The Economic and Social Value of Non-Timber Forest Products in a Forest Village Economy in N.W. Guyana

Interim report

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Cover picture inset: A craftsman in Assakata weaving a "crab-quake" from the Mucru plant

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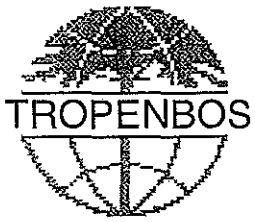

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Table of Contents

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The economic and social value of non-timber forest products in a forest village economy in N.W. Guyana.

Introduction

Huge variation exists in estimates of the numbers of species of living organisms which share the forest ecosystem, but all indicate that by far the greatest proportion of the Earth's biota is to be found in that 6% of its surface where tropical forests lie. This biodiversity is reflected in the large number of species made use of by humans in these latitudes, and many of these are what can be referred to as non-timber forest products (NTFPs). It is hoped that a greater understanding of the use and value of these non-timber products will contribute towards the achievement of more effective policies of sustainable use of tropical forest resources.

1.1 Guyana's forest resources.

Approximately 94% of the land area of Guyana is forested, covering some 18 million hectares. About half of the nation's forests are designated as state land, and the government is under increasing pressure to develop the revenue-generating potential of these resources. An increasing number of large timber concessions have been granted to a variety of multinational interests, and in addition to this, the activities of mineral extraction companies are becoming more extensive. Together, these large-scale timber and mining operations are putting pressure on the integrity of the forest ecosystem itself. According to the National Forestry Action Plan, Guyana is home to over 8000 species of plants, and half of these are to be found nowhere else. More than 1000 species of land vertebrates live in the Guyanese forests (Sizer, 1997), and with over one-third of the forest allocated to logging, and more allocated to mining concessions, this species diversity is now seriously threatened.

Until recently, the high rates of deforestation seen in other countries have not occurred in Guyana. This situation may not continue however, and exports of timber have risen dramatically, from 657,344 cu. ft. in 1993 to 1,242,202 cu. ft. in 1995. (Guyana Forestry Commission, 1996). In spite of these rising export figures, government revenue earned from logging activities came to less than US$1 million in 1995 (Sizer, 1997), indicating that the nation as a whole is not getting the benefit of the exploitation of its forest reserves. If the expansion of timber output continues at such a rate, without generating national wealth, it is sure to have a significant economic and environmental impact, which may well reduce the potential of achieving sustainable development policies for the nation in the future.

1.2 Amerindians and Non-timber forest products.

Since the establishment of the earliest Dutch trading posts in the 16th century, the Amerindians have been involved in the trade in forest products (Forte, 1996), and this to some extent still continues today. Although the trade in gums and essential oils has now declined in Guyana, Amerindians are still major players in the trade in wild animals and exotic birds, and the availability of their labour has contributed significantly to the development of the growing palm-heart extraction industry in the coastal wetland forest zones. Providing the major workforce for both logging and mining interests, these forest

dwelling people have always been unable to command a high return for their labour, and even now continue to be exploited by market forces and unscrupulous entrepreneurs.

Today, there are almost 50,000 Amerindians living in Guyana (Household Income and Expenditure Survey, 1993), the majority of whom live as subsistence farmers in the interior of the country (Forte, 1996). These communities have extensive knowledge about non-timber forest products, and draw on these resources as an essential feature in their lives. When the first serious study of NTFPs in Guyana was completed in 1948 (Fanshawe, 1948), the botanical knowledge of Amerindians was recognised, and this is still reflected today by the fact that most 'tree-spotters' employed by outside logging interests, are Amerindians. It is now widely known that Amerindians as a group have an understanding of forest flora and fauna which is unsurpassed, and, for this reason, it is important that their expertise is now acknowledged and respected by all of those involved in the process of forest policy development.

1.3 The Tropenbos Foundation.

Established in 1988, the Tropenbos Foundation aims to contribute to the conservation and wise use of tropical rain forests (Tropenbos, 1994), promoting research and capacity building in a number of tropical countries. With project sites in Africa, S.E. Asia and Latin America, its contribution to global understanding of rain forests is increasingly well-known. Numerous academic publications have been produced as a result of Tropenbos-funded research, and a large number of post-graduate students from tropical countries have been supported by the foundation. With forest management as a main theme, Tropenbos researchers have contributed significantly to our understanding of forest ecology, water and nutrient recycling, and parameters for sustainability.

In recent years, the remit for research objectives has been expanded to take account of biodiversity and the use of non-timber forest products. Because of their nature, NTFPs have tended to be undervalued in assessments of forest values, although at a household level, they contribute to food security, health and material well-being of millions of forest dwelling people. The fact that many NTFPs have an economic value and can be harvested without substantial forest disturbance (Peters et al., 1989), has brought forward the notion that they can make a significant contribution to conservation and sustainable development strategies in tropical forest zones. The Tropenbos Foundation has been quick to recognise this, and has designed a comprehensive and multi-disciplinary research strategy eventually to bring about the integration of NTFP extraction in land-use planning. As part of this strategy, work on NTFPs has been incorporated into projects in Indonesia, Colombia, Cameroon and Guyana

1.4 The Tropenbos-Guyana programme.

The Tropenbos-Guyana programme began in 1989, with an intergovernmental agreement between the Netherlands and Guyana, in which the Universities of Guyana and Utrecht collaborate on forest research. For many years this work has predominantly involved biological and ecological studies, providing an understanding about aspects of rain forest ecosystems which in some cases have global applications. Soil dynamics, vegetation inventories and growth rates in undisturbed ecosystems have provided a baseline on which a deeper understanding of disturbance impacts has been built. Most research work on the Tropenbos-Guyana project is now carried out at Mabura Hill, 235

kms. south of Georgetown, within the logging concession held by Demerara Timbers Ltd.

As a further extension to the multidisciplinary approach fostered by the Foundation, the work in Guyana now includes social, economic and anthropological research into NTFP use, of which this particular project is a part. In association with the Amerindian Research Unit of the University of Guyana, this type of work is carried out in other locations, most notably in the N.W. of the country in Region 1. Here, the biological studies of NTFPs conducted by Tinde van Andel, have been complemented and extended by anthropological and economic studies of how these NTFPs are currently being used by forest dwelling people of the region.

1.5 The objective of this research.

The purpose of this research is to investigate the socio-economic significance of non-timber forest products (NTFPs), as used by Amerindian forest dwellers in Guyana. The term 'Amerindians' is the collective name given to those individuals descended from the earliest known peoples of South America. Since the Amerindians have evolved a lifestyle of survival in tropical forests for thousands of years, they hold a deeply embedded knowledge of these forests which cannot be rivaled by any of the later arrivals to the continent.

Because of the nature of most NTFPs, it is important to assess their importance at a local level, and the main objective here is to do this as accurately as possible. The development of a field-study design, which attempts to achieve this objective, has been the result of reference to work by botanists (Godoy and Bawa, 1993) forest economists (Panayotou and Ashton, 1992), economic anthropologists (Hill, 1986), social anthropologists (Sykes, 1996; Redclift, 1987), economists (Bliss and Stern, 1985), and development bodies, such as the IIED (Pretty et al., 1995) , the ODI, and the Rainforest-Foundation.

2. Fieldwork Preparations.

2.1. Country selection

Guyana, as the only English speaking country in South America, is an important research location for an English-speaker conducting socio-economic research. Investigation in any of the social sciences involves the development of an accurate understanding of many complex activities and relationships, and by minimising linguistic variables, less errors of both data collection and interpretation may be made. Since Amerindian groups in the North West of Guyana have tended (as a result of hisorical pressures) to lose the use of their own languages (Forte, 1995), it becomes feasible to conduct relatively detailed socio-economic research in that area, without too much linguistic difficulty[1].

[1]. This is not to say that a researcher could expect to go there and fully understand the local dialect of spoken English. The official language of Guyana is English, but over the years it has evolved into *Guyanese Creolese* , used by other ethnic groups in the country, especially those of African and East Indian descent. Some Amerindian groups in Guyana have retained their own cultures to the extent that languages such as Carib, Warrau and Arawak, are still spoken as the first language, but in the North West of the country this is sadly not the case. For these Amerindians, specialised vocabulary relating to their culture, such as the names of household utensils, like the *matapee* (cassava squeezer), have been absorbed into the English framework, and it is this mixture which has now taken on the role of the first

2.2. Selection of the field sites, and recruitment of field assistants.

A preliminary visit to Guyana was made in March 1996, to organise the institutional arrangements associated with work such as this, and to gain an understanding of the background to the situation of the potential study area. This also provided the opportunity to identify the actual villages to be studied, and select the local fieldwork team.

During the preliminary visit to Guyana, a number of organisations were contacted. These included the Ministry of Amerindian Affairs, the University of Guyana, the Amerindian Research Unit, the Guyana Forestry Commission, the Ministry of Education, the Ministry of Natural Resources, Amazon Caribbean Ltd. (the palm-heart processing company), and a number of NGOs. Through the University of Guyana, contact was made with Amerindian students studying forestry or agriculture, and these were invited to a meeting to investigate possible participation in the project. Those who expressed interest at the meeting were then briefed in full as to the rationale behind the project, and those selected were given some introductory reading matter to familiarise them with the general background of the work.

At the same time, in consultation with the selected field assistants, a number of suitable villages were identified, which fitted the criteria for the study. From a short-list of villages, the three were finally selected with assistance from Janette Forte, Director of the Amerindian Research Unit at the University of Guyana (see map, Fig. 1). It was planned that the three villages selected should have small enough populations to allow a complete survey of all households. They were all to be located within a specific forest type (lowland mixed forest), and each was to be on an Amerindian reservation, where land-tenure rested with the Amerindian community. Each was selected on the basis of its proximity to relatively undisturbed forest, and being predominantly influenced by one of three types of land-use, namely:

- having income through palm-heart harvesting (Assakata);
- having income from traditional sources of handicraft & farming (Karaburi);
- having income from employment in the logging industry (Sebai).

It was felt that by including different types of villages in this way, a variety of household types would be included in the survey, and a useful comparison could be made on the impact of the different income sources to the well-being of the people in the different villages.

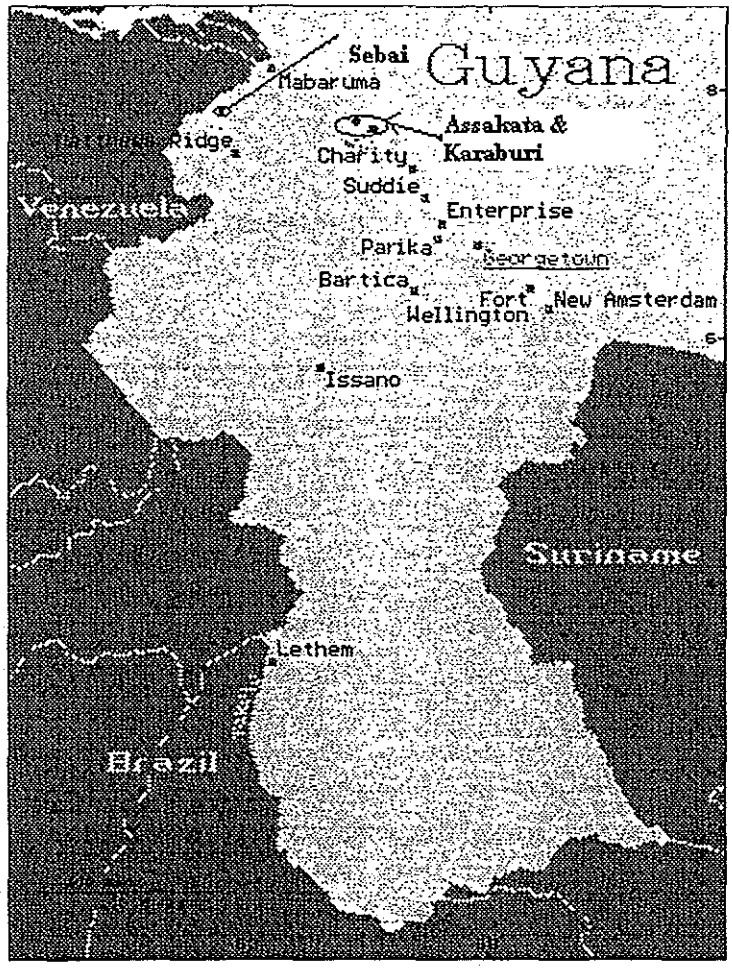
In the period March 96 - June 96, correspondence was conducted with the '*Captains*' (head-men) of the selected villages, requesting permission to conduct the study in their villages, and to use the school building as accommodation for the research team. In all cases, a very positive letter was returned, making it clear that the villages concerned were interested to participate and enthusiastic about the study. The village headmasters were also contacted, to inquire if they were interested to participate in the study, and again, enthusiastic responses were received. In all three villages, the headmasters were willing participants, and acted as official field assistants to the project for its duration.

language. In some areas, their version of the local language is even further embellished by terms from Venezuelan Spanish, spoken across the nearby border.

During this same pre-study period, all field assistants were sent training material, to provide them with a basic preparation of what they would be required to do during the field work itself[2]. Contacts were also made with each of them to formalise the agreement, and a per diem allowance plus food and lodging, was agreed with all of them. Arrangements were made to meet on a given day at the village of Moruka, the administrative centre for the region.

Figure 1. Map of Guyana showing study villages.

[Scale: 1 cm. = 100 Kms.]



[2] The material used was based on the 'Participatory Learning and Action' approach of the International Institute for Environment and Development in London. The training of the field assistants continued when the group met at the start of the fieldwork period, in the regional capital of Moruka, where supplies were bought to take to the first study village. This meeting was the start of a period of discussions on sustainable development, the planning of research methodology, and getting to know one another as a team. This 'informal training process' continued for several days, and all of the field assistants stated on several occasions that they had learnt a lot from it.

2.3. Preparations in Georgetown, prior to travel to the study sites.

After arrival in Guyana, one week was spent in Georgetown making travel arrangements, collecting supplies, and obtaining the necessary travel permits required for visits to Amerindian reservations. Two other field assistants (who had been selected to collect data on the sale of non-timber forest products and handicrafts in the Georgetown markets) were briefed and trained on the preferred methods of data collection to be used. It was stressed that the field assistants were to make it clear that this was not a government study (for example for tax purposes), and that interviews with market vendors and craftsmen/women were to be kept as informal as possible. This part of the data collection was viewed as a pilot study, to provide some general background information about the current state of non-timber product marketing in the capital (rather than a rigorous study of the market for the purposes of analysis, which would obviously require some more in-depth attention).

2.4. Field assistants, Assakata, June 1996

The field assistants in the Assakata study included both males and females, aged between 17 and 42. All were at least part-Amerindian, and all came from the North West area of the country. They included:
Lloyd Savory, Headmaster, Assakata Government School.
Peter Abrahams, Headmaster, Karaburi Government School.
Lovell Rebeiro, Forestry Student, University of Guyana.
Trudie Daniels, Forestry Student, University of Guyana.
Graham Atkinson, Agriculture Student, Guyana School of Agriculture.
Supatra Abraham, Graduate, Santa Rosa Secondary School.
This group of field assistants conducted the household surveys and participated in other data collecting activities, while the author, as team leader, coordinated their work and conducted both formal and informal interviews with key informants, collected soil samples, etc.

3. Methodology of data collection

3.1. Fieldwork procedure and data collection in the village.

Assakata is located 36 miles, or 6 hours paddling time, from Moruka, on the Assakata Creek, a tributary of the Biara River. The fieldwork team reached it by powered boat hired for the purpose. At the sound of the approaching engine, the Captain, (village headman) and other senior villagers gathered ready to meet the research team on arrival at the 'landing' (jetty). After introductions were made, a gift of some agricultural tools was presented to the Captain, much more as a token of friendship than any kind of payment for services rendered. A brief explanation of what was to be done was given, and then arrangements were made for a whole-village meeting to be held later the same afternoon in the school.

3.2. The introductory meeting.

Word was spread through the village that the team had arrived, and a majority of villagers attended the introductory meeting. Almost all households were represented, even in cases where the men were out hunting, fishing or cutting palm-heart. In each village, the team of researchers was introduced by the Headmaster. A brief talk was

given on the objective of the project, explaining the interest in sustainable development, non-timber products, and what these may mean to a community such as theirs.

During the meeting, lists were made of the names of people involved in various activities, (such as palm-cutting, handicrafts, hunting etc.), and in the case of those who were absent from the meeting, names of persons to be included in these lists were suggested by the other villagers. These lists were later used to build up a picture of which household participated in which activities, and it helped the team to identify those households to be included in the surveys of the various activities. Diaries were distributed to one member of each household, and an explanation of how to complete them was given. The field assistants then went round amongst the villagers, ensuring that people understood what they had to do with the diaries. Due to literacy rates of 90% amongst Amerindians in Guyana (Family Income and Expenditure Survey, 1993), it was not a problem to find someone from each household capable of completing the diary[3].

The floor was then thrown open to questions, and on each occasion, a number of people had questions about why the team were there, how their village was chosen to participate, and what the investigation was about . Some people wanted to know if the research team were from the government, or from some political group, and it was seen to be advantageous that we were not. It was made clear to everyone that there would be no direct benefit to the village in terms of money income or future investment as a result of the study, but that it may have longer-term benefits for them if the results could have an impact on policy issues.

At the introductory village meetings, it became clear that the term 'sustainability' was something some people had heard of, while the vast majority had not. The ideas underlying the concept however were something that the people of these villages clearly understood, and could identify with in their own views of life. Nevertheless, although interest in sustainability as a development concept was clearly there, it was apparent that for most people, feeding the family and improving the standard of living were of more pressing importance.

Throughout the study, it was made clear that there would be no payment for participation in the surveys, but the villagers' assistance in the project was important, and their contribution was valued. In each village, the meeting was brought to a close after about an hour, and a group photograph was taken of those present. At the end of the meeting, a representative of the village (usually the Captain), once again welcomed the research team to their village, and reiterated their appreciation of the fact that for the first time, people were asking their opinion. This was another reason why the villagers were enthusiastic to participate, and willing to support the study.

