Chapter 5: CONNECTING THE ECOSYSTEM TO THE ECONOMY

In the previous section of the book the river and its floodplain were described as an ecosystem with many species, physical-chemical characteristics and ecological interactions. Humans were a very minor part of this description, in part because the ecosystem is still wild and largely undisturbed. With this section of the book the focus changes to the humans and their relationships with the river system. This is not a study of anthropology but rather a description of physical, economic and cultural interactions between people and the Sittee River ecosystem.

Figure 5-1 shows an overview of interactions between Sittee River village and the river ecosystem. Six pathways are depicted in which humans in the village interact with the river. Interaction #1 represents stress on the ecosystem from pollution and deforestation. This type of interaction represents direct environmental impacts. While impacts are obviously important, they are relatively minor and the river and floodplain have high environmental quality, based on measurements described earlier.

Interactions # 2-5 represent values that people in the village derive from the ecosystem, either directly (# 2 and 3) or indirectly through activities that generate income (# 4 and 5). Table 5-1 summarizes the interactions based on several characteristics with examples of each type. One basic distinction is between exploitive vs. non-exploitive interactions. These are distinguished on Figure 5-1 by how the flows originate from the ecosystem. Exploitive flows represent actual harvest of materials from the ecosystem and they are shown with a pathway originating directly from the system. Non-exploitive flows represent existence-type values without any removal of materials from the ecosystem. These types of flows occur because of the existence of the ecosystem in an intact, high quality condition. Because non-exploitive flows do not result in any physical removal of materials, they are depicted as originating from the sensor symbol on the ecosystem rather than from the ecosystem itself, as was the case with the exploitive flows.

Another important distinction between interactions # 2-5 is whether or not they generate income for people in the village. Some products derived from the local ecosystem are valued by people outside of the village and can be sold. This is market-based economics in which prices are determined by the balance between supply of the products from the system and demand for the products by people outside the village. In Figure 5-1 pathways of money flow are shown with a dashed or broken line to differentiate them from flows of energy or materials, which are shown with solid or unbroken lines. Money flows in the opposite direction of energy or materials in economic transactions and the ratio of the flows is the price.

A final distinction between interactions shown in Figure 5-1 is whether or not they support the ecosystem. This kind of interaction (# 6) is shown as a feedback from the people in the village to the ecosystem. All of the other interactions in Figure 5-1 are associated with outflows from the ecosystem in one way or another but # 6 represents an inflow that supports the ecosystem.

All of the interactions shown in Figure 5-1 and listed in Table 5-1 can be related to ideas of sustainability. For the ecosystem to operate sustainably, environmental impacts from the people in the village (interaction #1) should be minimized. Also, sustainability is favored by emphasizing interactions that are non-exploitive (interactions # 2 and 5) over those that are exploitive (interactions # 3 and 4). These tactics relate to the definition of sustainability as actions that do not reduce natural capital and thus do not influence the ability of future generations to meet their needs. However, because people in the present generation require money to meet their needs, at least some interactions that generate income (interactions # 4 and

