley floor and riverbed. All households are within 15 to 20 minutes walking distance of one of these wells. A seasonal stream is also used for bathing and watering carabao; none of the San Pablo farms are irrigated.

Unlike Karila, the drought produced changes in San Pablo’s sources of water and its quantity and quality. All of the dug wells dried up during the drought, as
did the river. In response, four new wells (four to five meters) were dug by house-
holds whose land was most likely to yield water; these wells provided the only
water for the community during the drought. From March through June San Pablo
households collected their water at prearranged times to avoid over-use of the
wells. The usual rules limiting human and animal bathing nearby were also more
strictly observed during these months, as was the expectation that all households
contribute to the daily cleaning of the wells. Despite the regulated water use and
daily cleaning, many wells had no water at all and in the rest water quality had
declined during the latter months of the drought.

Crops

Karila

The impact of the drought on Karila’s crops was mixed, depending primarily
upon each crop’s inherent moisture requirements and the location in which it was
grown. Irrigated rice production was virtually unaffected; there was sufficient
water throughout the drought to irrigate all paddies. Significantly, however,
irrigated rice fields in neighboring villages downstream from and dependent upon
overflow from Karila’s paddies, did not receive adequate water and subsequently
the rice crops died. Similarly, the few households who grow rainfed rice in an
adjacent watershed lost their crop and many of the fields were too dry to replant as
of mid-July.

Agricultural production from Karila’s hillside farms was badly affected by the
drought. Most corn and sweet potatoes died by mid-April. The few farms in which
corn and sweet potatoes survived suffered reduced yields and increased losses due
to insect infestation. Significantly, the only hillside farms to sustain corn and sweet
potato production, however much reduced, were long fallow swiddens (10-15
years) recently cleared from and adjacent to well developed forests. All other
hillside farms experienced total crop failure. Household gardens were also destroyed
by the drought (with the exception of those in long fallow swiddens). Most peren-
nial crops, whether fruit-trees or vegetables, continued to produce throughout the
drought, though in reduced amounts.

Coconut products, both copra and tuba, declined in Karila. Several coconut
trees wilted and died, while the size and number of nuts produced declined slightly.
Tuba production was even more severely affected as daily yields dropped by 80 to
100 percent.

Abaca and pakodo, which are frequently intercropped, were only moderately
affected. Some abaca, particularly that planted near ridgelines and other dry sites,
wilted and died. However, as most abaca is grown alongside moist, shaded
streams, total abaca production was not severely affected. Pakodo continued to
grow throughout the drought period, though some farmers reported yields as much
as 40 percent below normal.
San Pablo

The impact of the drought on San Pablo’s agricultural crops was much more severe and widespread than in Karila. Corn production either failed entirely or had greatly reduced yields from late 1982 through the first half of 1983. Sixty-seven percent of the households sampled reported that their last corn harvests were in late 1982 and that all grain supplies were exhausted by mid-April 1983. The few households able to harvest corn at all during the Winter and Spring of 1983, reported greatly reduced yields. For example, the latest and most productive corn harvest among the sample households occurred in April and was approximately 30 percent of the normal yield. The owner reported that this harvest “did not compensate for the labor involved.”

In addition to reduced yields and crop failures, the drought also delayed planting of subsequent corn crops for one to two months. With the onset of rains in early July, corn was planted on all available land in a majority of farms. The planting of corn instead of mongo or fallow altered the normal cropping sequence, particularly in poorly drained and wind-exposed sites. Farmers recognized that there was a risk associated with planting corn in low wet areas and on high windy slopes, but stated that they “had no choice due to the need for food.” Two farmers also elected to plant peanuts as a cash crop for the first time in an attempt to earn additional income.

The few gardens in San Pablo died by mid-March and tree crops suffered drought-induced dieback by April. Only bananas (var. escalante) continued to bear fruit during the drought, though they too ceased production in most farms by early June. Coconut production suffered a similar decline in San Pablo as in Karila: some trees died, the number and size of nuts declined, and tuba production fell precipitously. The only crop in San Pablo that was not severely affected by the drought was tobacco; over half of those households that grew tobacco during the drought reported producing a good crop. Unfortunately, typhoon “Bebing” in July leveled most of the plants, necessitating a premature harvest.