There is no doubt that the incorporation of the Amerindian field assistants into the project was a great success, and had an influence on the quality of the collected data. The fact that the people in the survey villages felt they were talking *'to one of their own'*, had an important impact on the detail of the collected responses, and the informal nature of the interviews conducted with participants also had a beneficial effect. For the purposes of analysis, the data collected was standardised across households, by having

[3] Literacy rates varied across the village, with the older and younger people having a much better literacy rates than those in their 20s. This reflects a decline in educational standards which appears to have occurred for a period in the 1980s, and seems to be evident in other villages as well as Assakata.

the field-assistants complete pre-structured data recording sheets some time after the conversation with the survey subject had begun. This was designed to highlight the idea that the field-assistants and survey subjects were having a friendly, down-to-earth conversation, rather than it being seen as a highly structured interview with strangers. The fact that the field assistants were also Amerindian villagers, helped to ensure that the data recorded was realistic and representative of the actual situation in the village, as it was unlikely that respondents would give unrealistic responses when the questioner would clearly know this to be the case.

3.3. Participatory mapping of the village.

After meeting with the villagers, the next task was to construct a map of the village, to identify the houses and farms, and other features such as the landings, (jetties), creeks, or schools. This was done in consultation with the villagers, but it was started by involving the children in the school. To do this, each field assistant was assigned a group of children from the total school population. The children were divided into roughly homogeneous groups, on the basis of age and size, and each was given a flat glass bead, which was to be used to signify their house[4]. Using a large sheet of paper, each field assistant drew the school at the centre of the map and linked it up with the landing by a path. Each child was then asked how they came to school, and a series of paths was sketched, which represented the pathways in the village (some children also came by canoe to the landing). Each then took it in turns to show where their house was in relation to the school, using the glass bead to indicate where they thought it was. Using a compass, the position of each house relative to the school was accurately marked on the map, and the others in the group were asked to verify if they thought the marked position was correct. After the houses were marked for each member of the group, the children were allowed to keep the glass beads and take them home.

After this first session, the research team put together the maps from all of the groups, and from these constructed a map of the entire village. When it was completed, it was drawn carefully on the school chalk-board, and the headman and other villagers were asked to come and see if they agreed with it. The villagers were very interested in the map, and were active in their discussion of it. The few households in the village which had no children in the school were added in at this point, and some refinements and clarifications were made. Later, to get an accurate estimate of the size and degree of dispersal of the households in the village, the distances involved between the various parts of the village or the houses themselves were checked on two occasions using a pedometer. This map of the village (see example in Fig. 2) was then used as a basis for organising the collection of the household data.

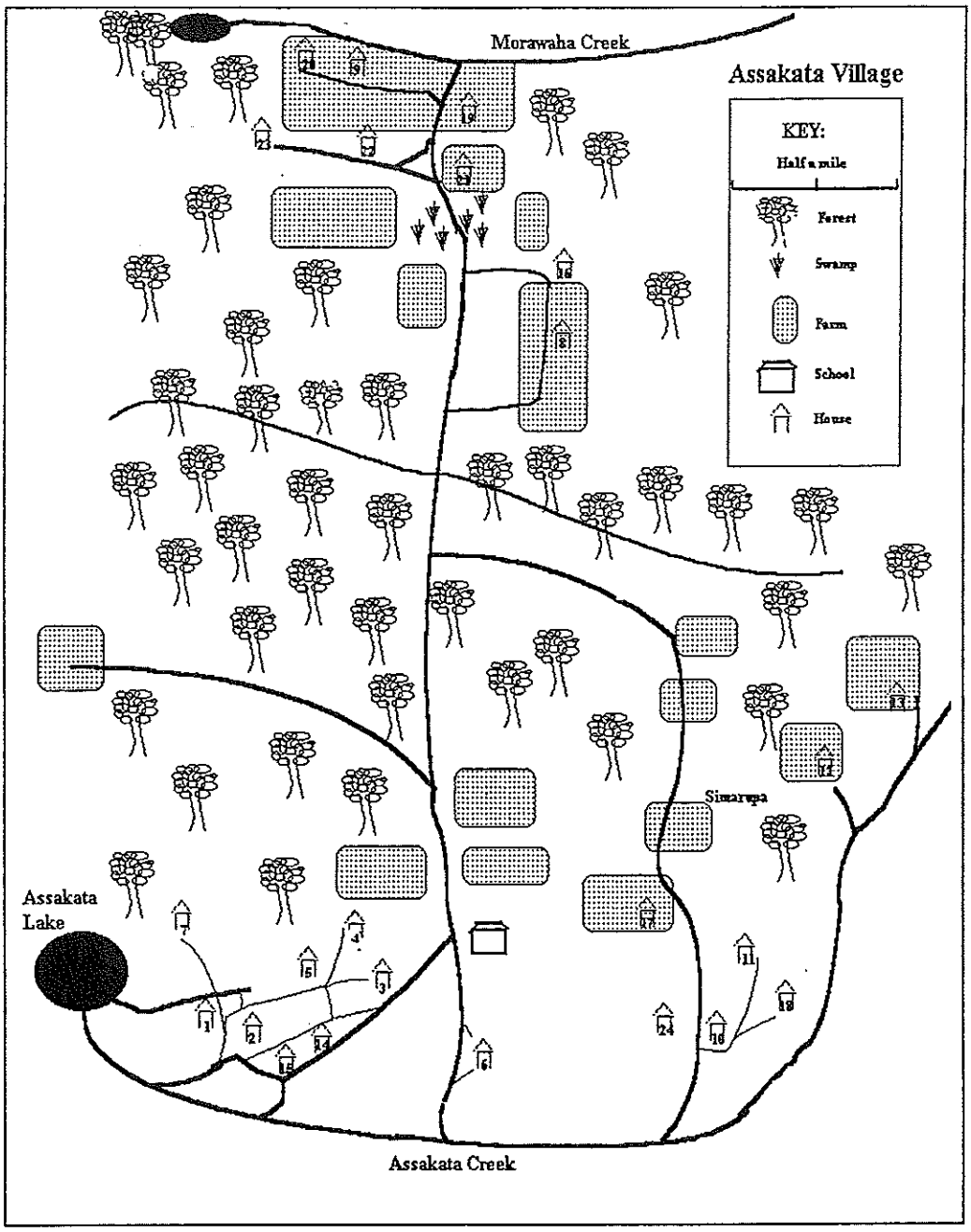
Each house was given a number on the map, and this number was then consistently used as a reference for that household. In the case of houses which contained more than one household (family unit), subscripts *a* and *b* were used to differentiate between the different family groups. This was only required in a few cases, and was usually when two brothers shared a house and farm, each having their own wife and children. During the

[4] The use of the glass beads was to take the place of the stones and twigs used in participatory mapping exercises in other studies. This was because it was known that the village of Assakata was located in a *white sand* area, where few stones are to be found at hand. The glass beads were also very appealing to the villagers, with both adults and children keen to have one as a souvenir.

work in the village, any mistakes on the map which came to light when the actual surveys were conducted, were corrected.

Figure 2. A map of Assakata,

(Scale: 1 inch = 1 mile).



3.4. Conducting the household surveys.

On the basis of the information elicited by the map, the village meeting, and the lists of the householders' names, the field-work team was divided up to cover sections of the village, which included all households. The field assistants worked in pairs, (where possible, one male and one female) going first to the houses farthest away from the

school, then working inwards towards the centre. In this way, all households were accounted for, and the team worked their way through the entire village until all the houses were included.

In the first visit to the households, conversations were conducted with the male heads of household, usually with the male field assistant. The senior female members of the household were separately interviewed at this time, if this were possible, usually by conversations with the female field assistant. In some cases these structured conversations were conducted with two women at once, but usually they were done individually. Each of these survey interviews took some time, depending on the nature of the household and the character of the person being interviewed. The efforts made to create a relaxed atmosphere for the discussions also meant that more time was needed than may otherwise have been the case, but this was considered essential to try to ensure accurate answers by those surveyed. In most cases, appointments were made with householders to verify that the survey would not interfere with their daily routine. Data from all of these structured conversations was recorded towards the end of each visit, on pre-prepared standardised data sheets. Examples of these are shown as items 1 to 12 in the appendix.

When all of the male and female interviewee data-sheets were completed, the next stage was to collect farmers data, and this was done where possible by interviewing a different family member (such as son, brother, wife or daughter) from each household. Information on handicrafts, hunting, fishing, palm-heart cutting and NTFP collecting, was then gathered systematically from those households where these were relevant, and also structured interviews were conducted with both elders and youths. All of the information was collated at the end of each day, and a check was made daily to ensure that no households were being omitted. Every morning, each pair of field assistants were assigned a variety of tasks for a certain number of households, and, in most cases, these tasks were completed as planned. In a small number of cases, no-one was present in the households, and this meant that no data was collected there. If it was known that this was a temporary absence (due to palm-heart cutting or crab hunting), average values for household activities were assigned to that house, but if it was a case of a house which had been unused for some time, no data was included for it.

3.5. Interaction between the field-work team and the villagers.

In many rural areas in developing countries, communities are small and people are sometimes suspicious of strangers. Although an element of this exists in Amerindian societies in Guyana, they tend to be trusting and straightforward in their dealings with people, once a stranger has been accepted into the community. In a study such as this, it was important to cultivate an acceptance of the fieldwork team by the villagers, in order to ensure smooth operation of the data collection activities.

In relation to the efficiency of data collection, an important consideration was the relationship between the team leader, the field assistants, and the villagers themselves. Due to the nature of the planned participatory research activities, it was essential that there should be a commitment by the field assistants to the overall objectives of the study, and its real relevance to their people. By selecting people who were interested in the work, and who sincerely felt that it may have some benefit for the Amerindian people, it was possible to build up a degree of mutual respect and trust within the team

itself. The feeling of respect and trust was also important between the team and the villagers, as this could clearly influence the way people responded to the interviews in which they participated.

The idea of having Amerindians who were local to the area as field assistants was very important to the principle of participatory research. Including the village headmasters as field assistants was also important, as these were people who had an already established relationship of respect in the village. It was very fortunate that it turned out quite by chance that two of the village headmasters had been students of the team leader, some 18 years before. This meant that even before actually meeting each other for the fieldwork itself, the senior field assistants were favourably disposed to the team leader, and were enthusiastic in their involvement with the project as a whole. This positive attitude was transferred to the rest of the research team, creating a bond of friendship, respect and trust right from the early days of the study.

When the team was introduced to the people in the villages, this historical connection between the team members brought about respect for the team leader, which meant that people were willing to participate fully and enthusiastically in something which they felt could have some benefit on their lives. I believe that this link with the past was something which was crucial, as without some particular motivation, the villagers may well have been quite unwilling to participate in something which they could have seen as involving *'just another set of foreigners with their own agendas'*.(Radzig, 1996). In addition, In two of the three study villages, Assakata and Karaburi, some members of the research team were blood relations to at least one family in the village, and this was another factor in the acceptability of the research to the villagers themselves..

3.6 Methods of estimating proportions and quantities.

Although the Amerindian people of Guyana are quite well-educated, it was important to use a standard method to enable people accurately to estimate quantities of crops produced or food eaten. In the case of the crop outputs, the standard size basket (*quake*) [5] used in the village was used as a measuring unit, and the field assistants then converted this to the number of pounds weight produced. Pounds were used as a measure of weight as that is what is used in Guyana. This procedure was effective and efficient, as all households had a good knowledge of how many *quakes* they produced, as they had to carry these back from the farms to the households (this could often be some miles away). Using this method, the quantities elicited represent accurate estimates, with any error being of under-estimation rather than over-estimation.

In the case of estimates of proportions, or scoring, this was done using glass beads similar to those used in the mapping exercise with the children. The person being

[5] The locally made *Quakes*, (baskets) may vary in size depending on their use, but farmers in the village tend to use a fairly standard size. Usually, they are only able to hold a maximum of 50 lbs, but to ensure a conservative estimate, the weight of each quake, for the purpose of calculations in this study, is taken to be 40 lbs. People were asked to state how many quakes of a crop they produced, and the field assistants then were required to re-calculate this as the number of pounds weight. To verify the validity of using 40 lbs as an estimate of the standard weight of a *quake*, random checks using a spring balance were made on *quakes* being carried in the village, and these showed 40 lbs to be a conservative but suitable estimate of the average weight carried in quakes in this village. It is interesting to note that the farmers, when asked to estimate the weight of the quake or other load which they were carrying, were very accurate.

interviewed was given ten of these, and asked to share them out to represent the various portions of the item in question. For example, when women were asked about the type of food they ate, they were able to use this method to indicate what proportion *by volume,* was provided by each type of food. This method was also suggested to men, when estimating proportions of farm output used for food in the home, but many of them did not need to do this, as in most households, all farm output was consumed in the home.

3.7. Other data collecting activities in the fieldwork villages

In addition to the systematic household surveys, other activities were also conducted, to collect background information for the project, and to promote friendly and open relations between the villagers and the study team. Activities were designed to provide a comprehensive 'snapshot' of the economic and social conditions in each village, and included:

- forest walks with the village headman and other senior villagers;
- formal interviews with the village healthworkers, village council chairpersons, and village 'captains';
- random weighings of 'quakes' being carried by farmers, and assessments of their accuracy at estimating the weight being carried;
- collection of soil samples from a number of farms, and water samples from a variety of locations throughout the villages, including the rain-water tanks at the schools, used for children's drinking water during the rainy season;
- group meetings with craftswomen/men;
- group and individual meetings with interested villagers;
- interviews with NTFP traders (especially *Kuffa, Nibbi, Truli* and *Manicole*[6] traders);
- observations of wildlife traders buying macaws, parrots and other wildlife;
- interviews with senior farmers in the village;
- participation in hunting and fishing trips;
- observation of palm-heart cutting techniques;
- observation of palm-heart purchasing by company agents and visits to collection points;
- group discussions with children;
- group discussions with women during clothes washing sessions at the river;
- observations of food prices in village retail outlets (if any), plus detailed pricing of crops and other goods at the nearest markets of Kumaka/Santa Rosa, and Port Kaituma.

[6] These are important forest plants which are traded both regionally and, in some cases, nationally.

All of this information, together with that collected in the diaries, served to cross-check the information on the structured data sheets, ensuring a measure of reliability for the dataset as a whole.

3.8. Conclusion of village visits.

After 16 days in the village, the household surveys were completed, and as many datasheets as possible were collected for each household. A total of 146 data sheets of various types were collected for Assakata, 199 for Sebai and 305 from Karaburi, a bigger village. A total of 98 diaries were collected, varying in quality and quantity of completion, ranging from fully completed diaries for all of the days of the survey, outlining clearly the day's activities for each family member, to those containing very sketchy information about the family for just one of two days. Altogether, in the three villages, this survey data covers 131 households, representing approximately 800 people.

When all of the work was completed for the village, a final meeting was held with the villagers to thank them for their participation, and give them a brief explanation of what had been achieved during the study. In all of the villages, people expressed their gratitude for the fact that they had been consulted about the use of the forest, and all pointed out that, to their knowledge, this had never happened before.

3.9. Data collection outside of the villages.

In addition to the village data, a signficant amount of other information was collected during the fieldwork period. This involved collection of prices in local markets (Port Kaituma and Moruka), market surveys in the capital Georgetown (see section 3.11), and a detailed visit to the head-office and factory of the palm-heart extracting company, Amcar.

3.10. Collection of data relating to the commercial extraction of palm-heart.

Some research has been done on the use of the *Manicole* palm (Euterpe oleracea) in Guyana (Johnson, 1994). Since palm-heart extraction in the region is an example of a commercially exploited non-timber product, contact was made with the one company involved in this in Guyana. The company, Amazon-Caribbean Guyana Ltd., locally known as Amcar, were very cooperative, and made their records available for the study. They also provided transport for the survey team from Kwebana, a river port near Karaburi, to Drum Hill, on the Barima River, where their factory is located. The company is a medium-scale, French owned operation which has been in business in Guyana since 1987 . The company buys the palm-hearts from the free-lance cutters (either directly, or through buying agents located at strategic points in the various rivers), then processes and cans them before shipping them out to Georgetown, where they are labeled and examined by customs officers before being exported to Europe.

A number of boats are owned by the company for the purpose of buying the palm-hearts from the cutters. These ply a regular route three times a week and collect from various places on the Barima, Waini and Aruka rivers. The survey team traveled on one of the company boats on an overnight buying trip, which stopped at several 'cabbage-landings'[7] including all of those serving the cutters from Assakata and Karaburi. This

[7] The term 'cabbage landings' refers to the places in the rivers where the palm-heart cutters sell their harvest to the company. These are simply temporary jetties which are built in the river from the stems of the Manicole palm, located on a route where the large company boat can pull in to collect the palm-

enabled detailed observations to be made of the quality control system used by the company, whereby palms which are either too old or too young are rejected. The age of the palm itself can be easily seen by an examination of the cross-section of the stem; similar to other trees, the number of rings/skins in the stem indicate the age of the palm. This means that it is easy for even the untrained eye to tell if the palm is cut at the appropriate age.

According to the company, the restriction on the age of the palm acts as a means of ensuring that depletion of the resource does not occur, as the lack of incentive to harvest both the older and the younger palms ensures the process of species regeneration. In addition to not wanting to buy the young palms, they do not want to buy the old ones, as they are bitter-tasting and unsuitable for processing. Until comprehensive biological surveys of this regeneration process are completed, it will not be possible to estimate the sustainability of the palm-heart extraction business,[8] but the company is clearly interested to maintain a sustainable harvest, and thus are strict about the buying process as a way to influence the cutters.

During the buying process at the landings, it was also possible to observe the extent to which the cutters took advantage of the company's service of providing basic food and other goods in exchange for palm-hearts, instead of paying for them with cash. It was clear that cutters were very keen to do this, as the exchange prices used by the company[9] are much less than those charged by retailers in the nearest alternative market at Moruka. Interviews with the cutters suggested that the availability of these cheap goods provided significant motivation to participate in palm-heart harvesting work, and it was stated that it was because of this, that most households in Assakata had at least one family member involved in this collecting.