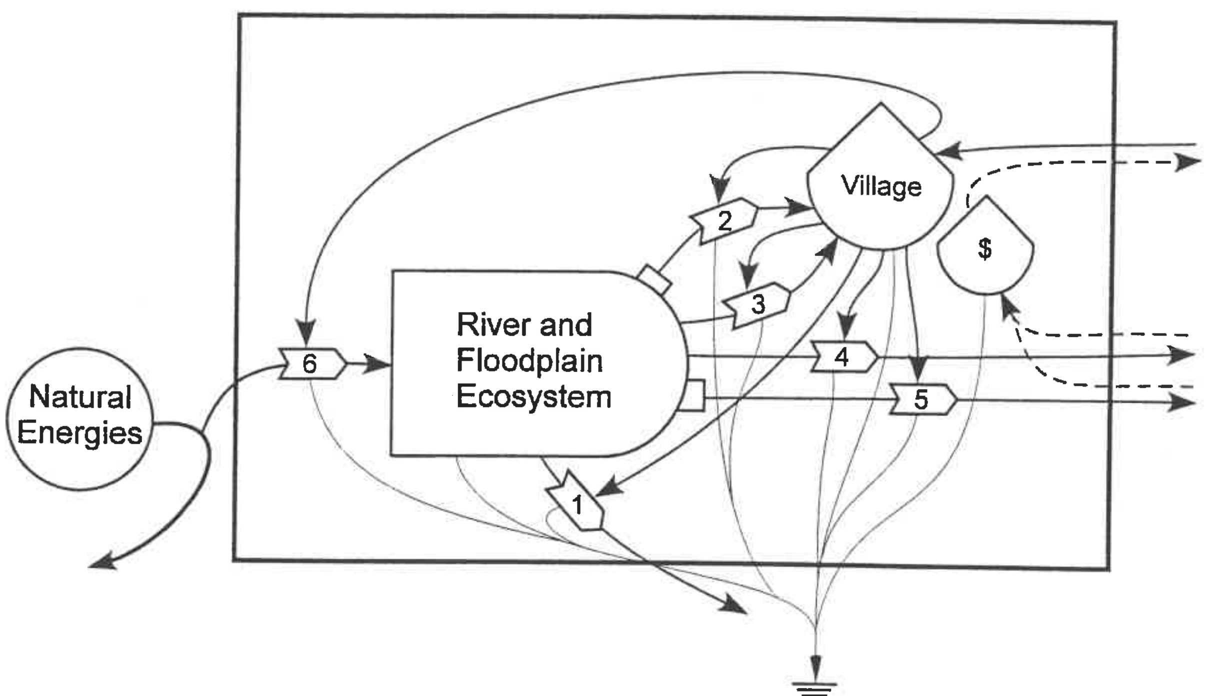

Figure 5-1. Energy circuit diagram of interactions between the village and the ecosystem along the Sittee River. See Table 5-1 for a description of the pathways.

Table 5-1. Classification of interactions on Figure 5-1.

Interaction	exploitive	non-exploitive	generates direct value	generates indirect value	examples
#1	yes	no	no	no	deforestation, pollution
#2	no	yes	no	yes	nature education, flood control
#3	yes	no	no	yes	subsistence fishing
#4	yes	no	yes	no	sport fishing, sale of timber
#5	no	yes	yes	no	ecotourism, sale of non-timber products
# 6	no	yes	no	no	restoration

5) are necessary. This tactic relates to the definition of sustainability as actions that meet the needs of the present generation. Finally, sustainability is favored by feedbacks that support the ecosystem (interaction # 6). This tactic relates to the definition of sustainability by building natural capital that can be used by either the present or the future generations of people in the village.

For the whole system of village plus ecosystem to become sustainable, pathways that feed back should balance pathways that feed forward. In nature this is a condition called mutualism in which both components of an interacting system mutually benefit each other. Some of the classic examples of mutualisms in Nature come from the Tropics and, in fact, can be found in the ecosystems around Sittee River. These include corals with zooxanthella algae and coelenterate animal, the ant and the acacia and the mycorrhizal system of fungus and tree root. Thus, one way to think of the ultimate goal of environmental science and management is to design systems of man and nature, such as at Sittee River, to be like the examples of tropical mutualisms. Both the ecosystem and the economy need to coevolve together as one system (see Norgaard 1994 for an application of coevolution to sustainable development). The next sections in this chapter describe the existing local economy of Sittee River with notes on connections to the river ecosystem.

CITRUS FARMING

Citrus production in central Belize began after World War I (Bowman 1955) and the industry has grown to rank second to sugar production from sugar cane as a source of agricultural export sales. The industry is based on the production of oranges and grapefruits which are converted to concentrates for export. The conversion of fruit into concentrate allows the industry to preserve and ship their product with greater efficiency than if the fruit itself was exported.

Citrus is the dominant form of farming in the Stann Creek District, including both large (1000s of acres) and small (1-10 acres) scale operations. Because of the economic importance of the citrus industry, conversion of land into citrus farms has been the main cause of deforestation in central Belize. A definite culture has developed around citrus farming in central Belize, as for example in Florida (McPhee 1966), and local people in Sittee River village are very knowledgeable about the growth potential, soils, pests, prices and the market which is a concentrate factory owned by a foreign corporation.

At least four types of orange and three types of grapefruit are commonly grown in and around Sittee River village (genus Citrus). Most farmers plant some of both oranges and grapefruits because of prices vary from year to year. Limes are also grown locally but not for commercial harvest. All types of citrus are grafted (with a piece of shoot) or budded (with a bud) on to sour orange root stock. This is done because of the good qualities of sour orange, which grows well from seed, is productive and resistant to disease. Typically, sour orange is grown in a dense bed until pencil-sized. At this size the seedlings are grafted or budded with another species. The modified seedlings are then grown in a nursery until they are large enough to be planted out in the farm. Grapefruit are planted 25 feet (m) apart and orange are planted 18-20 feet (m) apart, to account for the different sizes of adult trees. Both will start to bear fruit in three years after planting. Grapefruit yields up to 25 bags of fruit per tree and oranges yield up to 10 bags per tree, where one bag equals 100 lbs (kg). Grapefruit are harvested in November-December and oranges are harvested in January-February.

The price of the fruit is determined at the concentrate factory and it is based on a test for acidity. The determination of prices is a critical event each year as noted by Hartshorn et al. (1984):

"The major constraint to the industry is the never-ending dispute between growers and processors over prices to be paid for fruit. The dispute surfaces every season and a price has to be negotiated before harvesting commences. Fruit losses can be heavy during times of prolonged negotiation."