Household Labor Allocation and Income Generation

Karila

During the drought most of Karila’s household food and income generating enterprises continued as normal; however, some households diversified or engaged in one or more new livelihood activities for the first time. Tasks associated with rice cultivation, the most central and labor-intensive activity, were unaffected by the prolonged drought. Similarly, cash income generated from hourly wage-labor for plowing, weeding, harvesting and threshing rice (especially important to the paddy-less households) was not altered. Labor allocated to copra also continued as usual, but production of copra and tuba lessened. As the quantity of tuba declined, the time devoted to tuba collecting also decreased. The loss of income from tuba
sales was a severe hardship for over half of the survey respondents.

The most significant change in Karila’s household labor and income generating behavior as a consequence of the drought was the reduced time devoted to hillside farming and an increased gathering of rattan and other minor forest products including wild plants, game and timber. Rattan gathering for sale in Baybay is a regular subsistence activity for 33 percent of the households surveyed. During the drought, an additional 13 percent of sample respondents reported engaging in rattan gathering (at least 3-4 times per month) in order to acquire cash. As it happened, the latter months of the drought (April-June) were precisely the months in which rattan is in high demand. While both old and new collectors complained that rattan gathering is a strenuous and time-consuming kind of work, they stated that, "...getting rattan is the only way I can get income especially with no income from tuba." Cutting and hauling timber are additional normal livelihood activities that a greater number of households engaged in during the drought. While working in the mountains, rattan and timber collectors simultaneously check traps set for wild game and collect and fish in streams.

Gathering of wild and cultivated food for home consumption and sale also increased during the drought. All household members were involved in gathering edible plants, usually two to three times per day; children’s labor was especially available and utilized during April and May due to summer recess from school. In addition, all respondents cultivated pakodo in their hillside farms for domestic consumption and 33 percent were able to sell some in the Baybay market once or twice a month. One respondent, a rice paddy owner, also sold surplus rice. Other households prepared and sold small cooked food items for additional income. All sari-sari stores, another regular form of supplementary household income, were virtually closed during the drought due both to the shortage of capital to purchase stocks and lack of patrons. In summary, Karila households experienced a decline in their standard of living during the drought. However, the continued availability of income generating activities and wild foods as well as a normal rice yield enabled them to maintain a subsistence level of living without incurring substantial debts or forfeiting future income.

San Pablo

In San Pablo, in contrast, household labor patterns, sources of income, and living standards were drastically altered by the drought: over half of the surveyed households fell below subsistence levels as evidenced by drastic reductions in food consumption, income and household assets, and by increased debt. During the drought virtually all farming activities ceased, forcing residents to find alternate sources of food and income. Approximately 83 percent of the households surveyed sold most of their livestock (including chickens, pigs, and carabaos) at lower than normal prices to purchase food. Prolonged malnourishment and the usual animal losses took the lives of most remaining livestock. In order to forestall the death of
his starving carabao, one respondent reported spending most of every day pasturing it in another watershed with sufficient forage.

In addition, households in San Pablo increased their fishing activity during the drought much more significantly than in Karila. While both villages are approximately the same distance from the sea and normally depend upon fishing for supplementary subsistence food and income, there was a slight increase in fishing in Karila, but a sixfold increase in San Pablo. The decision among San Pablo households to go fishing more frequently during the drought strongly suggests a loss of usual food-producing activities and hence a greater need for exploiting the ever-present opportunity for fishing.

The major source of income during the drought for 58 percent of the San Pablo households surveyed was collecting and selling dried ipil-ipil leaves. Marketing ipil-ipil is not a regular livelihood activity in San Pablo, but it became the major income source as demand for the dried leaves increased in San Isidro for use as animal fodder, and as households had few other economic alternatives. One six-member household reported that they could collect as much as three cavans of ipil-ipil leaves per day (18 kilos dried) which they would sell for ₱0.50 per kilo in San Isidro. The income earned from one day of ipil-ipil collecting (around ₱9.00) was sufficient to purchase one ganta of corn, the household’s normal daily corn consumption. In this household there was no alternate source of income; in order to maintain a normal level of corn consumption, ipil-ipil leaves had to be collected every day of the week. However, this household reported that they were unable to sustain this rate, thus their daily corn consumption dropped below normal levels.