While visiting the Amcar factory, interviews were held with the boat captains, buying agents, factory workers, the company health-worker and the factory manager, and detailed statistics about the factory operations were collected. Families living nearby, including the immediate neighbours, and the headman of the nearby Amerindian reservation of Red Hill, were interviewed, revealing generally favourable reports on the company. In addition, after returning to Georgetown towards the end of the study, more details from the company records were collected from the head office, as well as from the Guyana Forestry Commission which has the responsibility to oversee the operation and collect royalties from the company.

3.11. Data collection in Georgetown.

In addition to the field assistants in the villages, two other field assistants were employed to collect data from markets in Georgetown, while the village surveys were being carried out. The first of these, an Amerindian student of forestry from the University of Guyana,

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hearts. Palm-hearts are referred to in this area as 'cabbage', and on the night when the survey team accompanied the boat, 10,108 palm-heart stems were purchased by that boat alone.

[8] At present, the Tropenbos Foundation of the Netherlands is funding the work of Tinde van Andel, a biologist from the University of Utrecht, currently completing a study of the non-timber products of N.W. Guyana. At present, this work has been extended to make a survey of the regeneration of palms in the Assakata area.

[9] Company policy is that provisions are bought wholesale in Georgetown, shipped in to the factory at Drum Hill, and then sold to the cutters at the Georgetown wholesale price, making them as little as half the price paid elsewhere in the area.

John Campbell, was detailed to investigate the market for non-timber products in Georgetown, the capital. To this end, he visited all of the markets in the town and located any sellers of such products, whom he then interviewed. Although the same low-key, informal interview technique was employed, he found the market people more suspicious of him, afraid that he may be some sort of government tax informant. Nevertheless, he was able to obtain some useful information on how these products were sold, either in their natural state, as leaves, roots etc., or in some processed form, such as Crabwood oil pressed from seeds, or baskets made from *Nibbi* or *Mukru*[10]. In addition to this, he also conducted a small survey of tour operators to investigate briefly the interest in ecotourism in Guyana, this being another potential source of income for intact forest areas.

The second of the field workers was a Guyanese of mixed East Indian and African descent, Marcus Sukhlal, well known in the town as a skilled craftsman. His remit was to survey craftsmen and women in the capital, and collect information on the market for craft there. Although not all of the craftsmen or craftswomen used non-timber products, some did, while others made wood-carvings. The information collected by both these assistants was to provide background information about the market for handicrafts and other NTFPs, and served as a pilot study to set the rest of the survey data in context. The results of this aspect of the study will be provided in the final report.

Other information was also collected in Georgetown, and in most cases this took the form of statistical data and qualitative information, collected through interviews with staff members in such organisations as the Bank of Guyana, the Government Statistical Office, the Ministry of Health, the Guyana office of the World Health Organisation, the Ministry of Amerindian Affairs, the Wildlife section of the Ministry of Agriculture, the Guyana office of IICA, the Ministry of Natural Resources, the Iwokrama Project and local NGOs. In addition, a survey of the prices of basic items, including food and hardware, was made in 3 major retail outlets in the capital. Taken together, all this information is to be used to set in context the data collected at the three study sites.

3.12. Problems with the data collection.

Due to the enthusiasm and dedication of the Amerindian field assistants, and the genuine interest in the project expressed by the villagers, there were surprisingly few difficulties in the data collection process. The few problems which did arise were more to do with logistics rather than the quality of data collected. These included:

- Some time being wasted as a result of field assistants arriving too late to meet with householders who had already left for their farms. (This was solved by making appointments with people for a particular time).
- Time was used up by the need to walk quite long distances around the village, which, especially in the case of Karaburi, was very spread out. The field assistants often had to walk as much as 10 miles per day.
- Some houses could be reached only by canoe, and this involved borrowing a canoe and paddle from one of the villagers, which was not always possible.

[10] *Nibbi* and *Mukru* are two forest plants very important to the Amerindian lifestyle, and widely used for basket making and other purposes.

- On very rainy days, the field assistants were not keen to go out early in the morning and needed to be persuaded, or waited until the rain stopped.
- Care needed to be taken to take account of which church the villagers participated in, as there was a degree of antagonism between those who followed the formerly dominant Jesuit church, and those who had converted to the new Pentecostal church (fortunately the field assistants were sensitive to this).
- Continuous checks had to be made daily by the team leader to ensure no houses were omitted.
- Transport from village to village took up a lot of time, and in the case of reaching Sebai, was very expensive.
- In the early part of the study, some mistakes were made in the interpretation of certain questions; this was remedied as time went on.
- It was not always possible to get data of all types from every house, (due to the family being away for some of the time of the study). Where appropriate, village averages were used to fill up 'gaps' in these cases.
- Field assistants in Georgetown had more problems with reluctance on the part of those approached in the various markets, through a suspicion that this was some kind of government income assessment for tax purposes.
- At the end of the fieldwork, time and money ran out, and the work in Sebai had to be hurried. This was mostly due to the fact that Karaburi had many more houses than had been suggested from the information collected in the preliminary visit. Fortunately, the field assistants were much practiced by the time Sebai, the last village, was reached, and they were determined to complete the job well, in spite of the short time, rather than do a poor job. This meant that in that particular village, they all worked very hard, and for long hours every day.

In spite of these relatively minor problems, the fieldwork was completed effectively, and although more time would have been useful, the goal of taking a *'statistical snapshot'* of the villages was achieved.

4. The analytical framework used for the calculation of the economic use-value of non-timber forest products in Assakata.

The use of an accounting framework to calculate the importance of non-timber forest products as a resource is an attempt to overcome some of the problems associated with environmental valuation.

4.1.The accounting framework.

Conventional measures of economic valuation often fail to account for environmental impacts, (Markandya and Perrings, 1992) and in the case of tropical forest valuation, the lack of inclusion of the value of non-timber forest products results in an under-valuation of the resource. Resource auditing procedures which may be useful in other circumstances fail in this case because of such problems as the lack of clearly defined

markets, uncertainty regarding both current and future demand and supply of forest products, and the lack of detailed information about how these resources are used.

There are, of course, a number of disadvantages associated with the widely accepted United Nations System of National Accounts (SNA). The two major ones are the fact that no provision is made either for the inclusion of the value of environmental goods and services, or for the depletion of the resource over time. (Repetto, 1988; Daly, 1989). While this study cannot overcome these problems, it does attempt to include some otherwise ignored values, as well as highlighting the need for a more holistic approach to forest resource assessment. In addition, the data collected here about current rates of use of non-timber forest products, could be of use to future researchers attempting to calculate rates of resource depletion.

4.2. Modeling the village economy to calculate the value of the Village Product.

The main objective of this work is to examine the extent to which non-timber forest products (NTFPs) are important to forest households, and to estimate the monetary value of their worth in such an economy. In particular, this work makes an attempt to extend the valuation process beyond the monetary sphere, to include the flows of natural capital and ecosystem services which are utilised by households, and to examine these in a way which takes account of the social and biophysical impacts which they may have.
In these villages, NTFPs contribute to the household in a number of ways, as a source of:

- food;
- roofing materials for houses;
- medicinal treatments;
- income from the harvesting of palm heart;
- income from handicraft & housewares made from non- timber products;
- income from fishing, hunting and trapping for the wildlife trade[11].

As a means of estimating the value of these NTFPs, a model of the village economy is developed, and the value of the Gross Village Product (GVP) calculated. This will be based on the usual accounting framework, as used in the calculation of Gross National Product, but modified to represent the simpler economy found in a subsistence village. The model of the village economy will be calculated on the basis of the usual equilibrium accounting assumption that:
Value of household input = value household output
Here:

$$Household\ inputs = wL^h + rK^h + \delta K^h + p_f F^h$$

Where:
w = wage rate;
L^h = weighted hours worked by household h (weighted for men, women and child labour inputs);
r = rate of interest for the use of capital in production;
K^h = value of productive capital used by household h;

[11] These are included since they are forest products which are dependent on the forest for their habitat, and as such, represent a proportion of the value of that ecosystem as a whole. Other, more esoteric measures, reflecting option and existence values are not addressed here, and it must be borne in mind that the purpose of this study is simply to assess the use-value of NTFPs.

δ = capital depreciation rate;
p_f = implicit price of each unit of nature (forest) used;
F^h = implicit quantity of nature (forest) used by household *h*.

$$Household\ outputs = \sum_{i=1}^{n} p_i Q_i^h$$

Here:
p_i = price of the good
i = Counter for NTFPs; hunting, fishing, handicraft & farming outputs, etc.
Q_i^h = quantity of that good produced by household *h*.
All values used here refer to the period of one year, and so for convenience, the time subscript (t) usually applied will be omitted. The value of 'savings' (ΔK) would be included in this equation as an output, identified by one of the Q_i^h values, but without intertemporal household data, it is impossible to identify any specific value for capital accumulation by households. As a result, this value is included in the total of 'value added' associated with the use of the forest. Since the value of depreciation is calculated here and accounted for as one of the costs of production, the model which is constructed is that of the model for *Net* Village Product.
By equating the value of household inputs and outputs, we get:

$$wL^h + rK^h + \delta K^h + p_f F^h \equiv \sum_{i=1}^{n} p_i Q_h^1 \qquad [1]$$

To build the complete model of the village, we then need to consolidate all the data together, and the Net Village Product (NVP), is obtained by summing across all households *h*:

$$NVP = \sum_{h=1}^{H} (wL^h + rK^h + \delta K^h + p_f F^h) = \sum_{h=1}^{H} \sum_{i=1}^{n} p_i Q_i^h \qquad [2]$$

4.3. Determining the value of forest inputs from Net Village Product.

The value of $p_f F^h$ will be derived as a residual from the completed equation of all other inputs and outputs. This residual represents the contribution made to NVP by the various NTFPs, and each of these is in the form of output values from village activities generated by the use of forest resources. Those activities which are forest-dependent clearly make a contribution to the economy of the village, and by examining their monetary value[12], it will be possible to assess the proportion of village output which depends on forest utilisation. The use of this framework therefore permits a calculation of the value of the forest for the households, and by summing across households, a figure for the value of the forest to the village as a whole, is derived, as shown below.

$$\sum_{h=1}^{H} p_f F^h = \sum_{h=1}^{H} (\sum_{i=1}^{n} p_i Q_i^h - (WL^h + rK^h + \delta K^h)). \qquad [3]$$

It is important to note here that the values obtained by this calculation are based on non-timber values. No account of revenue generated from timber harvest is included. In the

[12] In all calculations, the exchange rate of UK£1 = G$208, is used (rate for June 1996)

case of Assakata, some timber is used in house construction, etc., but this is not included, and no commercial timber harvesting is done in that village. Obviously, the addition of timber values would increase the overall obtained forest value, but the objective here is to look at the value of the non-timber products and services of the forest.

5. Calculating the analytical components from the raw data collected in the village.

To enable the use of the accounting framework, detailed calculations must be made to establish the magnitude of the various components used in the equation for net village product. The components required are the estimated values of all household inputs and outputs.

5.1.Household inputs.

In this model, household inputs are made up of labour values, capital values, depreciation of that capital, and its foregone interest. No inclusion is made for rent on land, as this is not paid by these households.

5.2. Household labour inputs.

The household labour supply is calculated from data collected during the village survey. Daily hours of the various types of work done by men, women and children in each household are taken from information recorded on the *heads of household* and *senior female* data sheets. This information was supplemented by information from other sources of data collected during the study, such as information on time spent by *hunters*, *palm-heart collectors*, *farmers* and *fishermen*, and the diaries completed by each household during the survey period. It is important to note that the stated hours per activity given by the respondents is a figure calculated in consultation with the field assistants. This is a necessary procedure, as the ability of Amerindians (many of whom do not have watches) to estimate time, is often limited (Forte, 1997). Since the field assistants were also Amerindians (albeit much more highly educated than most householders in this village), living in similar households themselves, it was possible for them to assist householders to estimate a reliable figure for hours of work spent in each activity.

To take account of different levels of efficiency between types of workers, the total number of household working hours is weighted according to the number of men, women and children participating in the production process. This weighting is based on the assumption that women's and children's physical efficiency at productive work is less than for men (as borne out by data from the palm-heart cutters). To avoid an overestimation of the value of the household labour supply, an hour of men's work was given the weight of 1, while a woman's hour was given the weight of 0.5 and that of a child of 0.25.[13] This means that the calculated hours of work for each household represent *effective working hours*, and each hour is then valued equally across all households, irrespective of demographic composition.

[13] The selection of these weights is not intended to imply any suggestion that the women (or indeed the children) work any less that the men. It is simply a process to ensure that the value of the village labour supply is not overestimated through the use of the shadow wage, which inevitably will be different for men, women, and children.

5.3. Seasonal variations.

It is important to note that for the purposes of this estimation process, it is assumed that the people in the village work for a more or less uniform number of hours throughout the whole year. From interviews with both men and women, it was apparent that this was indeed the case, as the main difference which they claimed to be the result of seasonal variation was seen to be in the *type* of the work that they do, rather than the *amount* of it. 93% of the respondents claimed that the type of work they did was influenced by the seasons, while only 5% felt that the seasons influenced the amount of work they did. This provides justification for summing weekly labour hours to reach an annual total, as even if some variation occurs in *what* is actually done in each season, it is unlikely (according to the village inhabitants) that the *amount* of work done will change significantly throughout the year.

5.4. The supply of labour in Assakata, 1996.

Using the method outlined above, the total supply of household labour for each economic activity is calculated. The supply of labour in each household in the village of Assakata represents the combined totals for the labour inputs of men, women and children living in that household.

Table 5.1 Annual hours per activity, by household. Assakata 1996

Household hours spent in each activity per year.								
House no.	Farming,	Fuelwood	NTFP	Fishing	Handicraft	Annual palmheart harvesting	Hunting	Total hours per year
1	1,300.5	540.0	276.0	1,989.0	382.5	1,058.0	612.0	6,158
2	2,295.0	270.0	34.5	1,683.0	918.0	0	1,224.0	6,425
3	2,632.2	574.6	828.0	795.6	0	0	0	4,830
5	3,672.0	720.0	56.2	612.0	2,448.0	0	3,672.0	11,180
6	1,377.0	630.0	103.5	0	0	302.3	2,448.0	4,861
7	1,989.0	900.0	69.0	0	0	4,626.3	0	7,584
8	2,754.0	630.0	34.5	1,071.0	0	846.4	0	5,336
9	3,098.3	585.0	56.2	1,224.0	765.0	604.6	1,224.0	7,557
10	2,754.0	540.0	56.2	1,224.0	153.0	0	0	4,727
11	2,983.5	315.0	138.0	0	1,836.0	415.6	1,836.0	7,524
12	1,836.0	540.0	899.8	0	0	75.6	0	3,351
13	4,562.4	996.0	69.0	2,457.1	0	604.6	0	8,689
14	1,377.0	360.0	34.5	1,224.0	1,836.0	755.7	1,224.0	6,811
15	1,147.5	405.0	56.2	1,224.0	0	4,232.0	1,836.0	8,901
16	1,930.3	421.4	56.2	1,039.5	0	0	0	3,447
17	4,666.5	630.0	69.0	612.0	612.0	0	0	6,590
18	1,912.5	630.0	34.5	1,071.0	459.0	423.2	3,060.0	7,590
19	3,672.0	540.0	56.2	2,142.0	1,300.5	0	0	7,711
20	1,912.5	344.8	276.0	0	0.0	559.3	0	3,093
21	2,142.0	315.0	552.0	2,945.3	1,683.0	151.1	0	7,788
22	1,989.0	585.0	56.2	2,754.0	1,224.0	0	3,672.0	10,280
23	2,456.7	537.5	56.2	1,319.6	0	0	0	4,370
24	2,295.0	540.0	34.5	0	1,530.0	226.7	0	4,626
Total	**56,754**	**12,549**	**3,902**	**25,387**	**15,147**	**14,881**	**20,808**	**149,430**

By combining the total hours for all marketable activities, a figure is obtained for the daily household labour supply. The same methodology is used to calculate the values of labour in Karaburi and Sebai. Annual totals of labour inputs are calculated from the daily totals, by multiplying these by the number of working days in a year. From the household diaries it is known that all households keep Sunday as a day of rest, and no work is done. It is known, however, that work is done on all other days. On days when it is raining heavily, less, or different work is done, but this simply means that more work is done on other days, to compensate. It is assumed that all households have some days in the year when they unexpectedly do not work (for example to attend weddings, funerals, etc.), and to cover this, a total of 51 weeks in the year are counted instead of 52. The annual household labour supply therefore is calculated by multiplying the daily labour totals by 306 days, to get the total number of hours for the year. (306 represents the annual number of working days for 51 weeks with Sundays not included). By summing across all households, the total labour supply for the whole village is obtained. Details of this are shown in Table 5.1, and from this we can see the total annual supply of productive labour in Assakata village to be 149,430 hours.

5.5. Calculation of the shadow wage rate.

In situations where an assessment of the value of labour is required, but no standard wage rate is available, the value of wages can be imputed through the use of a shadow-wage. This is determined from the concept of the *opportunity cost* of labour, that being the value of that labour *in its next best use*. In the case of this research, an attempt is being made to capture a 'snap-shot' of the economy of the village at one specific moment in time. This means that time series data is not available, and changes in various prices, or factor availability over time, are not relevant. In the case of these study villages, at the time of the fieldwork, the next best alternative form of employment for any worker is in the harvesting of palm heart (*Manicole Palm*) which can then be supplied to a purchasing agent. As a result, in the villages of this study, the value of the labour supply in monetary terms can be estimated by using a shadow-wage rate based on the *wage-earning potential* available to all workers, in the form of palm-heart cutting. This is an unregulated labour market, with no barriers to entry, so it is reasonable that this could realistically represent the opportunity cost of labour. Using this approach, it is possible to demonstrate what any person, (male, female or a child) could earn in this alternative available form of employment. This is useful if we want to assess how much income may be generated by participation in various activities, where the earnings from that activity are not directly known.