Citrus farming is an intensive form of agriculture in requiring a number of purchased inputs and labor. Figure 5-2 illustrates the energy signature of a citrus farm, which is evaluated in Table 5-2. Weeding and application of pesticides take place approximately on a one to three month time period while white lime and fertilizers are applied approximately yearly. Citrus trees will grow on a variety of soil types but they must be well drained. Flies and leaf-cutter ants are important insect pests which must be controlled by insecticides; birds are also predators on the fruit but they are not controlled. Technical assistance is available to local farmers on all aspects of production through the nationally-based Citrus Growers Association.

Economic Analysis of Citrus Farming

The study is based on interviews with five farmers within the village but the work is representative of farming operations throughout the Stann Creek District, which is the center of citrus agriculture in the country. Economic costs and yield of citrus farming in Belize are outlined in Table 5-2, with footnotes in Appendix 5-1. The data are for a typical small scale farm. The dominant costs are for labor and fertilizer which together make up more than 75% of the total costs.

The economic balance for the citrus farming, based on the interviews, is as follows:

Gross income	- total costs	=	net income
900.00$/acre/yr	677.38$/acre/yr		222.62$/acre/yr
(364.37$/ha/yr)	(274.26$/ha/yr)		(90.13$/ha/yr)

This net income rate is significant given that the 2002 average per capita income in Belize was US$ 3,190 (Darwin et al. 2005).

Environmental Aspects of Citrus Farming

Like all forms of agriculture, citrus farming involves a number of environmental impacts. As mentioned earlier, conversion of forest to citrus is the main cause of deforestation in the Stann Creek District, thus loss of habitat is a primary environmental impact of this land use. Other impacts include erosion and soil compaction, altered hydrology and pollution from runoff of pesticides and fertilizers. While these impacts are all potentially significant, they are largely uncontrolled under the present political conditions of environmental regulation in Belize.

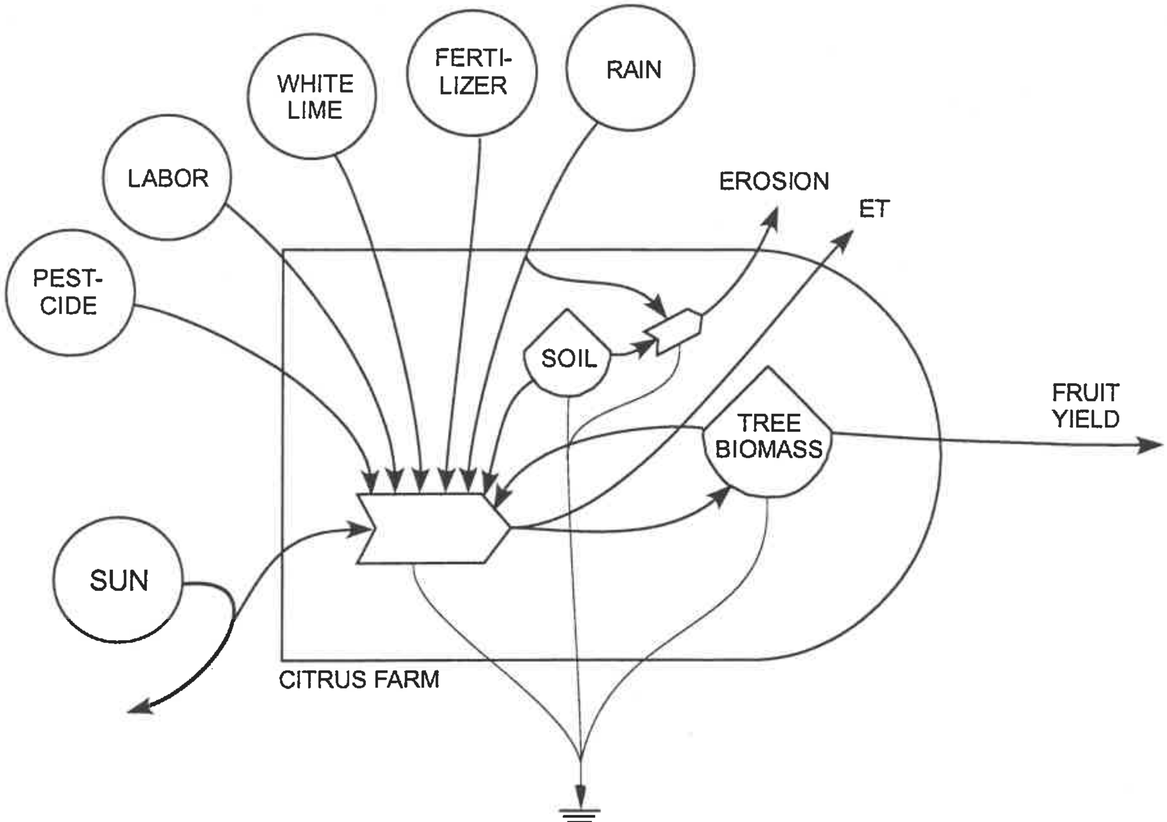

Figure 5-2. Energy circuit diagram for a citrus farm.