Most of the ipil-ipil was illegally gathered from private lands and thus represented a risk — a risk that households with other adequate income-generating opportunities generally preferred not to take. Over half of the survey respondents who did not collect ipil-ipil stated that fear of getting caught dissuaded them. However, many respondents in both San Pablo and Karila acknowledged that theft is an ongoing reality of life even during normal times and that losses of bananas and coconuts (and *malunggay* or *kamunggay* in Karila) were particularly great during the drought. But despite the widespread practice, no one in San Pablo complained of ipil-ipil being stolen (perhaps because most of the supply came from a nearby hacienda) and one who had not engaged this practice even defended it by claiming that ‘‘for many people here it was their only way to survive.’’

Temporary Out-Migration

*Karila*

Only one of the households interviewed in Karila reported a family member leaving the community to seek employment elsewhere during the drought. However, this individual had made his decision to leave during March and the decision was unrelated to the drought. The months of May and June are normal
out-migration times in Karila, because they fall after the end of the academic year and the annual May fiesta. Residents and survey respondents did not notice an unusual amount of out-migration in 1983.

San Pablo

Temporary out-migration in San Pablo was an important strategy for those households that could not survive the drought. Approximately 40 percent of the households surveyed reported one or more members out-migrating to temporarily work in Isabel (a rapidly industrializing area nearby), Cebu, or Manila, and over half of those reported that it was the first time a family member had ever sought work elsewhere. Furthermore, respondents stated that most of the men who left the village this year did so because of the hardships created by the drought. Young women also left in greater numbers; for example, one respondent reported that he was reluctant to allow his daughter to work in another town, but a shortage of food in the household persuaded him to do so.

Food

Karila

The largest impact of the drought on Karila's food consumption was the shortage of the usually available staple supplements (especially sweet potato and corn) and an increase in consumption of wild foods. Because of widespread crop failures sweet potatoes and corn were scarce. Under normal conditions these foods supplement and occasionally replace rice as a meal; both are desired for their taste and diversity and, in the case of sweet potato, for staving off hunger a long time after being consumed. Without them, all of the households surveyed reported consuming their rice reserves more quickly, necessitating earlier rice purchases (an average household usually purchases 50-75 percent of its rice needs).

Daily consumption of rice and other foods did not change appreciably in Karila during the drought. This was due to three major factors: 1) rice harvests were at normal levels, 2) alternate income generating activities, such as the sale of rattan, substituted for sources of income lost as a consequence of the drought, and 3) access to wild foods replaced supplementary food crops that died.

Wild plants are normally eaten only by the poorest segments of the community, but became important to a greater number of households (including the better off) during the drought. Bananas, wild and cultivated tubers not normally eaten (including pakodo, cassava, and koyot) and wild fruits and vegetables adequately supplemented the major staple, rice, during the drought (see Table 1). All of these wild foods were available within 15 minutes walking distance of all households and in ample supply. Importantly, there was virtually free access to them in the nearby forests.

Wild game also supplemented household food supplies. One wild pig or deer
### TABLE 1. WILD FOODS CONSUMED DURING THE DROUGHT