The shadow wage is calculated from data collected directly from a 100% survey of palm cutters in the village of Assakata. From these reports, the average number of palm hearts harvested per man per day is 100, while for women it is 80. Given that women may be less efficient at cutting when they also have their children to care for, it may be more cautious to use a lower value of 50[14] when calculating their shadow wage, and so for

[14] The use of a 50% weighting of the value of women's labour serves to take account of the fact that the women questioned about their rate of palm-cutting were only few in number, and also generally stronger than the other women in the village. In addition, women are generally more heavily involved in non-marketable activities, and even when working in marketable activities, their productivity may be seriously influenced by the need to be simultaneously involved with caring for their children. It in no way implies any qualitative difference in labour supply as a result of gender differences, and it also prevents an over-estimation of the value of household labour using a shadow wage.

this purpose we assume that 50 stems represent the average daily number of palm-hearts harvested by woman. For the shadow wage of children's labour, a value of 0.5 of the women's rate is used. The number of palm-hearts cut by each type of worker per day is then multiplied by the selling price of the hearts to the buying agent (which in July 1996 was G$7 per stem), giving a final daily wage of G$700 for men. Using this system, the daily shadow wage would be G$350 for women, and G$175 for children.[15]

Table 5.2. Monetary values of labour inputs, calculated using a shadow wage.

Shadow value of annual labour inputs, Assakata,1996		
House no.	Total hrs.	Value of hours worked (G$)
1	6,158	431,060
2	6,425	449,715
3	4,830	338,126
5	11,180	782,616
6	4,861	340,255
7	7,584	530,900
8	5,336	373,513
9	7,557	528,994
10	4,727	330,906
11	7,524	526,690
12	3,351	234,593
13	8,689	608,234
14	6,811	476,785
15	8,901	623,051
16	3,447	241,318
17	6,590	461,265
18	7,590	531,314
19	7,711	539,751
20	3,093	216,476
21	7,788	545,188
22	10,280	719,616
23	4,370	305,904
24	4,626	323,835
Total	**149,430**	**10,460,108**

During the period of the survey, householders were asked to keep a diary of their daily activities. In these diaries, all activities of all household members were recorded, and from these, it is clear that generally people in this community work a ten-hour day. From the other data collected from householders, farmers, etc., the hours worked by each household member average out at 10.1 hours per day, and so on this basis, it will be assumed that in the village of Assakata, the normal working day is 10 hours per day. On

[15] Variations in child productivity rates can be allowed for by the allocation of a modest figure for child harvesting rates. The term child in this survey refers to all 'under -16s', and it is clear that older children will be more productive than younger ones. Since the demography of the village follows a roughly normal distribution, it is reasonable to use 25 stems per day as the representative figure, and indeed this was confirmed in reports by younger cutters.

the basis of this ten-hour day, the shadow wage per hour is G$70 for men, G$35 for women, and G$17.5 for children.

As explained in Section 5.2, the household labour inputs have been converted to a figure for the *effective* labour supply, by taking account of the demographic composition of each household. This means that to calculate the monetary value of the total household labour inputs, it is necessary to multiply the total *effective* household hours, by the shadow wage of G$70 per hour. On the basis of this methodology, the annual total monetary value of all household marketable labour inputs in Assakata is G$10,460,108 (see Table 5.2.). It should be noted that these calculations of the value of household labour follow the normal accounting procedures used in the standard System of National Accounts (SNA). As in the case of the usual SNA procedure, no account is taken of the value of non-marketable labour activities, such as cooking, housework, child-rearing, etc.

5.6. Estimating household capital stock

Amerindian villages are often places where households and extremely poor (Forte, 1996), and as a result, hold little capital. Usually, people in these villages do not have bank accounts or savings. Often, their only capital may be in the form of a good axe, a transistor radio, or a canoe. Conventional monetary assessments normally used to assess household wealth holdings are therefore not suitable in this context. To avoid this problem, the household wealth holdings are calculated on the basis of what tools and household implements they have (Pretty et al., 1995). During the field-work, male and female householders were asked to identify which items of household or productive importance they held.

In the survey data collected from both women and men, ownership of important household and production items was identified and evaluated. This provided a systematic basis for computation of the amount of capital held by the household, and by applying the price of these household items to the numbers of items held, it is possible to construct a *wealth profile,* both of the households and the village. This facilitates the computation of the total value of wealth or capital stock held in the village. Data from the senior women members of the household provided information about the types of household items likely to be found in the houses themselves, such as cooking utensils, furniture and items associated with children such as toys and books. In the case of the men's data, items identified were those likely to be used in the process of production, such as farming tools, canoes, animals, etc.

5.7. Prices used for capital estimates

Base prices selected for the purpose of the calculation of capital stock were identified by a survey of a range of retail outlets in Georgetown, thus ensuring a representative price for each item. Clearly, some variation exists between the price of similar items from different sources. For example, hoes, rakes, and other farm tools may either be produced in Guyana, or imported from various countries, and as a result, significant price differences exist. Even with imports, significant variation exists in the price of goods from India or Brazil, compared with the same type of goods from Germany or the UK. To illustrate, an axe can cost anything between G$400 and G$2,000 in Guyana, depending on its origin, and to try and take this into account in estimating capital values,

prices used are computed averages from the various types and qualities of the goods concerned.

Some items, such as beds and chairs, musical instruments, toys and books, are very variable in price, depending on source of manufacture and the quality of material. The prices used for these items in this calculation again represent a reasonable figure for the cost of such an item in an Amerindian household, and are not meant to represent the actual purchase price of such an item in a city store. For animals, the price of $300 each is used as an indicator, this being the price of a young chicken of 2.5lbs weight in June 1996. (Chickens are sold at between G$120-G$150 per pound in the area, and have been used as the numeraire, as these are the most likely animals to be kept by such households, but the figure could also represent the purchase price of a young *Agouti* (small rodent), which theoretically could be held as animal stock).

Table 5.3. Prices used to calculate the value of capital stock, Assakata, July 1996.

Item	Georgetown price (G$)	Prices in Moruka (G$)
Shovel or Spade	750	1,125
Rake	275	413
Hoe	500	750
Manual Saw	900	1,350
Chain Saw	145,000	145,000
Boat Paddle	-	200
Outboard (10h.p)	250,000	250,000
Radio	2,000	3,000
Cassette player	6,000	9,000
Canoe	-	3,000
File	600	900
Axe	1,400	2,100
Cutlass/ bush-knife	600	900
Animals	-	300
Hammock	-	3,000
Mortar and Pestle	-	500
Matapee	-	600
Chair	-	800
Bed	-	2,500
Table	-	1,000
Musical instrument	3,500	5,250
Toys	150	225
Sewing Machine	100,000	100,000
Books	400	600
Cooking pots	3,000	4500
Fan	-	50
Sifter	-	200
Quake	-	250
Other(housewares)	500	750

Table 5.3 shows the regionally adjusted prices used for the purpose of calculating the value of capital stock in the village of Assakata, in June 1996. Since the village of Assakata is a minimum of two days travel from the capital using normally available

transportation, the prices of consumption goods and capital items are not the same as in Georgetown. This price difference is the result of both the transport costs to the area, and the actions of the various suppliers who attempt to maximise their profits by exploiting this situation. As a result, the prices of any goods in any part of the interior of Guyana are not the same as the normal market prices found in the capital.

To estimate the value of capital stock in Assakata, the regional price variations must be taken into account. In the case of goods brought in from Georgetown, the prices used are calculated on the basis of the selling prices in Georgetown, multiplied by 1.5, to take account of the high transport and other costs associated with trade in this region. The figure of 1.5 has been estimated on the basis of several price comparisons between the region and the capital, made frequently during the fieldwork period. For items which are produced locally by craftsman, such as canoes and sifters, these price differentials are not applicable, and so these items are priced using the normal market price in the local markets in the area

These prices were taken directly from information given by craftsmen, and by surveys in the local market at Kumaka Landing in the Santa Rosa area of N.W. Guyana. In the case of outboard motors, chain saws and sewing machines, increasing the Georgetown price by a factor of 1.5 is not appropriate, as if a person from this area were going to buy such an item, it is likely that he would go to the capital to do so. The transport cost associated with this is included in the price estimates give for these items.

5.8. The value of Household Capital.

Details of the items held by each household, and their value based on these market prices, are shown in Tables 5.4a and 5.4b below. The listed items were identified prior to the fieldwork, in consultation with the field assistants. During the household surveys, participants were asked to state which, and how many, of each item they held in their homes. On the basis of this information, total values for the capital holdings of each household were calculated. From these household totals, productive items were identified, and from these, the value of productive capital stock per household can be calculated. On the basis of the value of productive capital stock, it is possible to estimate the value of capital input in each household, and from this, the value of interest foregone, and capital depreciation, which are both an essential part of the value of net village product.

5.9. The distribution of capital stock in the village of Assakata.

The spread of wealth within most economies follows a *lognormal distribution*, which gives a typical shape of a unimodal frequency density function with a rightward skew (Lambert, 1993). This type of distribution indicates that most cases fall into the larger body of the group which exhibit lower and middle levels of wealth holdings, while a smaller number are found in the long tail to the right, exhibiting high levels of wealth holdings. In spite of the fact that the wealth estimates for Assakata village have been calculated on the basis of material items, rather than money stocks, it appears that the capital stock in the village follows the typical shape of a lognormal wealth distribution. When the fieldwork was conducted, the whole range of household items held by both men and women were included, and the total of all village wealth holdings was G$1,341,605 (Tables 4.4a & 4.4b). This was calculated by taking the number of each of

the items listed in each household, multiplying this number by the estimated price of each item, and then summing across all items for all households.

Table 5.4a Monetary value of men's household wealth items. Assakata, 1996.

Monetary value of men's household items (GS)															
[Prices shown in first row]															
House no.	Spade / shovel	Rake	Hoe	Manual saw	Chain saw	Boat paddle	Outboard engine	Radio	Cassette Player	Canoe	File	Axe	Cutlass/ knife	Any animals	Total monetary value of men's household items
	1,125	413	750	1,350	145,000	200	250,000	3,000	9,000	3,000	900	2,100	900	300	GS
1	0	413	1,500	2,700	0	800	0	3,000	9,000	3,000	2,700	0	900	0	24,013
2	0	0	3,000	0	0	600	0	0	0	3,000	900	0	900	300	8,700
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*21,937*
5	0	0	0	0	145,000	400	0	0	9,000	6,000	2,700	6,300	0	300	169,700
6	1,125	0	0	0	0	400	0	3,000	9,000	6,000	900	2,100	0	0	22,525
7	0	0	0	0	0	200	0	0	0	3,000	900	0	0	0	4,100
8	0	0	0	0	0	400	0	0	0	3,000	0	2,100	900	0	6,400
9	1,125	0	0	0	145,000	400	0	0	0	0	900	2,100	0	0	149,525
10	0	0	0	0	0	400	0	3,000	9,000	3,000	900	2,100	0	0	18,400
11	0	0	0	0	0	400	0	0	0	6,000	900	2,100	0	0	9,400
12	0	0	0	0	0	400	0	0	0	6,000	900	0	0	300	7,600
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*21,937*
14	0	0	0	0	0	200	0	0	0	3,000	900	0	0	300	4,400
15	0	0	0	0	0	400	0	0	0	3,000	900	4,200	0	300	8,800
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*21,937*
17	1,125	0	0	0	0	400	0	0	0	3,000	900	2,100	0	300	7,825
18	0	0	0	0	0	400	0	0	0	6,000	900	2,100	0	300	9,700
19	1,125	0	0	1,350	0	600	0	0	0	3,000	900	2,100	0	300	9,375
20	0	0	0	0	0	200	0	0	0	3,000	900	0	0	0	4,100
21	0	0	0	0	0	600	0	0	0	3,000	900	2,100	0	0	6,600
22	0	0	0	0	0	800	0	3,000	9,000	3,000	0	2,100	900	0	18,800
23	0	0	0	0	0	400	0	0	0	3,000	900	2,100	1,800	0	8,200
24	0	0	0	0	0	400	0	0	0	3,000	900	2,100	0	0	6,400
Total	**4,500**	**413**	**4,500**	**4,050**	**290,000**	**8,800**	**0**	**12,000**	**45,000**	**72,000**	**19,800**	**35,700**	**5,400**	**2,400**	**570,374**

Notes: 1. *Men's household items* only indicates the source of the information is taken from the men's data sheets, rather than the items themselves having some kind of gender significance. **2.** Figures in italics represent households where no data on wealth was taken due to the male head of household being away while the fieldwork took place. In these cases, the average for all other households is used as an estimate.

Fig. 3 shows the distribution of capital holdings in Assakata, and reveals that the wealth ranking methodology employed in the fieldwork is reliable as an indicator of how wealth is distributed in the village. Referring to Figure 3, it can be seen that in the case of the higher range of wealth holdings, of around G$140,000, no households feature, while a small number exhibit even higher holdings. The reason for this particularly stretched

'tail' is because of the very high monetary prices placed on a few, rarely owned items, such as chain saws or outboard motors.

Fig. 3. Household capital stock in Assakata, June 1996.

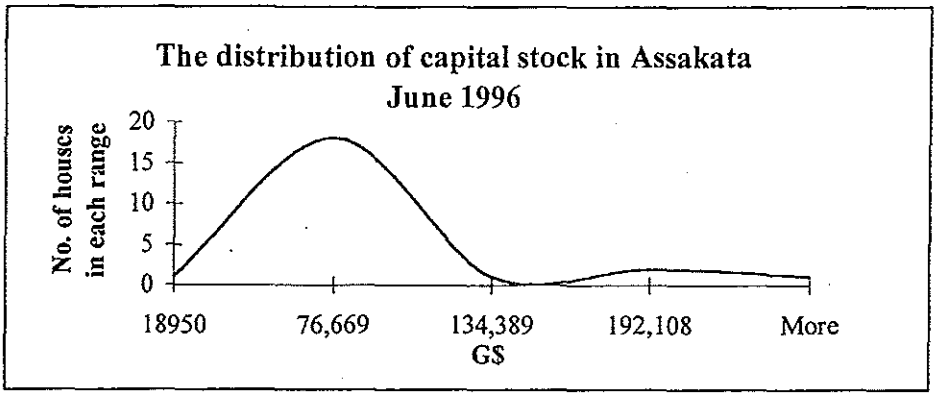


Table 5.4b Assigning a monetary value to women's wealth items. Assakata, 1996.

Monetary value of women's household items (GS) [Prices shown in first row]																
House no.	Hammock	Mortar & pestle	Matapee (cassava squeezer)	Chair	Bed	Table	Musical instrument	Toys	Sewing machine	Books	Cooking pots.	Fan	Sifter	Quake	Other	Total monetary value of women's household items
	3,000	500	600	800	2,500	1,000	5,252	225	100,000	600	4,500	50	200	250	750	GS
1	3,000	500	600	0	2,500	1,000	5,252	0	0	600	9,000	50	200	250	750	23,702
2	3,000	0	600	0	0	1,000	0	450	0	0	13,500	50	200	250	0	19,050
3	3,000	500	600	0	2,500	1,000	0	225	100,000	0	9,000	50	200	250	0	117,325
5	12,000	0	600	6,400	2,500	3,000	5,252	675	0	1,200	45,000	50	200	250	3,000	80,127
6	0	0	600	800	2,500	1,000	0	0	0	600	13,500	50	200	250	0	19,500
7	3,000	0	600	0	0	1,000	0	0	0	0	9,000	50	200	250	750	14,850
8	6,000	0	600	0	0	0	0	0	0	0	27,000	50	200	250	1,500	35,600
9	3,000	0	600	0	0	0	0	0	0	0	13,500	50	200	250	0	17,600
10	3,000	0	600	0	2,500	1,000	0	0	0	600	13,500	50	200	250	0	21,700
11	0	0	600	0	0	1,000	0	0	0	600	13,500	50	200	250	0	16,200
12	0	0	0	0	0	0	0	0	0	600	13,500	50	200	250	0	14,600
13	0	0	600	0	0	1,000	0	0	0	600	13,500	50	200	250	0	16,200
14	3,000	0	600	0	2,500	1,000	0	0	0	600	13,500	50	200	250	0	21,700
15	3,000	0	600	0	0	1,000	0	0	0	600	9,000	50	200	250	750	15,450
16	3,000	0	600	0	0	0	0	0	0	600	13,500	50	200	250	0	18,200
17	0	0	600	0	0	0	0	0	0	0	13,500	50	200	250	0	14,600
18	0	0	600	0	0	1,000	0	0	0	0	13,500	50	200	250	1,500	17,100
19	9,000	0	600	0	0	2,000	26,260	0	100,000	1,200	22,500	50	200	250	750	162,810
20	15,000	500	600	0	0	1,000	0	0	0	0	9,000	50	200	250	0	26,600
21	3,000	0	600	0	0	0	5,252	0	0	600	13,500	50	200	250	750	24,202
22	3,000	0	600	0	0	0	0	0	0	0	40,500	50	200	250	0	44,600
23	0	0	600	0	0	1,000	0	0	0	0	27,000	50	200	250	1,500	30,600
24	0	0	600	0	0	1,000	5,252	0	0	0	13,500	50	200	250	0	20,852
Total	75,000	1,500	13,200	7,200	15,000	19,000	47,268	1,350	200,000	8,400	382,500	1,150	4,600	5,750	11,250	793,168

Note: *Women's household items* only indicates the source of the information is taken from the women's data sheets, rather than the items themselves having some kind of gender significance.

5.10. Calculating the contribution of capital to the household and village production processes.

The value of village capital holdings is used as a basis to calculate the amount of capital input used in the process of production, as well as the corresponding figure for interest and depreciation (Table 5.5). Capital consumption has a cost associated with it, and when this is accounted for in the calculation of GVP (as the term δK_h, representing the change in capital stock through depreciation), it converts it into the net value of village product, NVP.

For the purpose of this production analysis, capital stock is assumed to have a life span of 5 years, on the basis of qualitative data from the respondents, giving a 20% depreciation rate. This means that the amount of wealth or capital consumed per year in the process of production is calculated as being 20% of the village total productive capital holdings. The total value of productive capital in Assakata is G$570,374, and with a 20% depreciation rate, the amount of capital consumed during the year is G$114,075 (from Table 5.5)

Table 5.5. The monetary value of depreciation and interest on productive capital stock, by household, Assakata, 1996.