Table 5-2. Economic inputs of citrus farming in the Stann Creek District of Belize. Units are US$/acre/year. Values in parentheses are in units of $/ha/year.

Footnote No.	Input	Cost	Percent of total
1	Labor	300.00 (121.46)	44.3
2	Fertilizer	216.00 (87.45)	31.9
3	Mechanical weeding	100.00 (40.49)	14.8
4	White lime	32.00 (12.96)	4.7
5	Herbicide	29.38 (11.90)	4.3
Total Input		677.38 (274.26)	100
6	Gross Income	900.00 (364.37)	

Monocultures of agriculture harvested for export to foreign markets, such as citrus, are common throughout the Tropics and they have both positive and negative socio-economic aspects (Ewel 1991).

In terms of loss of forest habitat, at least citrus farms maintain a savanna-like landscape of tree vegetation. Citrus species are thought to have been domesticated from ancestors which were understory trees in tropical dry forests of southern Asia (Smith et al. 1992) and they now make up a form of plantation which has some habitat value for birds (Johnson et al. 2006) and perhaps to other species. Thus, loss of forest habitat due to citrus farming is partially mitigated by the reduced habitat value of the citrus plantation. Runoff pollution from citrus also can be partially mitigated by the maintenance of forested buffers between the farm and the river as illustrated in Figure 1-1.

THE COCONUT OIL ECONOMY

The coconut (Cocos nucifera) has a long history of human use in the tropics as noted b the discussion in Chapter 4 (Cook 1910) where it has a worldwide distribution in coastal lowland areas (Harries 1978). Although the coconut has many uses, the oil which can be extracted from the nut may be the most important. Coconut oil is high in saturated fats but it is important for cooking in many parts of the tropics where butter or lard are either unavailable or in short supply and where calories are frequently deficient in the diet (Smith et al. 1992, Plotkin 1988).

In Belize coconuts support a rural economy similar to the case study described by Anderson et al. (1991) for the babassu palm (Orbignya phalerata) in Brazil. The tree produces coconuts all year long but with a peak season in about May-October, which is commonly referred to as the "good" season. In coastal areas coconuts are harvested almost exclusively from wild populations growing in riparian forests or along beaches on the mainland or on the islands of the barrier reef. This is an extensive agricultural operation in which coconuts are collected by hand from intact forests or lightly-managed plantations (Figure 5-3). The contrast between the coconut oil operation depicted in Figure 5-3 and the citrus farm (Figure 5-2) is especially dramatic in terms of the energy signature of external inputs. The coconut oil operation has very few inputs while the citrus farm has many. In general, the coconut oil operation is an example of a non-timber forest product economy which is considered to be a viable conservation option for rural people to obtain economic income from intact forests (Peters et al.1989, Bawa 1992, Plotkin and Famolare 1992).

Processing is done by individual families in simple mills which consist of covered areas with a gasoline-driven mechanical grating machine for shredding the meat or endosperm of the coconut. The steps in producing coconut oil are listed in Appendix Table 5-2. This is a labor intensive operation in which most of the family members share in the work. The cutting away of the hard, inner shell of the nut is done with a machete and it requires significant skill to be accomplished with safety. An interesting feature of coconut oil operations is that most of the waste materials are used as byproducts, in some cases in production of the oil: 1) corks for bottles of cooking oil are made from the husks or outer shells of the nut, 2) chips of the inner shell are used as fuel for the fire needed to boil the oil, and 3) after squeezing, excess coconut meat is used either as a fertilizer on gardens or orchards or as a feed for pigs. A small amount of the cooking oil produced is used for domestic home consumption but most is sold in nearby towns to generate income.