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Wild and Semi-Wild Edible Plants Consumed in Karila</th>
<th>Local Name</th>
<th>Part of Plant Eaten</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regularly Consumed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Colocasia esculenta</em> (L.) Schott.</td>
<td></td>
<td>gabi</td>
<td>leaves, root tubers</td>
</tr>
<tr>
<td><em>Gnetum gnemon</em> L.</td>
<td></td>
<td>bago</td>
<td>young leaves</td>
</tr>
<tr>
<td><em>Ipomoea reptans</em> Poir.</td>
<td></td>
<td>tangkung</td>
<td>leaves, shoots</td>
</tr>
<tr>
<td><em>Manihot esculenta</em> Crantz</td>
<td></td>
<td>calibre;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>kamoteng kahoy</td>
<td>root tubers</td>
</tr>
<tr>
<td><em>Moringa oleifera</em> Lam.</td>
<td></td>
<td>malunggai, kamunggay</td>
<td>leaves</td>
</tr>
<tr>
<td><em>Musa cv.</em></td>
<td></td>
<td>sagging</td>
<td>fruits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pusu</td>
<td>blossoms</td>
</tr>
<tr>
<td><em>Xanthosoma sagittifolium</em> (L.) Schott.</td>
<td></td>
<td>pakodo</td>
<td>root tubers</td>
</tr>
<tr>
<td><strong>Frequently Consumed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Anredera scandens</em> (L.) Moq.</td>
<td></td>
<td>alibato</td>
<td>leaves, root tubers</td>
</tr>
<tr>
<td><em>Artocarpus blancoi</em> L.</td>
<td></td>
<td>antipolo</td>
<td>fruits (in season)</td>
</tr>
<tr>
<td><em>Athyrium esculentum</em> Copeland</td>
<td></td>
<td>pako</td>
<td>young fronds</td>
</tr>
<tr>
<td><em>Calamus ssp.</em> ubud sa uway</td>
<td></td>
<td>ubud sa uway</td>
<td>'cabbage' buds</td>
</tr>
<tr>
<td><em>Caryota camingii</em> Lodd.</td>
<td></td>
<td>pugahan</td>
<td>young leaves</td>
</tr>
<tr>
<td><em>Sandoricum koetjape</em> (Burm.f.) Merr.</td>
<td></td>
<td>santol</td>
<td>fruits</td>
</tr>
<tr>
<td><strong>Occasionally Consumed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Artocarpus heterophylla</em> L.</td>
<td></td>
<td>nangka</td>
<td>fruits (in season)</td>
</tr>
<tr>
<td><em>Averrhoa carambola</em> L.</td>
<td></td>
<td>balimbing</td>
<td>fruits (in season)</td>
</tr>
<tr>
<td><em>Carica papaya</em> L.</td>
<td></td>
<td>papaya</td>
<td>fruits</td>
</tr>
<tr>
<td><em>Dendrocalamus curranii</em> Gamble</td>
<td></td>
<td>patong</td>
<td>young shoots</td>
</tr>
<tr>
<td><em>Dioscorea hispida</em> Dennst.</td>
<td></td>
<td>koyot</td>
<td>root tubers</td>
</tr>
<tr>
<td><em>Lansium domesticum</em> L.</td>
<td></td>
<td>buha-buha</td>
<td>fruits</td>
</tr>
<tr>
<td><em>Psidium guajava</em> L.</td>
<td></td>
<td>bayabas</td>
<td>fruits</td>
</tr>
<tr>
<td><strong>Rarely Consumed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Averrhoa bilimbi</em> L.</td>
<td></td>
<td>iba</td>
<td>fruits</td>
</tr>
<tr>
<td><em>Corchorus olitorius</em> L.</td>
<td></td>
<td>saluyut</td>
<td>young shoots</td>
</tr>
<tr>
<td><em>Cordia dichotoma</em> Forst. f.</td>
<td></td>
<td>anonang</td>
<td>leaves</td>
</tr>
<tr>
<td><em>Dioscorea sp.</em></td>
<td></td>
<td>ube</td>
<td>root tubers</td>
</tr>
<tr>
<td><em>Syzygium aquem</em> (Burm.f.) Alst.</td>
<td></td>
<td>tambis</td>
<td>fruits</td>
</tr>
</tbody>
</table>

**Wild and Semi-Wild Edible Plants Consumed in San Pablo**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Wild and Semi-Wild Edible Plants Consumed in San Pablo</th>
<th>Part of Plant Eaten</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Dendrocalamus curranii</em> Gamble</td>
<td>patong</td>
<td>young shoots (rarely consumed)</td>
</tr>
<tr>
<td><em>Moringa oleifera</em> Lam.</td>
<td></td>
<td>malunggai, kamunggay</td>
</tr>
<tr>
<td><em>Musa cv.</em></td>
<td></td>
<td>sagging</td>
</tr>
</tbody>
</table>
(15-20 kilos each) was trapped in the forest above the village at least once a month from February through June, and the meat sold (or credited) to many households. Since pork, chicken, and carabao meat are highly desired though rarely eaten (being saved for special occasions only), wild game provided both nutritional and psychological benefits. Thus, while supplemental food sources changed in Karila as a consequence of the drought, the basic staple, rice, was consumed in near normal amounts and there was no widespread hunger.

**San Pablo**

In San Pablo, household corn consumption was greatly reduced during the drought and was not matched with increases in alternate staple or supplemental foods. By April, all households surveyed had depleted their corn reserves and were buying corn at prices that were as much as 30 percent higher than normal. One woman responded to the drought by purchasing corn in January when corn prices were still low. Her strategy was to conserve household corn reserves to minimize the amount she would have to buy later at higher prices. Other households also reported conserving or rationing corn to cope with the effects of the drought. In both Karila and San Pablo mothers admitted to eating less so as to insure sufficient food for their children and husbands, who they thought ‘‘needed more because of the work they do.’’ In order to provide food for a nursing mother, another household rationed their corn months in advance.