Monetary value of productive household items (G$) [Prices shown in first row]														
House no.	Spade / shovel	Rake	Hoe	Manual saw	Chain saw	Boat paddle	Canoe	File	Axe	Cutlass/ knife	Any animals	Total monetary value of men's household items	Annual cost of capital use, (8%int.rate) (G$)	Capital depreciation, assuming a 5 year life (20%) (G$)
	1,125	413	750	1,350	145,000	200	3,000	900	2,100	900	300			
1	0	413	1,500	2,700	0	800	3,000	2,700	0	900	0	24,013	1,921	4,803
2	0	0	3,000	0	0	600	3,000	900	0	900	300	8,700	696	1,740
3	0	0	0	0	0	0	0	0	0	0	0	21,937	1,755	4,387
5	0	0	0	0	145,000	400	6,000	2,700	6,300	0	300	169,700	13,576	33,940
6	1,125	0	0	0	0	400	6,000	900	2,100	0	0	22,525	1,802	4,505
7	0	0	0	0	0	200	3,000	900	0	0	0	4,100	328	820
8	0	0	0	0	0	400	3,000	0	2,100	900	0	6,400	512	1,280
9	1,125	0	0	0	145,000	400	0	900	2,100	0	0	149,525	11,962	29,905
10	0	0	0	0	0	400	3,000	900	2,100	0	0	18,400	1,472	3,680
11	0	0	0	0	0	400	6,000	900	2,100	0	0	9,400	752	1,880
12	0	0	0	0	0	400	6,000	900	0	0	300	7,600	608	1,520
13	0	0	0	0	0	0	0	0	0	0	0	21,937	1,755	4,387
14	0	0	0	0	0	200	3,000	900	0	0	300	4,400	352	880
15	0	0	0	0	0	400	3,000	900	4,200	0	300	8,800	704	1,760
16	0	0	0	0	0	0	0	0	0	0	0	21,937	1,755	4,387
17	1,125	0	0	0	0	400	3,000	900	2,100	0	300	7,825	626	1,565
18	0	0	0	0	0	400	6,000	900	2,100	0	300	9,700	776	1,940
19	1,125	0	0	1,350	0	600	3,000	900	2,100	0	300	9,375	750	1,875
20	0	0	0	0	0	200	3,000	900	0	0	0	4,100	328	820
21	0	0	0	0	0	600	3,000	900	2,100	0	0	6,600	528	1,320
22	0	0	0	0	0	800	3,000	0	2,100	900	0	18,800	1,504	3,760
23	0	0	0	0	0	400	3,000	900	2,100	1,800	0	8,200	656	1,640
24	0	0	0	0	0	400	3,000	900	2,100	0	0	6,400	512	1,280
Total	4,500	413	4,500	4,050	290,000	8,800	72,000	19,800	35,700	5,400	2,400	570,374	45,630	114,075

NOTE: Figures in italics represent those households where household wealth data was not collected, and so average figures have been inserted.

The holding of capital also has a cost in terms of foregone interest, and so the village opportunity cost of holding capital is $\sum_h rk^h$, where r is the *real rate of interest* for the relevant period, and k^h is the total value of village productive capital stock. In Guyana, the real rate of interest is in fact a negative rate of -7% per annum, since the rate of inflation is 24.5% per annum (Dec 95), while the Cooperative Bank of Guyana agricultural lending rate (June 1996) is 17.5% per annum. The use of such a negative interest rate is not appropriate as an indicator of the true opportunity cost of capital use, and to avoid any distortion, a rate of return will be employed which will be more representative of the more usual rate of return to capital. For the purpose of this study, in the calculation of the NVP of Assakata, an interest rate of 8% will be used. On this basis, the opportunity cost of the capital used in production in Assakata comes to a total of G$45,630 per annum[16].

5.11. Estimating household outputs.

Household outputs will include the outputs from farming, fishing, hunting, handicraft, and other outputs which rely more directly on the collection of non-timber products, such as the harvesting of forest food, drink, and medicinal plants, and the collection of roofing and other materials.

5.12. Farm outputs.

Detailed surveys were conducted for all occupied houses, in each village. Farmers were requested to estimate the level of output of each crop produced during a year, and to give prices at which these crops were, or could be, sold. Estimates of output were relatively easy for the farmers to make, as they all use a standard-sized basket (*quake*, see Section 3.6) in which to carry their crops when harvested.

In the case of that share of the crops which are sold, these have to be transported to the nearest market. This physical limitation on the quantities transported makes it relatively simple for farmers to know quite accurately how much they actually produce, and what they sell. When the surveys were being conducted, the farmers were asked to estimate the crop output in terms of the number of *quakes* produced, and this was converted to pounds weight by the Amerindian field assistants.

In some cases, farmers were able to state clearly from the start what their output was in pounds weight, although in a few others, they failed to give even a rough estimate. In these cases, the estimated values were calculated by taking the average ouput of each crop from all recorded outputs, and then weighting this average on the basis of the household labour supply and the size of the farm itself.

Since the farmers all use a system of intercropping, farm acreage utilised was for all crops, and could not be separately identified as area per crop. Intercropping in these villages means that farmers plant many different crops amongst each other, not necessarily in regular rows or plots, but often seemingly randomly placed at the most

[16] It may be interesting to investigate the effect of selecting different rates of interest for the basis of this calculation. If the rate of interest used was 3%, the cost of capital use would come to a sum of G$17,111, while if it was 15%, the cost of capital use would amount to G$85,556. Due to the very small capital to labour ratio (1:229), the choice of interest rate has, in this case, little significant effect.

convenient point for the individual farmer[17]. This means that, although the majority of the farm area may be devoted to the production of Cassava (the staple food), other crops such as banana, yam, etc., are interspersed amongst the cassava plants. A wide variety of crops are cultivated, with a total of 30 different crops being mentioned, but most farmers cultivate a variety of between 10 and 15 different crops. The 10 most frequently cultivated crops are shown in Table 5.6 below, while in Tables 5.7 and 5.8, details of all the major crop outputs are given.

Table 5.6. Major crops grown in Assakata, June 1996.

Type of Crop	Percentage of farmers producing this crop. %	Type of Crop	Percentage of farmers producing this crop. %
Cassava	100	Pineapple	46
Yam	80	Watermelon	45
Banana	67	Tania	40
Eddoe	67	Sweet potato	40
Plantain	56	Pepper	40

5.13. The value of farm outputs.

The value of all farm outputs are calculated by multiplying the total estimated volume of each household crop, by the price of that crop. The prices used for this purpose are calculated on the basis of crop prices given by farmers, averaged across all households, and verified by price checks in local markets at the time of the fieldwork being conducted. The totals for the crops in Table 5.7 are combined with the totals shown in Table 5.8, to give the total farm output per household.

Because of the large variety of crops grown by every farmer, the totals for some individual crop outputs may be very small. In such cases, these small amounts have not been counted, ensuring that no over-estimation is taking place. Without very detailed, lengthy and costly agricultural surveys, farm productivity per crop cannot be estimated, and so an assessment of the gross output of all crops per farm is both more suitable, and practical.[18]

[17] Although the positioning may appear random to an outsider, often the crops are strategically positioned (according to traditional management practices) in relation to other crops or nearby trees which contain some insecticidal properties. An example of this in Guyana is the *Kunaparu* Bush, a deadly poisonous plant used for fish poison, but also known to keep away the highly destructive *Acoushi* ants.

[18] Both the practicality and cost of any social science research methodology is an important consideration when conducting fieldwork. The use of participatory research methods not only can reduce costs, by allowing more efficient collection of data, but can also increase the effectiveness of any resulting policy measures. Since the local community are not only involved in the collection of the information, but are also given the opportunity to think about it and contribute to it, they are more likely to be well-informed about the possible outcomes of the various policy options. As a result, they may be more willing to take the necessary action to implement the selected policies, assuming these are sensitive to their needs and cultural heritage.

Table 5.7. Value of farm output (1).

(Total values are obtained by summing across crops for all households, shown in table 5.8.)

Value of crop output per household, per year. Assakata, 1996 (G$)												
House No.	Bitter Cassava	Sweet Cassava	Yam	Eddoe	Banana	Plantain	Sugar Cane	Pineapple	Pumpkin	Water melon	Sweet Potato	Med. Plants
1	60,000		5,250		37,500				5,850			
2	75,000		3,000	32,000	60,000	32,000	3,536	4,500	2,782	4,500		
3	12,000	21,750	21,750		30,000					7,500		
5	70,000		90,000		42,366		1,000	4,500	1,391	2,250		
6	20,000	15,000	15,000	16,000	20,000	16,000		12,000				
7	10,000		2,250	4,800	80,000	4,800				3,750		
8	50,000		750	2,800	3,000	2,800		2,700	1,118	1,500		
9	5,500		12,000	12,800		12,800	4,165	3,600			10,500	
10	75,000		9,333	7,400	24,359	7,400		7,177			6,510	
11	70,000		11,464	9,089	2,000	9,089	4,075	8,815		9,000	750	5,819
12	55,536		17,857	14,158	46,607	14,158				14,217	12,456	
13	10,000			3,200	40,000	3,200				5,625		
14	25,000		7,500	8,000		8,000		12,328	3,718	6,000		
15	50,000		3,000	8,448	20,000	8,448	2,000	8,192		30,000	3,000	
16	25,000		1,500		16,000			1,200		3,750		
17	40,000		750					1,500	234	1,500		
18	40,000		3,000	1,600	6,000	1,600	5,000	18,000	6,500	22,500	30,000	5,500
19	50,000		6,000	8,000	30,000	8,000	5,000	10,500		15,000	7,500	3,520
20	10,000											
21	20,800	42,000	1,200	1,280	30,000	1,280	1,2500	18,750	3,290		1,200	
22	21,000	15,000	1,200	1,280	24,000	1,280	1,250	15,000				
23	20,800		10,299	8,166		8,166	3,663	7,920	2,913	8,200		
24	15,000		11,250	12,000		12,000	400				300	
Ave.	36,115	23,438	11,160	8,884	30,108	8,884	3872	8543	3089	9019	8024	4946
Total	**830,636**	**93,750**	**234,353**	**151,020**	**511,832**	**151,020**	**42,589**	**136,682**	**27,797**	**135,292**	**72,216**	**14,839**

Note: 1. Estimates of crop volumes are calculated by taking average output of each crop where value is not given, and adjusting it according to farm size and labour supply. 2. Prices are based on prices reported by farmers, averages used.

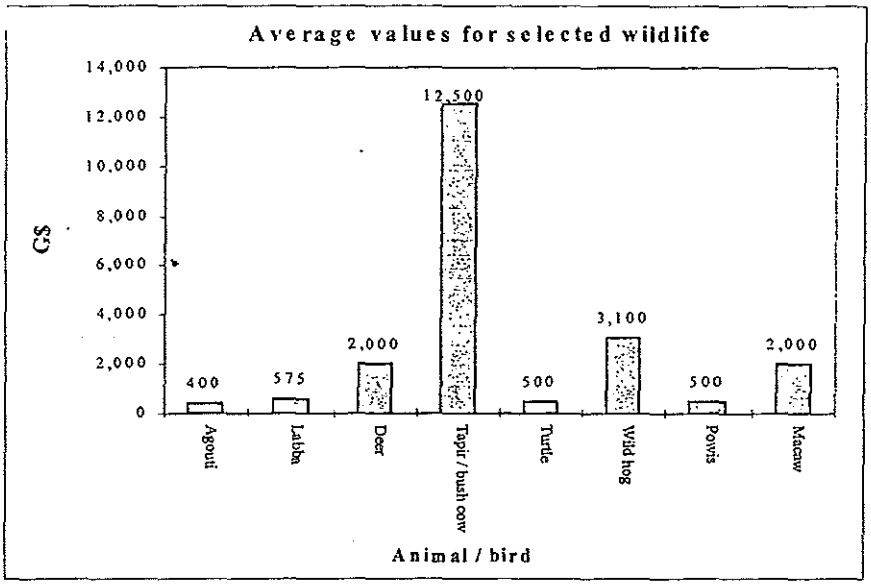
Table 5.8. Value of crop output (2). (Sum of tables 5.7. and 5.8)

Value of crop output per household, per year. Assakata, 1996 (G$)											
Greens	Tannia	Irish pots	Pepper	Coffee	Orange	Maize/ corn	Avacado	Squash	Cucum -bers	Other fruits	Total value of all crops per hh. (G$)
142,000				5,326	8,521		17,753	4,600	24,000		310,800
69,588	4,307		14,039				22,791		31,451		359,494
									45,000		138,000
120,000			6,600	11,100			37,200				386,407
10,000	15,000		22,000							3,900	164,900
15,000	4,500		16,500					10,000			151,600
	2,625		5,500								72,793
4,000			16,500								117,865
			13,200	6,450		140,000					296,827
			5,500								135,600
124,988	7,737					62,323		11,093	56,490		437,621
5,000			5,500			8,750		2,500			83,775
	7,500			11,025		55,950	36,749				181,769
200,000						1,750					334,838
						1,750					49,200
	750		1,100			52,990					98,824
			11,000	5,700				10,000		4,530	170,930
55,000	1,500		55,000							8,040	263,060
										3,210	13,210
100,000	1,200	1,200	22,000					7,265			263,966
53,400			17,600	5,250	8,400					4,200	168,860
	4,462					35,946		6,398		5,666	122,600
				4,650						3690	59,290
77,915	4,958	1,200	15,146	7,072	8,461	44,932	28,623	6,482	39,235	4,155	190,532
934,975	**49,581**	**1,200**	**212,039**	**49,501**	**16,921**	**359,459**	**114,492**	**51,857**	**156,941**	**33,236**	**4,382,230**

5.14. Assessing the value of hunting and trapping

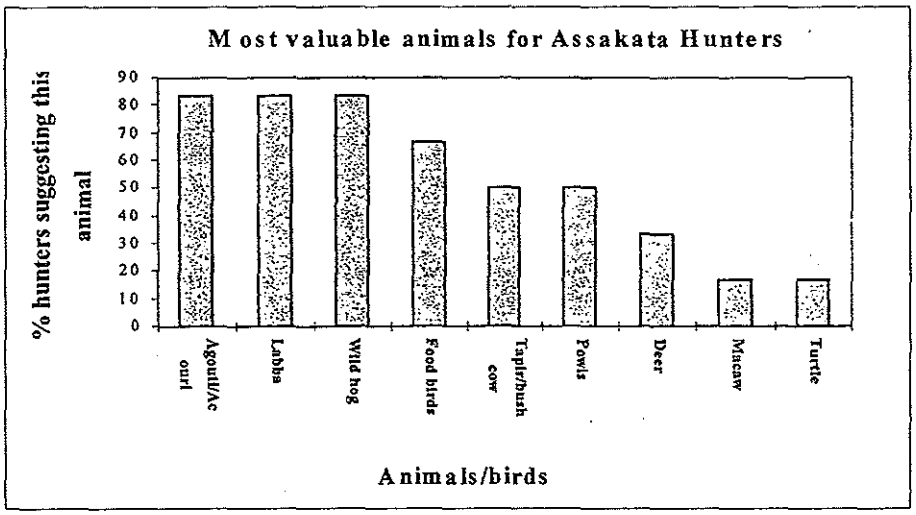
Animals caught in the forest provide a major source of protein for the people of Assakata. Buying meat from any outside source does not occur, due to lack of purchasing power, and only a relatively small amount of vegetable protein is grown in the form of beans. The recent rise in the trapping of exotic birds has been the result of a liberalization of the wildlife trade from Guyana, and several households in Assakata participate in this activity. An estimate of the value of the catch was made on the basis of the numbers of animals and birds caught, and on the selling prices to the local buyers or agents. On average, 65% of hunting catches are used at home, while 35% of the catch is sold or shared with other village households. In the estimate of hunting values, this home-consumed and shared meat is given an imputed value on the basis of the market price in force at the time of the survey.

Figure 4. Monetary values of selected wildlife



In this forest community, hunting is an activity limited strictly to men. Those who participated in hunting were asked to give their reasons for so doing, and for 67% of them, the major reason to hunt is to supplement household food supplies. In addition, the activity of hunters supplies the household with a certain amount of money income, especially in the case of those involved in wildlife trapping, and this is an important consideration for the well-being of all the household members. 34% of hunters stated that hunting was important because animals were easy to sell or exchange, and money earned from the sale of wildlife and bushmeat provides cash to enable the purchase of such things as kerosene, soap and hardware items, that they are unable to provide for themselves. The average values of selected animals caught while hunting is shown in Figure 4. The significantly higher value for a tapir (bush cow) reflects the fact that it is much larger in size than the other animals usually caught by people in this village. In Figure 5, the animals considered to be most valuable by hunters are shown.

Figure 5. Animals considered most valuable for Hunters in Assakata.

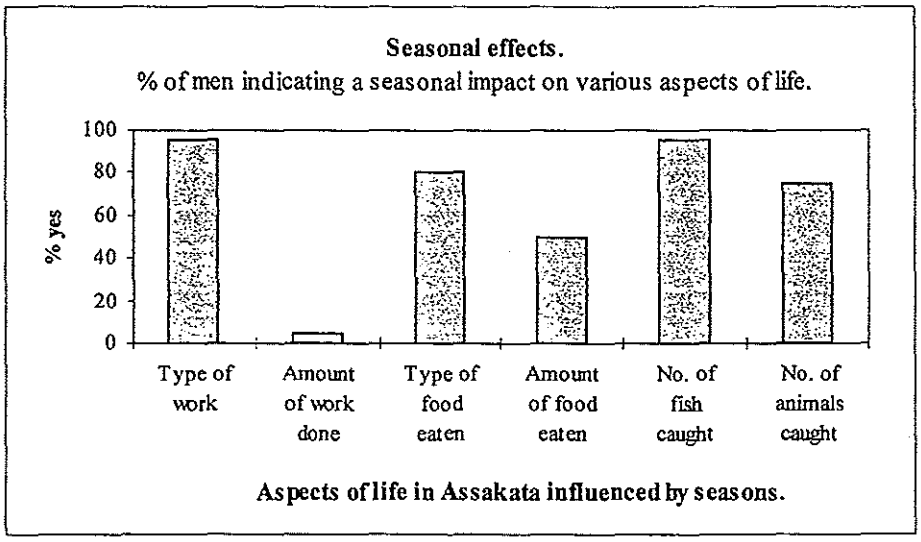


5.15. Seasonal variations in hunting and trapping.

Some seasonal variation will occur in any hunting activity[19], and consideration of this is taken by using a weighting of 0.85 for weekly, and 0.9 for monthly values. During the fieldwork period, all of the men in the village were asked about seasonal variations in hunting and fishing catches, and 95% of them said the seasons influenced fish catches, while 75% said hunting catches were affected. In both of these cases, men claimed that catches tended to be less in the wet season, and since the data here was collected during that season, the figures will not exaggerate the potential annual value of hunting catches. This prevents over-estimation of the value of this item in the calculation of the NVP.