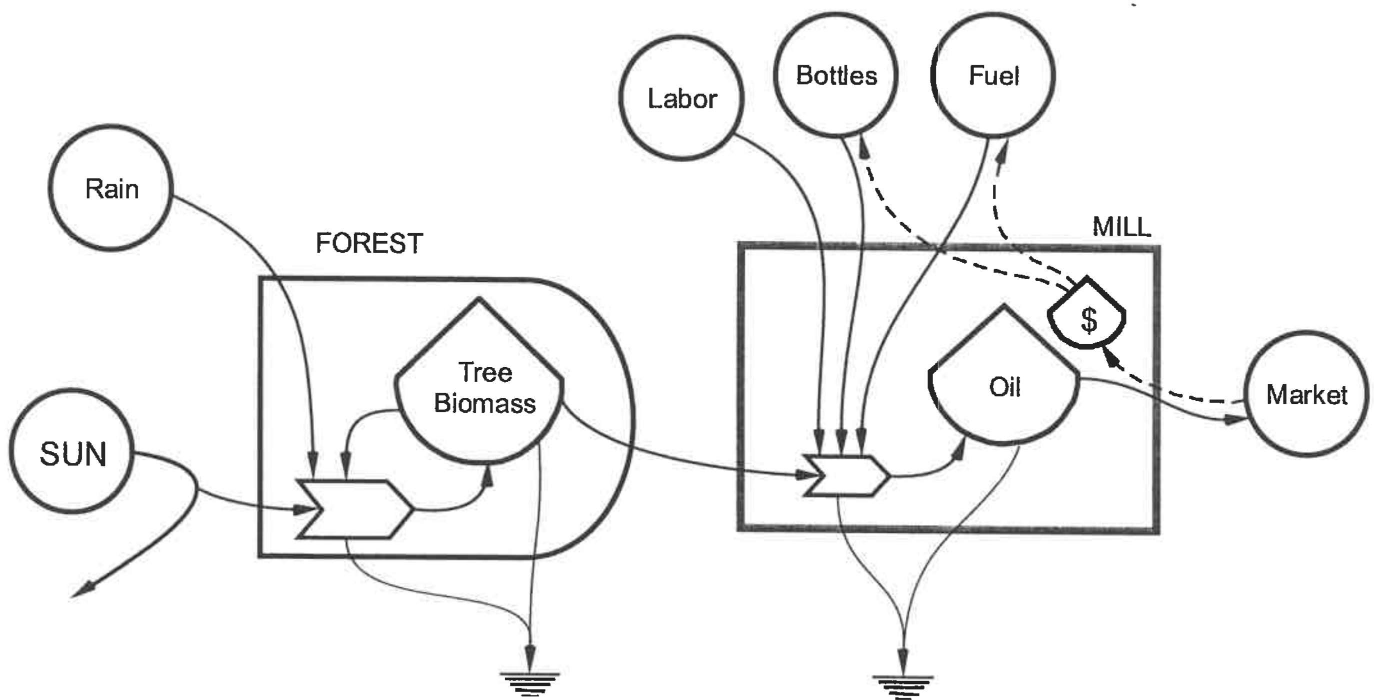

Figure 5-3. Energy circuit diagram for a coconut oil operation.

Economic Analysis of Coconut Oil Production Along the Sittee River

Details of coconut oil production along the Sittee River were examined in 1992 and 1997 by interviewing producers (McDonald 1992, Robles 1997). During each survey all of the principal coconut oil operations were visited and interviews were conducted with an adult family member who had a complete knowledge of the operation. Interviews were held at the family homes during daytime hours. The surveys included seven families who conducted coconut oil operations in both study periods. All of the operations were found to work on a weekly cycle with collection and processing during the week and marketing on Friday and/or over the weekend. Thus, data are reported as values per week.

Rates of production between study periods are compared in Table 5-3. All operations reported production in units of cases which consisted of the equivalent of boxes of 12 individual quart bottles of oil. Production during the "bad" season was only about 1/3 of production during the "good" season in both study periods and some operations closed down during the "bad" season as noted by the 0 values in the ranges. A significant drop in production was observed when comparing between study periods. This drop seems to be explained by a decline in coconut production due to a fungal disease as will be discussed later.

Basic economic data from the 1997 survey are listed in Table 5-4. Differences between "good" and "bad" seasons are a consequence of the reduced production of coconuts between these time periods. Total numbers of coconuts processed include both coconuts harvested by the family members and coconuts purchased from other people. Economic data is given for costs of purchased coconuts and of bottles along with gross income. The latter value was based on gross sales and price per bottle. The price of coconut oil varies depending on market location with lower prices received in nearby towns such as Dangriga and increasing prices in more distant towns such as Cayo or Belize City. However, most marketing is done in Dangriga and an average price in 1997 was $5BZ/bottle there (a fixed exchange rate exists of $2BZ=$1US). A transportation cost was estimated for marketing in Dangriga at $7BZ/week. This estimate was based on a 42 km round-trip distance from Sittee River to Dangriga, a gasoline price of $5BZ/gallon and an average mileage efficiency of 30 km/gallon for vehicles, along with the assumption of one trip per week to the market.

Net income can be calculated by subtracting costs for purchased coconuts, bottles and transportation from gross income. Cost of labor also could be included but it is considered to be internalized by the families who operate the mills. The basis of this assumption is that much of the time-intensive tasks in coconut oil production are carried out by children and young people during non-school hours of the day which represents a minimal lost opportunity cost. By the calculation noted above, average net weekly income was found to be $199.29BZ during the "good" season and $76.22BZ during the "bad" season. In order to gain perspective this net income can be extrapolated to an annual value by assuming one half of the year is included in the "good" season and one half of the year is included in the "bad" season. Under these assumptions the estimated average annual net income from the coconut oil operations is $7163.26BZ per family for 1997. This represents a significant source of income since the per capita income in Belize has been reported to be $5,230BZ/year. The additional income from coconut oil allows families to purchase items that would otherwise be beyond their means and to send children to higher levels of education. Although there are only seven families with significant coconut oil