Nevertheless, as a consequence of inflated corn prices and limited cash incomes, all San Pablo households interviewed reported that they could not afford to purchase the amount of corn that they normally consume. For example, in July a household of six was eating two 12-oz. tin cans of corn less than its normal consumption rate of six cans or one ganta per day; this amount represents a 33 percent decline in corn consumption as a result of the drought. The major strategy for coping with reduced corn supplies was to either eat the normal amount twice a day instead of three times, or to reduce the amount of corn eaten at the three meals by serving it in the form of a porridge called *lugaw*.

Reduced corn consumption was aggravated by the virtual absence of wild and cultivated supplemental foods (see Table 1). The few *malunggai* and other vegetables grown in backyard gardens died by late March and most bananas died in late May. As a result of the drought, there were severe food shortages and widespread hunger in San Pablo. ‘‘We would drink boiled water to warm our stomachs just to feel full,’’ reported one resident. Not only did San Pablo inhabitants experience an absolute reduction in total calorie intake, their intake of vitamins and minerals was also reduced as a result of the absence of fruits and vegetables. Not surprisingly, when asked to ascertain the most severe impact of the drought, 67 percent of households surveyed replied ‘‘shortage of food and hunger’’ (see Table 2).
TABLE 2. HOUSEHOLD PERCEPTIONS OF PROBLEMS ASSOCIATED WITH THE DROUGHT*

<table>
<thead>
<tr>
<th>Problem</th>
<th>Karila (n = 15)</th>
<th>San Pablo (n = 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most Severe</td>
<td>Next Severe</td>
</tr>
<tr>
<td>Hunger</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Reduction in Supplemental Food and Cash Crops</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Increased Dependence on Purchased Food and Related Expense</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Increased Debt</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Loss of Major Source of Income</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Loss of Livestock (death or sale)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Planting Delay (hillside farms)</td>
<td>—</td>
<td>3</td>
</tr>
</tbody>
</table>

*Household members were asked to discuss among themselves their opinion the worst effects of the drought on themselves and their families. These discussions revealed considerable consensus among household members and so we were able to record one response for each household. Hence the sample populations (n = 15, n = 12, respectively) refer to households, not individuals.

Loans and Assistance

Karila

Family and community networks in Karila were heavily relied upon during the drought for sharing meals, providing credit, and exchanging labor when a single household’s resources were insufficient to meet its needs. The predominance of intra-village forms of assistance was due to both traditional close-knit community and family ties, and to the almost normal availability of food and income in the village (though their types and sources changed). Hence, village-level assistance adequately supported Karila households during the drought and extra-community assistance was not utilized. A government sponsored aid-program did distribute five kilos of rice to ten Karila households in late July; however, this was the only outside assistance received during the drought.

San Pablo

In San Pablo, family and community assistance networks were insufficient and extra-community help was sought and utilized by half of the households interviewed. "How could I ask help from someone else, we all have the same problem," was the dominant response to questions concerning the extent of intra-community assistance during the drought. Consequently, 50 percent of survey respondents borrowed money from wealthy residents and merchants in San
The amount and nature of these loans and their terms of repayment varied. Most common was an outright cash loan on the average of P300.-(total) per household at a five percent monthly interest rate (or 60 percent annually), sometimes with the household’s subsequent corn crop used as collateral. Sacks of corn were also loaned; repayment in this case was usually the equal amount in kind plus P100 per cavan. San Pablo households recognized the risks associated with borrowing cash and grain under these conditions but explained that ‘‘... only for food for my family would I gamble so.’’ In fact, only half of those households borrowing from sources outside the village during the drought had ever done so previously.

DISCUSSION

As is evident from the preceding data (see Table 3 for summary), the drought affected Karila and San Pablo in vastly different ways. San Pablo households, in general, experienced much more hardship and disruption of normal livelihood activities than did households in Karila. While San Pablo received less precipitation during the drought than did Karila, this factor alone cannot account for the differences.