For over 80% of the hunters in Assakata, the most important animals are the Agouti, the Labba and the Wild Hog. This reflects the fact that they are easier to catch and are more plentiful than the other, more valuable animals such as Deer or Tapir. An interesting feature of hunting practice is the fact that the Powis (a turkey-like bird), is regularly caught by 50% of the hunters, while other food birds are caught by 65%, providing an important source of income for the households. Even the land turtle, which only provides a meager meal, is often recorded as a regular catch. The small number of people reporting the Macaw as a valuable catch (15%) reflects the difficulty and danger associated with the trapping of these birds, and the fact that the trappers are often exploited by the wildlife traders from the coast, who have formed a cartel to ensure purchase prices for wildlife remain low. This relatively significant consumption of forest birds has implications for the forest ecosystem, and as hunting continues, it may lead to species depletion, with possible consequences for seed dispersal and pollination of fruiting trees.

Figure 6. Some aspects of seasonal variation.



[19] A more accurate assessment of hunting and fishing catches could be made by making a long-term anthropological study of fishing and hunting practices, but since the object of this study is to produce a reasonable estimate for these activities, which does not over-state their value, the above methodology is considered acceptable.

Table 5.9. The value of wildlife caught for sale or for use as a food source.

Annual values of hunting catches, Assakata, 1996					
House no.	Weekly hunting for all hh.	Monthly Tapir catches	Annual value of weekly catches	Annual value of monthly catches	Total value of annual hunting catches (G$)
1	*	*	*	*	*280,135*
2	*	*	*	*	*160,077*
3	0	0	0	0	*0*
5	*	*	*	*	*480,231*
6	20,900	14,400	940,500	158,400	1,098,900
7	0	0	0	0	0
8	0	0	0	0	0
9	7,950	24,000	357,750	264,000	621,750
10	0	0	0	0	0
11	3,840	0	172,800	0	172,800
12	0	0	0	0	0
13	0	0	0	0	0
14	14,220	30,000	639,900	330,000	969,900
15	*	*	*	*	*133,099*
16	0	0	0	0	0
17	0	0	0	0	0
18	*	*	*	*	*350,261*
19	0	0	0	0	0
20	0	0	0	0	0
21	0	0	0	0	0
22	*	*	*	*	*420,313*
23	0	0	0	0	0
24	0	0	0	0	0
Total	**66,190**	**68,400**	**2,978,550**	**752,400**	**4,687,466**

Notes: 1. Annual totals are based on 45 weeks of weekly totals plus 11 months for monthly totals, to take account of seasonal fluctuations. 2. These figures represent hunting catches reported in June 1996, during the wet season. Hunting is easiest in the dry season, and so using these figures as the basis of an annual estimate is unlikely to produce an overestimation of hunting catches. 3. Qualitative data from hunters suggest that seasonal variation in hunting does exist, but it is more a variation on what types of animals are caught rather than how much. 4. Asterisks indicates '*other hunting households*' where weighted averages are inserted as an estimated value, used in cases where hunting is an activity undertaken by that household in the time allocation records,but detailed recordings of catches have not been taken. 5. Since tapir (bush cow) are caught only by the most skillful hunters, the figures for these catches are not included in the estimate used as the average value for the *other hunting households.*

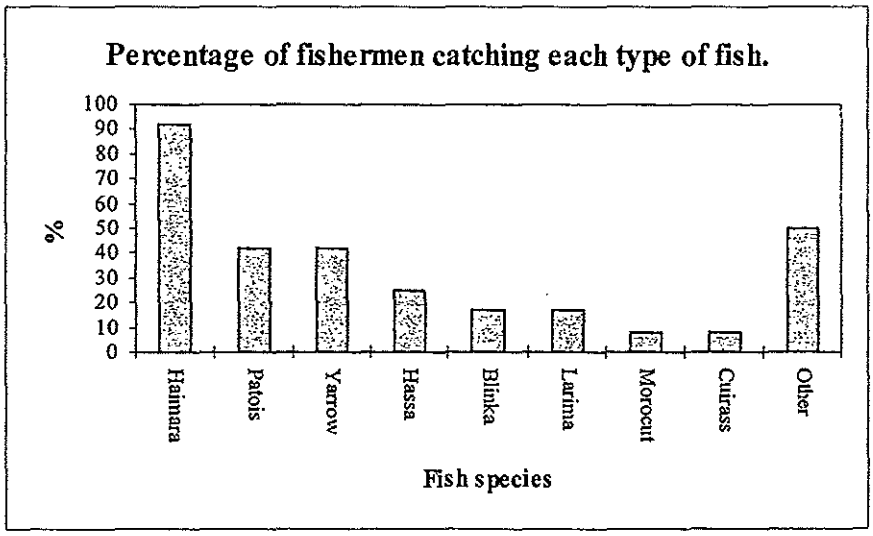
Details of the overall hunting and trapping values for the households in Assakata are shown in Table 5.9. Of the total of 23 households in the village, 10 spend some of their time hunting or trapping. Estimates for *other hunting households* are indicated by an asterisk (*), and are included where household data and diary entries indicated that hunting took place, but householders did not regard themselves as hunters, and were not directly interviewed as such. The figures for these households are shown in italics, and are based on reported average catch values, adjusted according to hours spent hunting by household members, relative to average hours spent hunting. (i.e. Percentage adjustment factor = household hunting time, divided by average hunting, time multiplied by 100.)

5.16. Assessing the value of fishing catches

All households were questioned about their fishing, and those who regularly went fishing were asked to participate in a specific discussion about fishing. This facilitated the collection of information about the population's fishing habits, and enabled some estimates to be made of the value of these fish catches to the household. Clearly, this is another form of household output influenced by a healthy forest ecosytem, and needs to be included as part of the amount regarded as that reflecting the economic significance of the forest to its inhabitants.

The major types of fish caught by the fishermen in Assakata are shown in Figure 7. In this area, and this season, the Haimara is clearly an important source of food for these forest dwelling people. The type of fish caught may vary with the seasons (see Section 5.14.), and it is claimed by the villagers that generally fish are harder to catch in the wet season. In the dry season, fish are easier to catch, due to their being concentrated in shrinking water courses, and so the volume of catches may be larger. The estimates made here are based on data collected in the wet season; this is likely to prevent an overestimation of annual fish values. The attempt to estimate annual fishing catches on the basis of information gathered in a short period under a Participatory Rural Appraisal (PRA) approach is one which obviously requires the use of aggregation techniques, and although it may not be as reliable as a more anthropological methodology requiring detailed daily observations over the period of a year, it does serve to provide a reasonable assessment of the likely level of fish catches in the village.

Figure 7. Major fish species caught in Assakata, June 1996.



In Assakata, only about half of the households actually regularly go fishing as an activity, although some male householders reported spending some time fishing when they were out catching birds or cutting palm hearts. This is because they set their nets or traps on the way to the site of the main activity, and harvest the catch on their way home. Using collected data on fish catch weights, species caught and market prices for fish, a figure for the household output of fish can be calculated. Some variation occurs in the proportions of fish used at home and exchanged or sold, but this does not effect the total

value of the fish itself to the village, or what it contributes to the Gross Village Product[20].

There are several fishing methods used by fishermen in Assakata, and it is interesting to note that most of these are indigenous methods which have very little external input. Those methods considered to be most effective are shown in Table 5.10.

Table 5.10. Methods of fishing considered effective. Assakata, June 1996

Fishing method	Seine net	Poison	Hook & line	Spring hook	Fish trap
Percentage of fishermen using this method regularly.	42	33	25	17	17

Note: Some fishermen use more than one method of fishing

In the case of both the traps and the fish poison, materials to conduct fishing are collected entirely from the forest[21], and it could be said that for the majority of the fishermen, the destruction of the forest would be likely to both reduce the number of suitable locations for fishing, and remove the source of materials required to catch the fish. This means that the opportunity cost of the forest needs to include the value of fish caught within it, and this again reinforces the contention that fishing output needs to be included as part of the estimate of the significance of the forest to these village dwellers.

The values of fishing catches are based on the estimated weights per catch[22], the types of fish caught, and the market prices of the various species. Although a relatively large variety of fish are caught by all fishermen, these fish values are based on the top three species caught by each fisherman, using the appropriate market price. A breakdown of the value of fishing catches is shown in Table 5.11. For those households where fishing was reported but no specific figures were collected, estimates of the output were calculated based on the average value of catches for all reporting households, adjusted by a household correction factor based on the hours spent fishing per household, relative to the average hours spent fishing. From Table 5.11 it can be seen that the value of the fishing catches by all households in Assakata in 1996 amounts to a total of G$3,120,555. This significant amount is again added as one of the output values to the NVP.

[20] In some tropical countries, freshwater fish are exported on to the world aquarium market, earning useful foreign currency, and in Guyana there is some of this type of trade taking place. Traders and exporters in this international market may deal in fish bred for the purpose, but there is no doubt that a trade exists in exotic fish species such as Arapaima, Schomburg's Leaf Fish, etc. No account has been take of this type of trade, as no evidence exists to suggest that it is relevant to this village, but nevertheless, the potential to breed fish for this market does exist, and this could provide a sustainable livelihood for people in the area in the future.

[21] Traps are made from *Mucru* and *Nibbi*, and the poisons are from such plants as *Haiariballi* (Alexa spp.), and *Monkey Ladder*, (Bauhinia spp) commonly found in the forest around the village. The line used for fishing today tends to be commercially produced nylon fishing line, although a very effective substitute for this can be spun from the ite palm, (Mauritia flexuosa).

[22] The weight of fish catches is calculated from fishermen's estimates of catch weights. To avoid the effect of any exaggeration, the reported catch figures are adjusted by an error term which is a percentage adjustment factor based on the variation between what the fishermen claimed was their average catch, and what they actually caught during the fieldwork period.

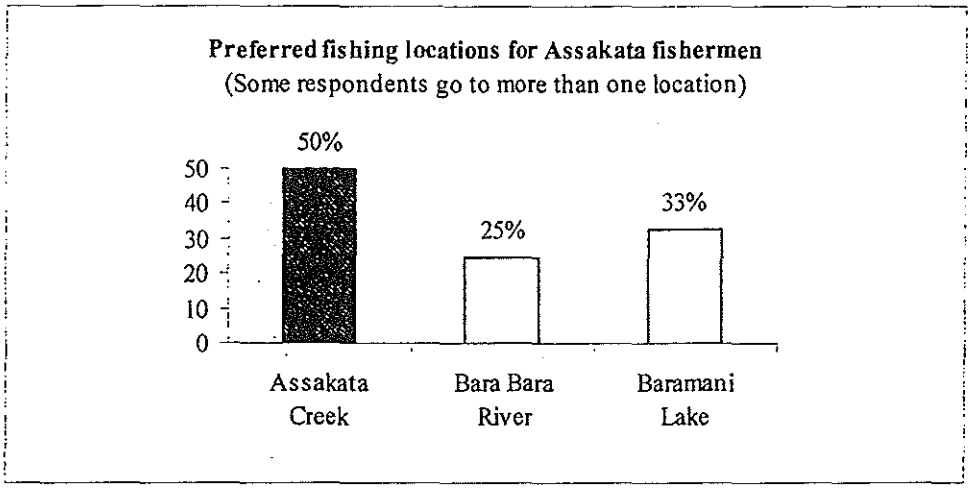
A number of different locations are selected by Assakata fishermen as being productive locations. The choice of location is shown in Figure 8, indicating that most fishing takes place in the Assakata Creek, but a significant number of fishermen go quite far to make a good catch. On average, it takes 2.6 hours of paddling time to reach the preferred fishing location.

Table 5.11. The value of fishing catches in Assakata.

	Annual values of fishing catches (G$)									
House no.	Reported value of fishing catches per day (G$)	Total daily hh. fishing hrs.	Total weekly fishing hours	Length of each fishing trip	No. of Fishing trips per week	Household adjust-ment factor (hh lab.hrs / av. lab hrs	Estimated hh. fishing value of each catch (av.val * hh adj factor)	Total value of fishing catch per trip (G$)	Weekly value of all catches (G$) (value per trip * no. trips /week)	Annual value of all catches (G$) (51 weeks/6 day week)
1	555.9	6.5	39.0	6.0	6.5	1.8	0	556.0	3,613.9	184,309
2	908.8	5.5	33.0	4.6	7.2	1.5	0	908.8	6,519.8	332,510
3	0	0	0	0	0	0	0	0	0	0
5	230.1	2.0	12.0	3.0	4.0	0.5	0	230.2	920.7	46,956
6	90.8	2.6	15.6	3.0	5.2	0.7	0	90.9	472.6	24,102
7	0	2.0	12.0	3.0	4.0	0.5	*190.3*	*190.3*	761.1	*38,814*
8	672.7	3.5	21.0	4.2	5.0	0.9	0	672.7	3,363.5	171,540
9	914.7	4.0	24.0	4.0	6.0	1.1	0	914.8	5,488.6	279,917
10	0	4.0	24.0	4.2	5.7	1.1	*380.5*	*380.5*	2,174.5	*110,897*
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	8.0	48.2	4.2	11.5	2.2	0	763.9	8,762.4	446,883
14	920.7	4.0	24.0	7.0	3.4	1.1	0	920.7	3,156.7	160,991
15	0	4.0	24.0	4.2	5.7	1.1	*380.5*	*380.5*	2,174.5	*110,897*
16	0	3.4	20.4	4.2	4.9	0.9	*323.2*	*323.2*	1,568.4	*79,989*
17	0	2.0	12.0	4.2	2.9	0.5	*190.3*	*190.3*	543.6	*27,724*
18	451.4	3.5	21.0	11.0	1.9	0.9	0	451.4	861.8	43,954
19	1,150.8	7.0	42.0	10.0	4.2	1.9	0	1,150.9	4,833.7	246,517
20	0	0	0	0	0	0	0	0	0	0
21	1,012.7	9.6	57.8	10.0	5.8	2.6	0	1,012.8	5,848.7	298,286
22	0	9.0	54.0	5.0	10.8	2.4	*856.2*	*856.2*	9,246.9	*471,590*
23	270.8	4.3	25.9	8.0	3.2	1.2	0	270.9	876.1	44,680
24	0	0	0	0	0	0	0	0	0	0
Ave.	351.4	3.7	22.2	4.3	4.3	1.0	351.4	485.6	2660.3	135,676
Total										**3,120,555**

Notes: 1. Household hours taken from heads of households and women. **2.** Length of fishing trips calculated from time to reported fishing site, x 2, + 3 hours fishing time. **3.** Weight of average fishing trip calculated for each household by taking the reported weight of last catch and adjusting it by error term based on deviation of stated average weight from actual catch weight observed during fieldwork period. **4.** For those households which reported spending time fishing but where no direct fishing data was collected, estimated values are used based on overall averages adjusted according to household hours spent fishing. These estimates are shown in italics. **5.** Values of catches based on prices of top 3 fish caught, calculating 33% of total catch weight for each fish type, x value of 1st, 2nd and 3rd most frequently caught fish, and summing. **6.** Annual total assumes 51 weeks of 6 days per week. (One week allowed for unexpected events such as weddings, funerals etc.)

Figure 8. Fishing locations used by Assakata fishermen, 1996.



In Assakata, 67% of persons fishing are men, while 33% are women. Of all those participating in fishing as an activity, 58% felt that fishing was harder now than before, whereas 42% felt that it was easier.

5.17. The value of palm-heart collection.

Palm-heart is a vegetable food similar in texture to asparagus, popular in many Amazonian countries, as well as in France and other developed countries. A number of different palms can be used for this, and in Guyana, the *Manicole* palm (Euterpe oleracea) is the one which is commercially harvested. Assakata is one of the major villages for the harvesting of these wild *Manicole* palms, and from there the edible part of the palms are taken to a processing plant for canning as food for export to Europe. By participating in this employment, which is an unregulated labour market with no barriers to entry, any person can earn useful cash which is paid on a weekly basis.

The buying company pays either in cash, or in the form of food and other supplies which are made available to the cutters at prices below the local market prices (see Section 3.10). This procedure is one which is very much appreciated by the cutters, as in addition to the cheap prices, the goods are delivered directly to their homes, without them having to paddle for 6 hours by canoe to reach the nearest alternative supplier. Of the palmheart cutters in Assakata, 95% are men, and while 70% of them say they want to cut the Manicole because it is easy to sell, only 15% of them have received any training on harvesting techniques from the buying company. The fact that 100% of them sell their harvest to the company AMCAR demonstrates the monopsonistic nature of the palmheart trade in Guyana. With one single buyer for their output, cutters are in a weak position to be able to bargain for higher prices.

Table 5.12. Monthly and annual earnings from palm-heart harvesting.

Palm-heart harvesting rates, Assakata 1996		
House no.	Av. monthly earnings from palm heart cutting G$	Annual earnings from palm heart harvest, G$
1	7,000	80,500
2	0	0
3	0	0
5	0	0
6	2,000	23,000
7	44,000	352,000
8	5,600	64,400
9	4,000	46,000
10	0	0
11	5,000	57,500
12	500	5,750
13	4,000	46,000
14	5,000	57,500
15	28,000	322,000
16	0	0
17	*16,593*	*190,820*
18	2,800	32,200
19	0	0
20	3,700	42,550
21	1,000	11,500
22	0	0
23	0	0
24	1,500	17,250
Average	8,713	100,198
Total	**130,693**	**1,348,970**

Note: The figures shown in italics represent estimates for non-reporting households. These are based on averages adjusted according to how many hours are spent by that household in palm-heart collection

From Table 5.12, it can be seen that the total monthly value of the palm heart harvest to the villagers of Assakata, is G$130,693[23]. To get the annual total, this will be multiplied by 11.5 months, giving a total income of G$1,348,970 resulting from the harvesting of wild palmheart from nearby forests. From the buying company records, and interviews with senior management, the use of 11.5 months is supported as being appropriate. For the company it is important to have a reasonably consistent supply, and cutters are encouraged to maintain a steady output throughout the year, although the canning plant is closed for 2 weeks in December and no purchases are made at this time. At a household level it seems that if the main cutter is unable to work, another family member takes his/her place to maintain the position of the household as being eligible to purchase the subsidised food and other supplies from the company.