Table 5-3. Comparison of coconut oil production between study periods. Values are weekly averages for seven family operations with ranges given in parentheses. A case consists of the equivalent of 12 individual quart bottles of coconut oil.

	good season	bad season
cases produced per week in 1992	9.4 (3.0 - 22.5)	3.6 (0 - 10.0)
cases produced per week in 1997	5.9 (2.0 - 10.0)	1.9 (0 - 4.0)

Table 5-4. Survey data from interviews conducted in 1997. Values are weekly averages for seven family operations with ranges given in parentheses.

	good season	bad season
total number of coconuts purchased	593 (200 - 1000)	217 (0 - 400)
cost of coconuts purchased, in BZ$	125.00 (0 - 200.00)	36.90 (0 - 67.50)
cost of bottles purchased, in BZ$	15.14 (6.00 - 25.00)	6.55 (0 - 12.00)
gross income, in BZ$	346.43 (100.00 - 600.00)	126.67 (0 - 240.00)

operations in the village, the economy also supports people who collect and sell coconuts and, to a lesser extent, individuals who sell the oil on a commission basis in distant towns.

Environmental Aspects of the Coconut Oil Economy

A question remains as to whether or not coconuts are being harvested sustainably along the Sittee River. Information on population dynamics is needed for this kind of determination (see for example, Peters 1991). As a preliminary assessment, counts of individuals in different stages of the coconut palm life cycle were made at a number of locations along the river. Locations for counts were chosen based on the presence of old husk piles, which indicate the occurrence of coconut harvest. At least 100 individuals were counted at a location before moving to the next. Data are shown in Appendix Table 5-3 for counts made in 1993 and 1997. Definitions of the life stages are as follows: 1) seedlings were recorded as recently germinated seeds with a single emergent leaf, 2) juveniles were recorded as individuals without stems but with multiple, elongate leaves radiating from a basal trunk at the ground level, 3) subadults were recorded as fully formed palm trees less than two meters in height usually without fruit, and 4) adults were recorded as palm trees greater than two meters in height usually with fruit. Results demonstrate a relatively large contribution from germinating seeds which suggest regeneration is continuing, despite harvest efforts. The lower percentages of juveniles and subadults in comparison to adults probably indicate that the adult life stage is relatively long lived, as expected based on palm natural history (Corner 1966). While not completely conclusive, these results show that coconut palms were regenerating and that the population did not seem to be overexploited to support the coconut oil operations along the Sittee River.

Overall, the coconut oil operations seem to qualify as an example of a successful non-timber forest product economy. Coconuts are harvested from a wild population scattered along local beaches and in the riparian forest and the harvest seems to be at a sustainable level. A significant amount of income is generated by the coconut oil operations which provides incentives for the local people to value and conserve the forests and plantations which produce coconuts.

The Disease

Unfortunately, the whole coconut oil economy in Sittee River and elsewhere in Belize is currently threatened by a disease which is killing coconut palms throughout the Caribbean, as mentioned in Chapter 4. Coconuts are dying all along the Sittee River and production rates are dropping. This decline is reflected in the price of a quart bottle of oil in Dangriga which has increased over time from $3.50BZ in 1992 to $5.00BZ in 1997 to $8.00BZ in 1999. Indications are that the disease will continue to spread and eventually kill most of the coconuts along the river. Some naturally resistant individuals probably will survive but not likely in sufficient numbers to support the past levels of coconut oil production. The loss of this economy will reduce incomes in the village and lower the standards of living of the local people. Additionally, there will be less incentive to conserve the riparian forests since they will no longer provide this source of income.

One alternative for the future is the planting of a hybrid coconut variety which is resistant to the disease. Hybrids are available from the government's agricultural experiment station but the costs are too high for most people in the village, many of whom exist at a near subsistence level.

Under the present conditions, few people will be able to purchase hybrids and those that do will probably plant them in plantations on cleared lands. Thus, the future is not promising for continuation of the coconut oil economy and its associated conservation values along the Sittee River.

ECOTOURISM AT THE POSSUM POINT BIOLOGICAL STATION

The economic basis of the Possum Point Biological Station is described in Figure 5-4. The large hexagon represents the Possum Point Biological Station operations, including storage units for capital assets and for money, and the interaction symbol represents the tourist experience. The driving force of the system is the visitor source. Visitors enter the system and bring in money. Visitors themselves are an input to the tourism interaction and the output of the interaction passes back to the source, thus completing the cycle of visitor travel and return. Other inputs to the tourism interaction come from Possum Point capital assets and from environmental features that are visited on tours from the station. The input of money from visitors is really an exchange for the tours and services received from Possum Point. Therefore, the money pathway from visitors is shown as flowing countercurrent to the return pathway of visitors back to the source. The number of visitors to Possum Point has grown considerably since the station opened in 1986. During the study period, from 1990 to 1992, a total of 854 visitors passed through Possum Point (Appendix Table 5-4).