Households in Karila survived the drought with relatively less disruption because of the presence of and wide access to abundant forest resources and the variety of direct and indirect benefits that such resources provide. Karila’s well forested watershed sustained stream flows at levels sufficient to meet all drinking, washing, and, most importantly, irrigation needs. While the drought killed root and vegetable crops in most of Karila’s hillside farms, the nearby forests provided a variety of alternative wild supplementary foods, which all households consumed. Those households experiencing a loss in income (usually due to declining tuba production) could also turn to the forests and collect rattan and timber. Thus, the presence of forest resources provided Karila residents with direct food and income sources, as well as with indirect water benefits, thereby ameliorating the effects of the drought and forestalling any need to borrow money or food from outside the village.

Residents of San Pablo were not so fortunate. The complete absence of forest cover in San Pablo’s watershed resulted in an early and prolonged shortage of water. Despite conservation strategies, residents had no alternative but to buy food and/or do with less once all rainfed crops had died and grain reserves had been exhausted. Due to the absence of forests, there was no rattan or timber to sell nor edible wild food to eat. Ironically, the gathering of ipil-ipil leaves, one of the few trees remaining in the watershed, provided the only means of subsistence for approximately half of the households during the drought.
TABLE 3. SUMMARY OF EFFECTS OF DROUGHT AND SOME HOUSEHOLD RESPONSES (IN %)

<table>
<thead>
<tr>
<th>Areas Explored</th>
<th>Karila (n = 15)</th>
<th>San Pablo (n = 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>change in source</td>
<td>no change</td>
<td>changed</td>
</tr>
<tr>
<td>quantity</td>
<td>no change</td>
<td>declined</td>
</tr>
<tr>
<td>quality</td>
<td>no change</td>
<td>declined</td>
</tr>
<tr>
<td><strong>Crops</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total loss of staple crop</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>total loss of supplemental food crop</td>
<td>84&lt;sup&gt;1&lt;/sup&gt;</td>
<td>100</td>
</tr>
<tr>
<td>planting delays</td>
<td>100&lt;sup&gt;2&lt;/sup&gt;</td>
<td>100</td>
</tr>
<tr>
<td>change in cropping pattern</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td><strong>Household Labor Allocation and Income Sources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>selling dried ipil-ipil leaves</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>selling rattan</td>
<td>33</td>
<td>46</td>
</tr>
<tr>
<td>fishing</td>
<td>13</td>
<td>20&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>selling tuba</td>
<td>50</td>
<td>0&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>selling livestock</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Temporary Out-Migration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>households with one or more member(s) out-migrating</td>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>related to drought conditions</td>
<td>0</td>
<td>100&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Food</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>reduction in total food consumption</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>importance of wild foods</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td><strong>Extra-Community Loans</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>households taking out loans</td>
<td>0</td>
<td>50</td>
</tr>
</tbody>
</table>

<sup>1</sup>This refers to households who planted (and lost) both corn and sweet potato crops.
<sup>2</sup>Delays occurred in planting hillside farms, not in planting ricefields.
<sup>3</sup>It is important to note that all households in San Pablo and 75% in Karila fish primarily in the ocean, while the remainder in Karila fish in mountain streams for freshwater shrimp and fish.
<sup>4</sup>Many households continued to produce tuba during the drought, but, in greatly reduced amounts and for home consumption only.
<sup>5</sup>Every household had at least one member out-migrating because of drought-related conditions; however, when reasons for leaving are examined on an individual basis, 80% left because of the drought.

FUTURE IMPLICATIONS

1. Changes in Cropping Patterns

The widespread and uninterrupted cultivation of corn in San Pablo poses several potential long-term problems. First, soil fertility is likely to decline more
rapidly due to the absence of the normal nutrient building mongo or fallow crop. Secondly, soil erosion rates are likely to be higher given the greater proportion of bare ground in corn cultivation in contrast to ground covered by mongo or grass. And thirdly, much of the June corn planting may be lost as a result of wind damage on exposed sites and waterlogging in low areas. Thus, the drought and the responses of San Pablo households to it may exacerbate existing environmental and socioeconomic problems.

Both San Pablo and Karila lacked sufficient planting materials (corn in San Pablo; sweet potato cuttings and vegetable seeds in Karila) at the onset of the rains, which would likely reduce at least short-term production of the affected crops. The problem of limited food supplies and hence the need to purchase food or collect wild plants will also persist for at least three months due to the delayed planting of all crops in San Pablo and hillside crops in Karila. Ironically, the drought may result in some minor long-term improvements in San Pablo’s watershed and household income as several farmers expressed interest in cultivating ipil-ipil trees on their land after realizing their economic importance and in planting more vegetable gardens around their homes.