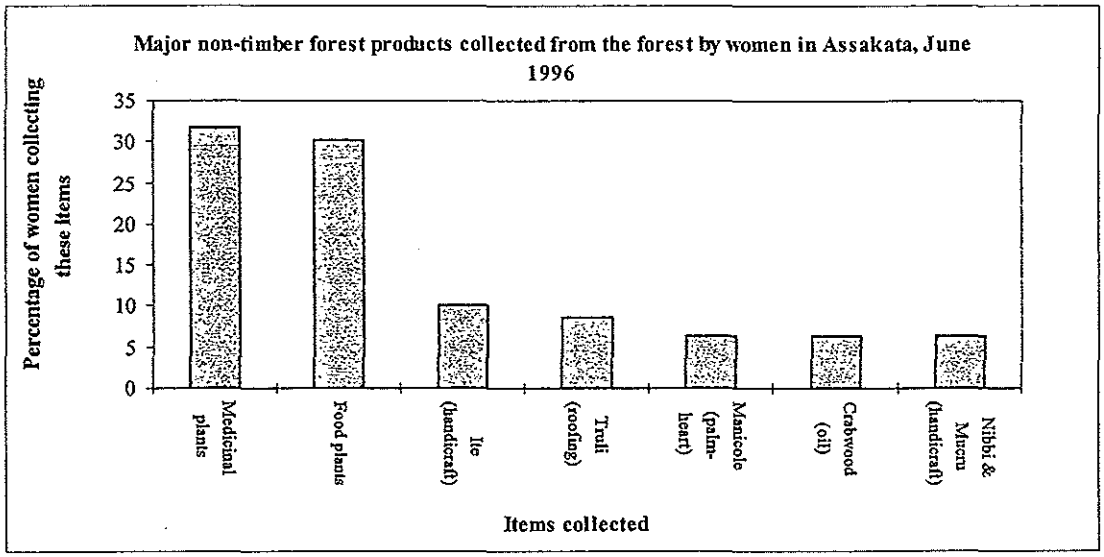
[23] On the basis of the buying company's records, a total of 17,210 palm-hearts was purchased from Assakata village in June 96, at a value of G$120,470. This compares closely with the figures reported by the cutters in the village, suggesting that the participatory research methods used to collect the data were reliable in this respect.

5.18. Assessing the value of other non-timber products to the household and village.

Figure 9 shows the most frequently collected forest plants used by the Assakata households, and shows the importance of both food and medicinal plants. The estimated values of forest plants used for food, drink and medicinal purposes in the household, and the actual value of the housewares, handicrafts, roofing, etc., made from forest plants which are made and used by the household, represent another form of household output which comes directly from the utilisation of non-timber forest products.

Both men and women are involved in collecting plants from the forest, but apart from palm-heart collection (*Manicole* palm), generally women engage in this activity more than men. While 65% of women usually spend a morning or an afternoon in the task (1-4 hours), 10% spend a whole day collecting (up to 8 hours), and the rest go on collecting trips lasting 2 days or more. Those who go on the longer trips tend to go in a group with other family members, and they go to collect specific plants such as *Truli* or *Mucru.*

Figure 9. Forest plants most commonly collected by women, Assakata, June 1996.



Notes: 1. *Ite* palm is used for making fibres used in handicraft, and fruits can be eaten. 2. *Truli* palm is used as a roofing material. 3. *Crabwood* seeds are used to make a valuable oil used for its medicinal properties. 4. *Nibbi* and *Mucru* are used for basketry and other handicrafts.

5.19. Estimating the value of food and drink from the forest.

All households use some forest resources for food. This food takes the form of fruit, nuts, honey, and palm heart, which is an important source of food in this area. A number of drinks are made from various plants which are important in many homes, and are commonly used as substitutes for tea and coffee. Although a little coffee is grown by some households, for the majority, they must buy it, and ordinary tea must also be bought from the market, at market prices. The use of NTFPs as the basis of household drinks is therefore an important way of saving the little cash available, so that it can be used for other purchases. From the data provided by women, we can see that the forest regularly provides food and drink items which supplement the family diet. Although

many of the forest products are seasonal, the fruiting of different trees at different times means that there is a fairly constant supply of these supplementary foods throughout the year. Other types of NTFP foods (such as palm-heart) are available all year round and can be collected at any time.

The importance of the forest as a supplementary food source is shown in Table 5.13 below, where women's perceptions of the various food sources are shown. It can be seen that farming, fishing and hunting are the most important means of getting food for this community (as borne out by the statistical evidence), but nonetheless, food from the forest is seen as making a significant contribution, with 74% of women regularly collecting food from the forest to supplement their main food supplies.

Table 5.13. Main and secondary sources of household food.

Source of food	Farming	Fishing	Hunting	From the forest	From the market/shop
% of women using each as their main source of food	87	13	0	0	0
% of women using each as their secondary source of food	12	73	66	74	69

Note: Most women have more than one secondary source of food.

In addition to nuts, fruits and leaves, several forest plants (such as *Turu, Capadulla,* and *Congo Pump*) are used for drinks, usually made by infusing the bark, stem or leaves in water. This type of drink is seen by people in the villages as being desirable, and has the added benefit of providing a clean source of drinking water, as the water is boiled during the process of the tea's preparation. The importance of drinks made from forest plants can be seen from those households which report collecting *Turu*[24] and other plants used as 'bush tea'. Since we know from the household diaries that 'tea' (the general name for a hot drink in these households) is reported to be drunk with every meal, we can see that the use of 'bush tea' is an important item to the households, and one which needs to be included in the estimate of the total monetary value of nutrition resulting from collection of forest plants. Table 5.14 shows the volumes and estimated values of food and drink collected from the forest.

[24] The nutritional value of food and drink from the forest cannot be calculated at this time, since a large number of the plants used have never been evaluated nutritionally.

Table 5.14 . Valuing forest foods.

Estimating the value of forest foods used by households (G$)							
House. No.	Average transport-able wt. (lbs/ collecting trip)	No. of forest collecting trips per month	Weight of forest plants collected per month. (lbs)	% of collected plants used for food	Weight of forest plants used for food (lbs. per month).	Annual weight of forest plants used for food (lbs. by 11 mths)	Annual value of forest foods (using *kokerite* etc. price of G$30 per lb as proxy for all foods)
1	*47.7*	4	190.8	20	38.16	419.7	12,592
2	50.0	1	50.0	90	45.0	495.0	14,850
3	*47.7*	3	143.1	0	0	0	0
5	25.0	2	50.0	90	45.0	495.0	14,850
6	*47.7*	3	143.1	0	0	0	0
7	*47.7*	2	95.4	20	19.0	209.8	6,296
8	50.0	1	50.0	90	45.0	495.0	14,850
9	50.0	1	50.0	50	25.0	275.0	8,250
10	*47.7*	2	95.4	30	28.6	314.8	9,444
11	50.0	4	200.0	12	24.0	264.0	7,920
12	50.0	1	50.0	85	42.5	467.5	14,025
13	50.0	2	100.0	50	50.0	550.0	16,500
14	*47.7*	1	47.7	50	23.8	262.3	7,870
15	*47.7*	1	47.7	10	4.7	52.4	1,574
16	50.0	2	100.0	20	20.0	220.0	6,600
17	*47.7*	3	143.1	25	35.7	393.5	11,805
18	*47.7*	1	47.7	50	23.8	262.3	7,870
19	50.0	1	50.0	25	12.5	137.5	4,125
20	50.0	4	200.0	35	70.0	770.0	23,100
21	50.0	2	100.0	30	30.0	330.0	9,900
22	*47.7*	2	95.4	75	71.5	787.0	23,611
23	*47.7*	2	95.4	42	40.0	440.7	13,222
24	*47.7*	2	95.4	42	40.0	440.7	13,222
Total						**8082.7**	**242,481**

Notes: 1. This data is based on hh. estimates of weights of plants collected. The annual total weight of collected plants is based on 11 months collection. This is to allow for seasonal variation as well as other household commitments. 2. Italics represent estimates of weight of plants collected, based on village averages. These are used for households where the weight collected is not reported, although time is spent by the household on forest plant collection. 3.The price of G$30 as a proxy price for all forest food is used as this is the price given for items such as *Turu* and *Kokerite* during the fieldwork period. Although it is clear that these foods are seasonal, it is stated by the villagers that in other seasons, other, substitutable foods are available from the forest.

In the case of food (and drink) from the forest, the value consumed by the household can be estimated by examining data given by both men and women on the use of forest plants. The amount of time spent on collecting from the forest is calculated, and the amount of time spent on an average collecting trip is determined from the survey data. Using the average weight of plants, etc., brought from the forest on such a collecting trip, it is possible to assess the amount of material overall which is collected by each household. Each household has reported the proportions of NTFPs used as food,

handicraft, medicine etc, and from this, the weight of NTFPs used for food and other uses can be calculated. For the purpose of valuing forest foods and drinks, a shadow price is used based on the market prices of Kokerite, Turu, etc., which all sell at G$30 per pound. (In other seasons, other fruits will take the place of these foods, and their price will be similar to this price assuming a normally productive year). By multiplying the weight of NTFPs used as food by this shadow price for forest foods, a reasonable value can be assigned to this nutritional use of forest plants[25].

5.20. Non-timber forest products as a supply of roofing materials for houses

Several forest plants may be suitable for use as roofing materials, but over time people in this area have come to prefer the shelter provided by certain species over others. This is due to the broadness of the individual leaves, and the resilience of the plant to pest infestation and weathering, when used as a roof for a house. Those harvested most frequently for the purposes of roofing are predominantly the *Truli* and occasionally the *Turu*, which is not as long-lasting. Other plants (such as *Mukru*) are used to bind the roof together, and a substantial quantity of that is required for each roof.

Usually families collect their own *Truli*, but some people in other areas make a living from collecting and selling it. For a household of the type found in Assakata, it would take 4 to 7 days to collect the materials, with each tree providing a maximum of four leaves. The average house in Assakata would require leaves from approximately 130 *Truli* trees.

The value of the roof in terms of the forest inputs can be calculated as being the number of *bones* (branches) of *Truli*, priced locally at G$1 per foot, plus the value of the *Mucru* binding. The *Truli* leaves are harvested from the forest, and then cut into *bones* each usually 5 feet in length. These are then laid out overlapping each other, and stitched together with the *Mucru* so that it becomes possible to pick up a whole section of what will be the roof, in one piece. Several pieces like this are then placed into position on the frame of the roof, and then bound securely with *Mucru* vine. The resulting roof is likely to last between 5 and 12 years, depending on the closeness of the *bones*, and the quality of the binding. Most families collect their own *Truli* on an ongoing basis, and simply repair damage as it occurs, rather than having a major roof overhaul from time to time.

The size of the average house in the village of Assakata would require on average 500 *bones*, each at G$5, giving a total cost of *Truli* at G$2500, with another estimated $G2500 being the cost of the approximately 120 *mucru* plants required for the job. This total cost of G$5000 represents an average house roof which in general lasts for 5 years before repairs are needed. On this basis, the cost of the roof would be G1000 per household per annum, (not including the labour costs for installation) a figure which should be included in the value of forest products used by the household.

This figure of G$5000 per roof compares favourably to the cost of a zinc sheet roof which is the modern alternative. For the same type of house, it would require approximately 40 sheets of zinc at G$1,500 per sheet which would be a total of

[25] By assessing the value of the food from the forest in monetary values, we are assuming equal utility for food from all sources. In relation to NTFPs, it is very likely (Melnick et al. 1996) that the food value in terms of vitamins, fats etc., is *superior* for wild foods compared with cultivated ones.

G$60,000, plus the cost of nails. Taking the zinc value alone and assuming a life of 20 years, this works out at G$3,000 per year. It is for this reason that no houses in Assakata have zinc roofs, although the roof of the school and recently built health-post are made of zinc. Undoubtedly the zinc roofs are longer lasting, but it is not uncommon for them to leak in at least a few places, as may a *Truli* roof. One major disadvantage of a zinc roof is that during rain storms it is virtually impossible to have a conversation under such a covering, whereas this problem does not arise with the *Truli* roof. This is ironic when we consider that zinc roofs are usually used on school buildings, and so when rain falls, learning activities may be seriously delayed. One other big advantage that the *Truli* roof has over the zinc is the fact that the building remains much cooler in the heat of the day, and more comfortable at night. Unfortunately however, a zinc roof inevitably carries a large status value in such a community, and this temperature and noise control feature of the *Truli* roof is a factor often forgotten by people who decide to invest in the modern alternative.

5.21. Non-timber products as a source of medical treatment

Almost every household in Assakata has at least one member who suffers from malaria. This disease is endemic in the region, and the number of households experiencing this problem is estimated to be 82% of the total. In some households more than one person is affected, and treatment can be taken from the village health post, where commercial anti-malarial drugs can be freely obtained, or by self-treatment based on locally well-known plant-based remedies, using various plants from the forest[26]. Other frequently occurring illnesses are fever, colds, and diarrhea and dysentery. These are also treatable by the health worker, or by the householders themselves using medicinal plants from the forest. According to village health-workers surveyed, and the staff at the Malaria Eradication Unit at the Moruka hospital, approximately half the villagers preferred to use forest plants for treatment against malaria. Mostly the reason for this was that 'it worked better', and they felt that it prevented the return of the disease for longer periods.

According to 86% of women surveyed, children suffered from most illness, and most of these occurred in the months of May, June and July. This was thought to be because during the wet season, water in the creeks is easily polluted from latrines etc. if flooding occurs. As a result, less opportunity exists for taking clean drinking water from the creeks. Also, small pools of stagnant water (breeding grounds for mosquitoes) are left standing after the rains. 95% of women felt that the forest was important to the family, for medicinal plants and as a source of materials for handicrafts, as well as food. 39% regularly collected medicinal plants or Crabwood oil and seed, while 31% regularly collected food from the forest. 37 % of men felt that medicinal plants would be one of the most important losses they would suffer if the forest was to disappear, while on average, women knew of and regularly used 8.23 different medicinal plants. This highlights the importance of these forest products to the well-being of households, and so a value should be estimated to cover this benefit.

Using the method previously described to assess the value of forest food and drink, based on the weights of plants collected in the forest, and the proportions of that used

[26] A number of plants are used as a treatment for malaria, including *Greenheart* seeds, (Ocotea rodiaei), *Quashie* (Quassia amara), *Huria* (Byrsonima coriacea) and *Wild Corailla* (Momordica charantia).(Fanshawe, 1948)

for medicinal purposes, values for the medicinal use of forest plants can be estimated. Details of this are shown in Table 5.15. In this case, the market price of Crabwood seeds/oil, (widely used for medicinal purposes), is used as a proxy for the value of all medicinal plants.

Table 5.15. Medicinal plant values.

The monetary value of medicinal plants, Assakata, 1996							
House no.	**Average. Transport -able wt (lbs / collecting trip)**	**Frequency of forest collecting trips (days per month)**	**Total wt. of plants collected per month (lbs)**	**Annual weight of plants collected from forest (lbs) (11mths)**	**% of collected plants used for medicine**	**Annual weight of collected plants used for medicinal purposes (lbs)**	**Value of plants collected for medicinal use, based on price of Crabwood seeds at $100 per lb. (G$)**
1	*47.7*	4	190.8	2,098.8	10	209.8	20,988
2	50.0	1	50.0	550.0	-	-	-
3	*47.7*	3	143.1	1,574.1	-	-	-
5	25.0	2	50.0	550.0	5	27.5	2,750
6	*47.7*	3	143.1	1,574.1	-	-	-
7	*47.7*	2	95.4	1,049.4	10	104.9	10,494
8	50.0	1	50.0	550.0	5	27.5	2,750
9	50.0	1	50.0	550.0	10	55.0	550
10	*47.7*	2	95.4	1,049.4	10	104.9	10,494
11	50.0	4	200.0	2,200.0	35	770.0	77,000
12	50.0	1	50.0	550.0	5	27.5	2,750
13	50.0	2	100.0	1,100.0	10	110.0	11,000
14	*47.7*	1	47.7	524.7	-	-	-
15	*47.7*	1	47.7	524.7	15	78.7	7,870
16	50.0	2	100.0	1,100.0	20	220.0	22,000
17	*47.7*	3	143.1	1,574.1	5	78.7	7,870
18	*47.7*	1	47.7	524.7	-	-	-
19	50.0	1	50.0	550.0	-	-	-
20	50.0	4	200.0	2,200.0	-	-	-
21	50.0.0	2	100	1,100.0	-	-	-
22	*47.7*	2	95.4	1,049.4	-	-	-
23	*47.7*	2	95.4	1,049.4	-	-	-
24	*47.7*	2	95.4	1,049.4	-	-	-
Average	47.7		97.4	1,071.4	6.3		
Total			**2240.2**	**24642**		**1814.7**	**181,467**

Notes: 1. Price of *Crabwood* Seeds = G$100/lb **2.** 1 ltr. of *Crabwood* oil sells for G$4000 in Georgetown. **3.** Italics indicate estimated weights for households not reporting weight collected.

It is hoped that in the final report, alternative valuations of medicinal plants can be made by incorporating the price of conventional malaria treatment.

5.22. Assessing the value of fuelwood collection

From both men's and women's data sheets, information was collected about the amount of time spent by people collecting fuelwood. To some extent, at least, this reflects the nature of fuelwood availability, and therefore its price. This is because if the fuelwood is readily available, the household will spend less time collecting it, whereas more time will be necessary (and therefore more labour) if the source of the fuelwood is further away.

Table 5.16 . Fuelwood values, Assakata, June 1996.