The remaining money flows in the diagram are outlays by Possum Point to support the tourism operation. Table 5-5 describes the magnitudes and some of the details of these flows. Money to the Belize Tourist Board was for a license fee to operate as a hotel and a monthly room tax. Outlays for fossil fuels (gasoline, oil, propane), labor and supplies, and services represent the direct operating costs. Almost all of this money went to the local economy, either in Sittee River Village or in Dangriga. These pathways are important because they provide income for people in the local community. Outlays for capital improvements were for large items or special services that came from beyond the local region, usually from Belize City, which is the largest city in the country.

Donation to the scholarship fund is a unique pathway that links the station with the local community. The fund was set up to help pay expenses for students from Sittee River Village who travel to Dangriga for advanced education. The money comes entirely from voluntary donations by visitors and is administered by a board of local people from Sittee River Village. Donations during the study period were as follows: \$1500 in 1990, \$2529 in 1991, and \$3795 in 1992. Because these are direct donations from visitors, they are not included in Table 5-5 as outlays from Possum Point. The scholarship donation has symbolic conservation value to the people of Sittee River by generating support for education from tourists who value the local environment.

The outlay pathway to the sugar mill site is of special importance. This is money donated by Possum Point to support development of the site. It is an abandoned plantation with sugar processing machinery dating to the mid- to late 1800s scattered over about 4 ha. The machinery includes two boilers, a small locomotive, an engine flywheel, a sugar roller mill, several pumps,

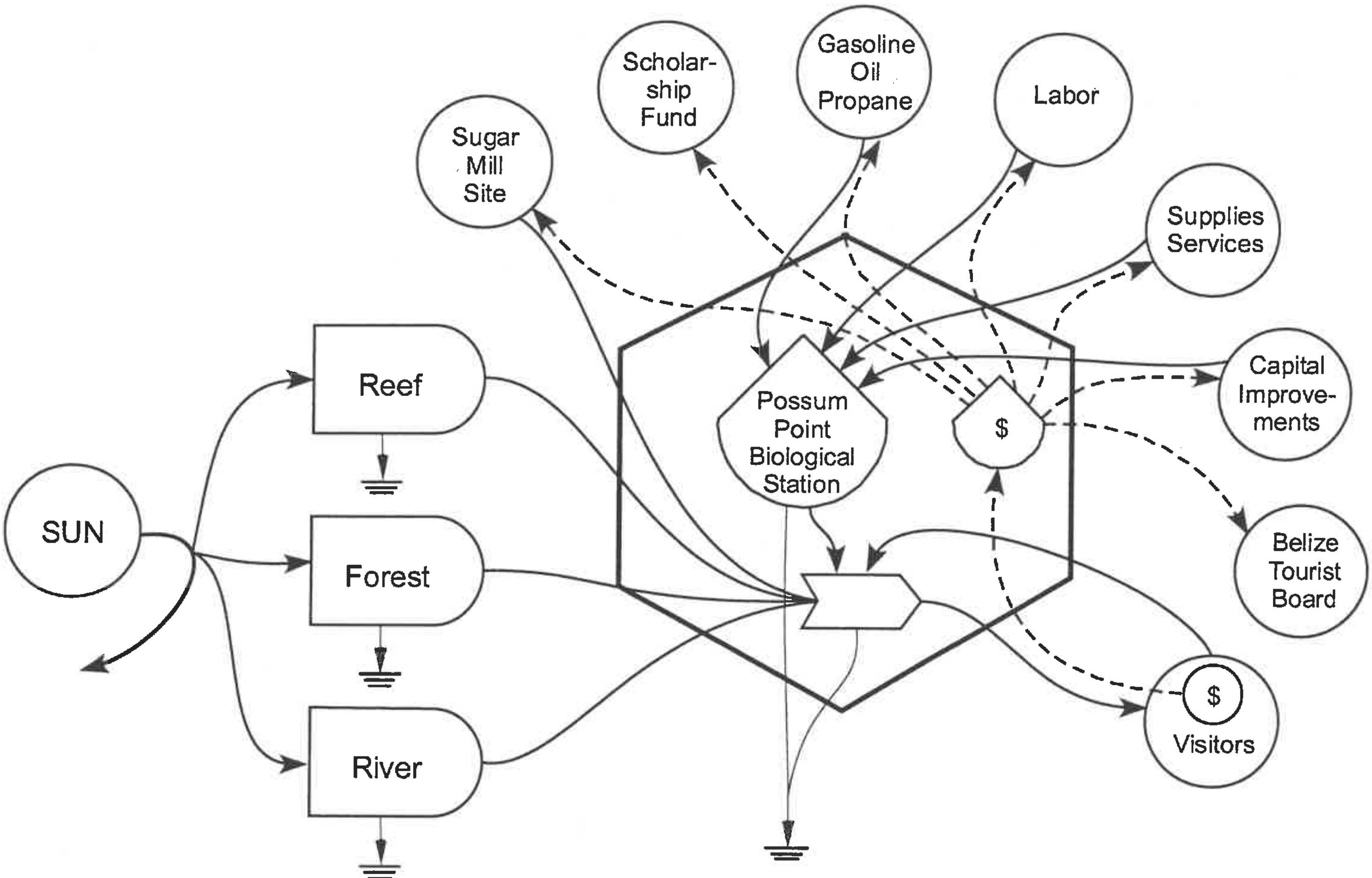

Figure 5-4. Energy circuit diagram for the Possum Point Biological Station as an ecotourism operation.