2. Diminished Household Assets and Increased Debts

As a direct consequence of the drought, livestock and cash assets of San Pablo households were greatly diminished and often depleted. These depressed economic conditions will make it difficult for households to repay current outstanding debts (such as Operation Land Transfer amortizing loans), as well as those debts incurred during the drought. Conflicts over which lender to pay first could arise. However, given the fact that many households pledged their next corn harvest as collateral to procure loans from San Isidro merchants, it is likely that these personal loans will be paid first, thereby further prolonging amortization payments to Operation Land Transfer creditors.

Household animal stocks in San Pablo, important for income in both normal and crisis conditions, will also be difficult to replenish given both the lack of capital and limited availability of animals in the village. Those households that lost a carabao will also be unable to plow and prepare fields in future plantings.

In Karila, diminished household finances will continue to depress the community’s standard of living. However, replenishing the usually low cash levels will not be as difficult as in San Pablo since there are no drought-related debts. In addition, Karila residents did not sell their livestock during the drought, thus their animals can continue to reproduce and contribute to the household economy.

3. Outmigration

The increased outmigration in San Pablo was the direct result of drought conditions while normal seasonal patterns were responsible for those temporarily leaving Karila. Accordingly, there is greater anxiety among San Pablo households
who had household members out-migrate than in Karila. Concern over the possible break-up of the family unit, the welfare and safety of nonresident family members, and mutual loneliness were sentiments expressed by these San Pablo households. Over the long-term, these feelings could contribute to a sense of prolonged crisis.

Furthermore, the future operation of farms could be affected in households that have lost a source of labor, as the labor can not be replaced through either hired help (given cash shortages) or exchange-labor systems. Moreover, the large supply of temporary labor available as a result of the drought in areas near San Pablo lowered salaries and depressed working conditions; this could increase the length of time a household member would need to work before returning home and hence the hardship experienced by all. On the other hand, cash subsidies from working household members could help pay back loans, ensure a steady food supply, and raise household living standards.

4. Dieback and Depletion of Cultivated and Wild Perennials

Copra production in both Karila and San Pablo will likely remain well below pre-drought levels for the next several harvests as a consequence of the extreme physiological stress experienced by coconut trees during the drought. Whether this decline will lead to a reduction in future household incomes will depend upon the international market price for copra. *Tuba* production and the resulting earnings will also likely remain low for at least several months for the same reason.

Future production and earnings from abaca may decline in some Karila households, particularly for those who have plantations on relatively dry sites. However, the vast majority of abaca plants appeared healthy in July.

Lastly, those Karila households that normally depend upon rattan gathering and timber harvesting may find their future earnings reduced and labor increased as the more accessible supplies are depleted. While the exploitation of forest resources predates and is independent of drought, several ‘‘regular’’ rattan collectors expressed concern over the large number of individuals involved in the trade during the latter months of the drought and the greater distances now required to collect marketable rattan poles.

5. Inadequate Nourishment

Inadequate nourishment of both human and livestock populations, especially in San Pablo, may result in reduced resistance to sickness and disease and lower labor productivity in the short-term.

6. Stress

The prolonged hardship and associated stress endured by households in both villages may affect residents’ health and feelings of personal well-being.
CONCLUSION

Households in both Karila and San Pablo responded to the severe and extended 1983 drought by creatively utilizing available local resources. However, while Karila households could turn to the forest commons for both food and income, San Pablo households had to resort to the sale of ipil-ipil leaves, out-migration, and/or borrowing of food and money from outside sources.

Household living standards declined in both villages as a consequence of the drought. However, in San Pablo the total loss of staple food crops and the absence of sufficient alternative food and income sources pushed many households below the subsistence level: hunger was widespread, family members were forced to out-migrate, and many households reluctantly went into debt at high interest rates. The principal factor responsible for this development and its absence in Karila was the lack of alternative local resources, specifically forests.

The forest resources of Karila, which normally provide subsistence income to the poorer households, as well as drinking, bathing, and irrigation water for all, served as an important source of income and food for all households during the drought. Without this forest resource and its many direct and indirect benefits, Karila households would also likely have been forced below the subsistence level.