Table 5-5. Descriptions of economic flows of Possum Point Biological Station during 1990-1992.

Flow	amount ($US) 1990	1991	1992	description
Input from tourists	74,552	139,181	166,268	charges for tourist groups
Outlays to the Belize Tourist Board tax	890	2,242	2,385	hotel license fee and room
Outlays for capital improvements	15,461	26,883	23,468	expenditures for appliances, boats and buildings
Outlay for supplies and services	37,316	68,146	94,816	sum of expenditures for field services, food and ice, maintenance, social security tax and miscellaneous expenditures
Outlay for labor	17,372	27,219	26,406	salaries for staff
Outlay for fuels	9,691	12,890	14,382	expenditures for gasoline, oil and propane
Outlay for the sugar mill site	500	375	0	donations
Total outlays	81,230	137,755	161,457	
Net balance	-6,678	+1,426	+4,811	

and other miscellaneous parts. Secondary vegetation covered the site after the plantation was abandoned. Local workers were hired by Possum Point to clear the understory and set up trails connecting the larger pieces of machinery. Trees were left standing to provide shade and to protecting the rusting machines. A sign describing the site was erected on the road to Sittee River, and it has been designated as a national historical site. Visitors to Possum Point are regularly taken to tour the sugar mill site. They learn about the history of the sugar industry, but also see examples of tropical natural history along the trails, such as large buttresses on trees, native rubber trees, and arboreal termite nests. The money spent by Possum Point to develop and maintain the sugar mill site represents a direct ecotourism link with the environment. It is a voluntary outlay that supports the local environment.

The overall economics of the Possum Point Biological Station are summarized by the net cash balance of inputs and outlays, shown at the bottom of Table 5-5. Over the three-year study period, the balance has gone from negative to positive (-$6678 in 1990 to +$4811 in 1992). Total money flow has also doubled, both in terms of inputs and outlays, over this period. These data demonstrate the growth and development of Possum Point as an economic system, progressing from net loss to profit. Even with this progress, profits are modest at only 3% of the input in 1992. The largest contributions to total outlays are for supplies and services and for labor in each year. Outlay for capital improvements is also significant in each year. In a sense this is an optional outlay, but it indicates a steady commitment to developing the facility over time. If these monies were not invested for capital items, then short-term profits would have been higher. Capital costs are not amortized in Table 5-5 because this table describes the annual net cash balance of Possum Point. If capital costs were amortized, the balances in the table would be greater each year.

The specific ecotourism outlay to the sugar mill was a small part of the total outlays, (0.6% in 1990 and 0.3% in 1991). However, this small investment has a large impact by providing a special addition to the tourist experience and by preserving a significant historical site for the Belizean people. In fact, the government and Sittee River Village have realized the importance of the sugar mill and have taken over its care as of 1992.

The economics of the Possum Point Biological Station indicate that profits can be realized, although it was operated at a deficit for the first of the study period years. The three-year study period described here is perhaps too short to detect a profit trend, but the results are encouraging. Small-scale ecotourism may seldom result in large profits, and it is as much a life-style as an occupation. Possum Point seems to be sustainable and to have little environmental impact, except for some bankside erosion along the river caused by motor boat traffic, based on ecological studies of the river ecosystem (Kangas 1994).

The operation has been successful in teaching many people from the United States and other countries about tropical ecology and about Belize. Much of the tourist money (about 80%) is retained by the local community in employment and purchases of goods and services. Because of these monies, the station ties in closely with the local community as a positive influence rather than by creating environmental and cultural impacts, as can happen in some tourist operations (Johnston 1990). These ties often allow visitors to have more contact with local people, and thus cultural interaction is an added benefit of a visit to Possum Point. One of the measures of success of the operation is the high return rate of groups year after year. This trend suggests that income generated by Possum Point should be relatively stable, which is an important aspect of sustainable development.

Tourism is an important industry in Belize in terms of generating foreign exchange earnings (Hartshorn et al. 1984). Belize is an attractive destination for tourists for several reasons. It contains many Maya ruins, the second longest barrier reef in the world, large areas of intact rain forest, and a rich diversity of local cultural groups. Unlike several other countries in Central America, Belize has no political unrest. It is close to the United States, an important source of visitors, and it presents no language barrier to US tourists. For all these reasons ecotourism operations, such as Possum Point, have the potential to grow and to continue to make significant contributions to the economy and to the conservation of natural resources in Belize.