Estimating the value of fuelwood use by households, Assakata, 1996				
House no.	Total weighted man/ woman/child hours collecting fuelwood /day	Annual hours spent per hh. collecting fuelwood (360days.)	Total annual volume of fuelwood per household (hrs.x 12lbs)	Total money value assuming 10lbs=G$70 (G$)
1	1.5	540.0	6,480.0	45,360
2	0.8	270.0	3,240.0	22,680
3	1.6	574.6	6,895.2	48,267
5	2.0	720.0	8,640.0	60,480
6	1.8	630.0	7,560.0	52,920
7	2.5	900.0	10,800.0	75,600
8	1.8	630.0	7,560.0	52,920
9	1.6	585.0	7,020.0	49,140
10	1.5	540.0	6,480.0	45,360
11	0.9	315.0	3,780.0	26,460
12	1.5	540.0	6,480.0	45,360
13	2.8	996.0	11,951.7	83,662
14	1.0	360.0	4,320.0	30,240
15	1.1	405.0	4,860.0	34,020
16	1.2	421.4	5,056.5	35,396
17	1.8	630.0	7,560.0	52,920
18	1.8	630.0	7,560.0	52,920
19	1.5	540.0	6,480.0	45,360
20	*1.0*	344.8	4,137.1	28,960
21	0.9	315.0	3,780.0	26,460
22	1.6	585.0	7,020.0	49,140
23	*1.5*	537.5	6,450.0	45,150
24	1.5	540.0	6,480.0	45,360
Total	**34.8**	**12,549.2**	**150,590.6**	**1,054,134**

Notes: 1.Since fuelwood is needed for cooking virtually every day, it is assumed that each household will collect wood on 360 days per year. 2. The value of wood can be assessed on the basis of the shadow price of kerosene giving a price of G$7/lb of wood. 3. Italics indicate averages inserted where data was omitted from household survey responses.

Some studies have shown that in some parts of Africa the time requirement for collecting fuelwood is so large that the labour requirement becomes insupportable for the household. In some countries, such as Rwanda, aid agencies and NGOs have been trying to ease this situation by the provision of transport to the faraway fuelwood sources. This

extreme measure is clearly an unsustainable activity, but the need for it has arisen as a result of the massive population migrations associated with the Hutu/Tutsi conflict in the region. Other research into fuelwood consumption in Nepal has shown dramatically how environmentally damaging this can be when over-use of an open-access resource occurs, and how pressing is the need for policies to be developed to cater for the needs of both present and future generations.

Table 5.16 shows the time spent by households in the collection of fuelwood, and the value of this is based on the assumption of collection rates being on average 12 lbs per hour. This figure is based on informal assessments of fuelwood loads collected during the survey period. Using the local price of kerosene as a shadow price for fuelwood, the monetary value of the wood can be calculated. From observations in the village, and on the basis of statements of householders, it can be assumed that 10lbs of wood is equivalent to one litre of kerosene, in terms of how much cooking service it can provide. On this basis, 10 lbs. of fuelwood can be valued at G$70.

Fortunately in this part of Guyana the fuelwood situation has not reached the desperate state found in Africa, but nevertheless, several hours of household labour is usually spent each week in its collection. It is therefore important that fuelwood collected in the forest should be counted as being of significant value to the household in our estimations of the importance of the forest to the household, and to the value of the Village Product.

5.23. Assessing the value of handicraft production

Handicrafts are fundamental to the Amerindian way of life, as it is through the use of various handicraft items that food is processed and produced. The most important of these is the *Matapee*, a woven squeezing device made from the Mucru plant, used to extract the starch and poisonous toxins of the bitter cassava plant, the staple food of these people. Mucru is also used to make the *quakes* (baskets), *maswa* (fish traps) and sieves and sifters found in almost every household, while bamboo is used to make the *kuyama* (another kind of fish trap), as well as sleeping mats and small fans used to heat the cooking fires. The skills of the craftsman are also important in the production of other essential household items, such as the hammock, traditionally made from *Tibisiri* fibre (from the *Ite* palm), or from home-grown cotton. In any community where rivers are the means of communication, canoes and paddles are important household items, and these are, of course, the product of specific craftsmen. Of these items, some of the most basic, such as the sifter and fan, may be made by the householders themselves, but today there is a tendency for the villagers to buy the more complex items from someone who makes them for a living. Table 5.17 shows the main types of handicraft materials used by the villagers, while in Table 5.18 the percentage of households doing each type of craft is shown.

Table 5.17. The use of handicraft materials by Assakata households, June 1996.

Materials used	Nibbi	Mucru	Ite	Cotton	Wood	Straw	Man-made fibre	Other
Percentage of households using each.	67	55	32	23	11	11	10	38

Note: Most households use more than one type of material.

In Assakata there are a number of persons making handicraft items, but in almost all cases, this is not considered important in terms of its contribution to household income. In some households, more than one person may participate in the craft-work, but in others, perhaps no such work is done.

Table 5.18. Households making various handicrafts. Assakata, 1996

Type of craft	Basketry	Weaving	Hammock making	Canoe making	Paddle making	Bow/arrow making	Wood carving	Seine weaving
Percentage of households doing each craft	67	56	45	23	23	24	11	11

Note: Some households make more than one type of craft.

The value of the handicrafts can be calculated from the craftsman's estimate of the weekly earnings from items made, and these are then converted to annual values, based on 50 weeks of output. (Two weeks are not included to allow for marketing and other activites). The estimated value of handicraft production is shown in table 5.19 below.

Table 5.19. Estimated annual value of handicraft produced in Assakata.

Annual totals from handicraft, Assakata 1996		
House no.	**Weekly earnings from handicraft (G$)**	**Annual earnings from handicraft (G$)**
1	-	-
2	-	-
3	-	-
5	-	-
6	-	-
7	-	-
8	2,000	100,000
9	200	10,000
10	-	-
11	4,450	222,500
12	-	-
13	600	30,000
14	300	15,000
15	500	25,000
16	-	-
17	-	-
18	-	-
19	1,000	50,000
20	-	-
21	-	-
22	-	-
23	-	-
24	2,000	100,000
Total		**552,500**

6. Assessing the value of non-timber forest inputs in the Net Village Product of Assakata.

The monetary value of NTFP use in Assakata are found by combining the values of outputs with inputs.

6.1. Assakata village inputs and outputs.

Figures for the estimated values of inputs and outputs in the village of Assakata are shown in Tables 6.1 and 6.2 below. These figures can now be inserted into the relevant formulae to complete the calculation of the Net Village Product, and subsequently, the value of the non-timber forest inputs. Referring back to equation [2], the formula to calculate NVP is:

$$NVP = \sum_{h=1}^{H}(wL^h + rK^h + \delta K^h + p_f F^h) = \sum_{h=1}^{H}\sum_{i=1}^{n} p_i Q_i^h \qquad [2]$$

To compute this value, we need to sum across all households for all outputs and inputs, and the value of $p_f F^h$ will be determined by re-arrangement of the known values, giving the formula:

$$\sum_{h=1}^{H} p_f F^h = \sum_{h=1}^{H}(\sum_{i=1}^{n} p_i Q_i^h - (WL^h + rK^h + \delta K^h)). \qquad [3]$$

Table 6.1 Monetary values of village outputs, Assakata, 1996

Value of village outputs (G$), Assakata, 1996										
House no.	Farming	Fishing	Hunting	Palm Heart	Handi-crafts	Medicinal plants	Forest food and drink	Fuel wood collection	Truli roofing	Total value of outputs
1	310800	184,309	*280,135*	80,500	0	20,988	12,593	45,360	1,000	935,685
2	359494	332,510	*160,077*	0	0	0	14,850	22,680	1,000	890,611
3	138000	0	*0*	0	0	0	0	48,267	1,000	187,267
5	386407	46,956	*480,231*	0	0	2,750	14,850	60,480	1,000	992,674
6	164900	24,102	1,098,900	23,000	0	0	0	52,920	1,000	1,364,822
7	151600	38,814	0	352,000	0	10,494	6,296	75,600	1,000	635,804
8	72793	171,540	0	64,400	100,000	2,750	14,850	52,920	1,000	480,253
9	117865	279,917	621,750	46,000	10,000	5,500	8,250	49,140	1,000	1,139,422
10	296827	110,897	0	0	0	10,494	9,445	45,360	1,000	474,023
11	135600	0	172,800	57,500	222,500	77,000	7,920	26,460	1,000	700,780
12	437621	0	0	5,750	0	2,750	14,025	45,360	1,000	506,506
13	83775	446,883	0	46,000	30,000	11,000	16,500	83,662	1,000	718,820
14	181769	160,991	969,900	57,500	15,000	0	7,871	30,240	1,000	1,424,271
15	334838	110,897	*133,099*	322,000	25,000	7,871	1,574	34,020	1,000	970,299
16	49200	79,989	0	0	0	22,000	6,600	35,396	1,000	194,185
17	98824	27,724	0	190,820	0	7,871	11,806	52,920	1,000	390,964
18	170930	43,954	*350,261*	32,200	0	0	7,871	52,920	1,000	659,135
19	263060	246,517	0		50,000	0	4,125	45,360	1,000	610,062
20	13210	0	0	42,550	0	0	23,100	28,960	1,000	108,820
21	263966	298,286	0	11,500	0	0	9,900	26,460	1,000	611,112
22	168860	471,590	*420,313*	0	0	0	23,612	49,140	1,000	1,134,515
23	122600	44,680	0	0	0	0	13,222	45,150	1,000	226,652
24	59290	0	0	17250	100,000	0	13,222	45,360	1,000	236,122
Total	4,382,230	3,120,555	4,687,466	1,348,970	552,500	181,467	242,481	1,054,134	23,000	15,592,803

Notes to table 6.1: [G$208=£1]

1. Annual figures for labour supply are based on 11.5 months of estimates. This is to avoid *overestimation* of the values, and allows for unforeseen events such as weddings and funerals which inevitably disrupt work from time to time. Hours are weighted to take account of age and gender.
2. Prices for household items used for capital values are based on regionally adjusted average market prices.
3. Farming values are found by applying market prices for crops, to farm outputs, and summing for all households.
4. Fishing values are based on market prices for fish, applied to the volume of fish catches, adjusted by an error term. Data was collected in the wet season when fishing is harder, and so provides a conservative estimate of annual totals. This same point applies to hunting totals.

5. Hunting values use 45weeks of hunting estimates, to take account of seasonal factors.
6. Handicrafts are based on estimated output by craftsmen, valued at market prices for outputs.
7. Roofing materials are calculated using market prices of these materials in Moruka market, with estimates of quantities required on the basis of an average house size, using *Truli* and *Mukru*, with a life of 5 years.
8. Food & drink from the forest is based on household estimates of quantities of food & drink plants collected (lbs) , with value calculated using a price of $30 per lb, the market price of *Acquero* and *Kokerites*, widely collected forest foods, and *Turu* the main 'bush tea' drink. Although these are seasonal, other foods will replace them in other seasons, and so annual totals can be estimated.
9. Medicinal plants are valued on the basis of the market price for *Crabwood* seeds, times the volume (lbs) of medicinal plants collected by those households who use them.
10. palm-heart harvesting values are based on reported harvests priced at the buying price paid by the company agents. Figures correspond well with company records used as a cross-check.
11. Fuelwood values are based on household hours spent on fuelwood collection, for 360 days, assuming a collected load 12 lb /hr spent, and a market price of G$7/lb (Shadow price from the price of kerosene in the area).

Table 6.2. Village inputs and outputs, Assakata, 1996

Values of inputs, outputs, and the derivation of $p_f F^h$						
House no.	**Labour values**	**Capital cost per annum (8%)**	**Depreciation (20%)**	**Total inputs**	**Total outputs**	**Difference: outputs - inputs ($p_f F^h$) (G$)**
1	431,060	1,921	4,803	437,784	935,685	497,901
2	449,715	696	1,740	452,151	890,611	438,460
3	338,126	1,755	4,387	344,269	187,267	-157,002
5	782,616	13,576	33,940	830,132	992,674	162,541
6	340,255	1,802	4,505	346,562	1,364,822	1,018,260
7	530,900	328	820	532,048	635,804	103,756
8	373,513	512	1,280	375,305	480,253	104,948
9	528,994	11,962	29,905	570,861	1,139,422	568,561
10	330,906	1,472	3,680	336,058	474,023	137,965
11	526,690	752	1,880	529,322	700,780	171,458
12	234,593	608	1,520	236,721	506,506	269,784
13	608,234	1,755	4,387	614,377	718,820	104,444
14	476,785	352	880	478,017	1,424,271	946,254
15	623,051	704	1,760	625,515	970,299	344,784
16	241,318	1,755	4,387	247,461	194,185	-53,276
17	461,265	626	1,565	463,456	390,964	-72,492
18	531,314	776	1,940	534,030	659,135	125,105
19	539,751	750	1,875	542,376	610,062	-32,400
20	216,476	328	820	217,624	108,820	-68,335
21	545,188	528	1,320	547,036	611,112	64,076
22	719,616	1,504	3,760	724,880	1,134,515	409,634
23	305,904	656	1,640	308,200	226,652	-81,548
24	323,835	512	1,280	325,627	236,122	-89,505
Total	**10,460,108**	**45,630**	**114,075**	**10,619,813**	**15,592,803**	**4,972,990**

6.2. The monetary value of forest use.

The figure of G$4,972,990 for the total village value of $p_f F^h$ shown in Table 6.2, actually represents the value added to labour and capital inputs by the use of the primary resource, land. This amount therefore is equivalent to the rent earned by that factor of production, and represents the value generated by the anthropogenic use of *non-timber products* from the forest. It is important to note here that no amount has been included

for the value of *timber products*, as these are not commercially used by the community, and the number of trees used for timber by them on a regular basis, is small. It must also be remembered that no values have been included by other non-timber forest services such as carbon sequestration etc., which would clearly increase the final value quite considerably, but at present, no satisfactory estimates for such things are available.

7. The social dimension of forest values.

As has been shown by the above analysis, the forest has a significant role to play in the economy of an Amerindian village, but its importance goes beyond the monetary sphere. Using a combination of qualitative and quantitative data, some social aspects of life in the forest village are examined.

7.1. Social attitudes.

For brevity, some illustrative statistics are shown in Tables 7.1 and 7.2, and along with a short analysis of gender differences in attitudes to forest functions, (Table 7.3), it can be shown that the forest itself is fundamental to the way of life of Amerindian people.

Table 7.1. Attitudes to life in a forest village. Assakata, 1996.

How people feel about aspects of life	% men	% women
Forest is considered as important to the family	89	95
Plants from the forest are considered essential to life[27]	100	100
Life in the future is considered to be harder than at present	42.8	37.5
Feel happy with life	85.7	91.7
Think children should stay in the village	85	66.7
Think their lives would improve with a job or more money	23.8	43

Table 7.2. Inter-generational perspectives on the environment

Observation from the last 10 years, for heads of household, or lifetime, for elders.	% Head of household	Village elders %
Think there are **less** animals in the forest now than before	42.1	83.3
Think there are **more** birds in the forest now than before	47.3	80
Think there are **more** insects around now than before	57.9	83
Think the standard of living **same /worse** now than before	47.4	66.7

These figures indicate some interesting points on how the villagers of Assakata feel about the forest, and their lives within it. 100% of villagers think that the forest is essential to life, with over 90% believing that it is important for their families. People seem to believe that although there may be more insects and birds in the forest than in earlier years, the number of animals is declining. 42% of men think that life will be more difficult in the future, and 47% think that their standard of living is the same or worse than before. In spite of this, the majority of both men and women describe their lives as 'happy', and want their children to stay in the village rather than move elsewhere. Women especially seem to feel that life would be better if they had more money, but men

[27] This is true in the sense that in order to eat the staple food of *Bitter Cassava,* it needs to be processed to extract poison and it is only through the use of handwoven squeezers made from Mucru plants that this can be done in these villages. In addition, the *Truli* Palm provides roofing for their houses.

see this as less important. Village elders seem to be more acutely aware of the changes in bird, animal and insect stock, and a larger proportion of them (67%) feel that the standard of living is no better than, or worse than before. These superficial observations need to be examined further if their significance is to be fully understood.

7.2. Attitudes to forest functions

How forests are perceived by people is an important consideration when considering values. What some people feel is important may be insignificant to others, and this can have important policy implications. As a preliminary investigation into the perceptions of forest functions, some brief analysis is here presented, and more will be forthcoming in the final report.

Table 7.3. Gender differences in forest functions.

Forest functions:

1.Shade
2. Money income
3. Source of fuelwood
4. Source of building materials
5. Influences rain and weather
6. Source of medicine
7. Source of food
8. Hunting place
9. Burial Ground
10.Affects water flows
11. Spiritual place
12.Culturally important

Forest function:	1	2	3	4	5	6	7	8	9	10	11	12
Men's mean score	4.55	3.20	5.00	4.85	2.70	3.95	4.25	4.80	1.85	3.25	2.50	4.15
S.D.of men's scores	0.69	1.70	0.00	0.67	1.59	1.19	0.97	0.89	1.46	1.45	1.82	1.50
Women's mean score	3.62	3.71	4.29	4.67	2.29	3.90	3.48	4.10	1.90	2.19	2.00	2.19
S.D. women's .scores	1.72	1.31	1.19	0.73	1.68	0.89	1.50	1.51	1.41	1.29	1.64	1.57

When questioned about forest functions, some gender differences appeared to exist in the village. Table 7.3 shows the mean and standard deviation of scores given by men and women for each forest function[28], and when analysed using *t* tests, there appeared to be a significant difference between men's and women's responses at the 5% level. This suggests that gender differences do exist in perceptions of forest functions, and it appears that men assign a higher 'value' than women to all of the functions tested. This is especially significant when considering the value of forest for '*shade*' (item 1), as '*affecting water flows*' (10) and as being '*culturally important*' (item 12). Given the dominant role of women in childrearing, this gender difference in 'values' may have some important implications for sustainability.

7.3. Gender differences in attitudes to change.

When questioned about possible changes in the future, men and women expressed differing attitudes to what they would like to see. These differences are illustrated in Figures 10 and 11, which show what suggestions were made by both groups about what changes they would like to see in the village in the future.

[28] Respondents were asked to assign a score from 1 to 5 on each of the forest functions, according to how important each was. (100 % of households represented.) Since bead counters were used to assign scores, the numbers obtained are implicitly on an interval scale, thus amenable to parametric testing..

Figure 10. Changes suggested by men.

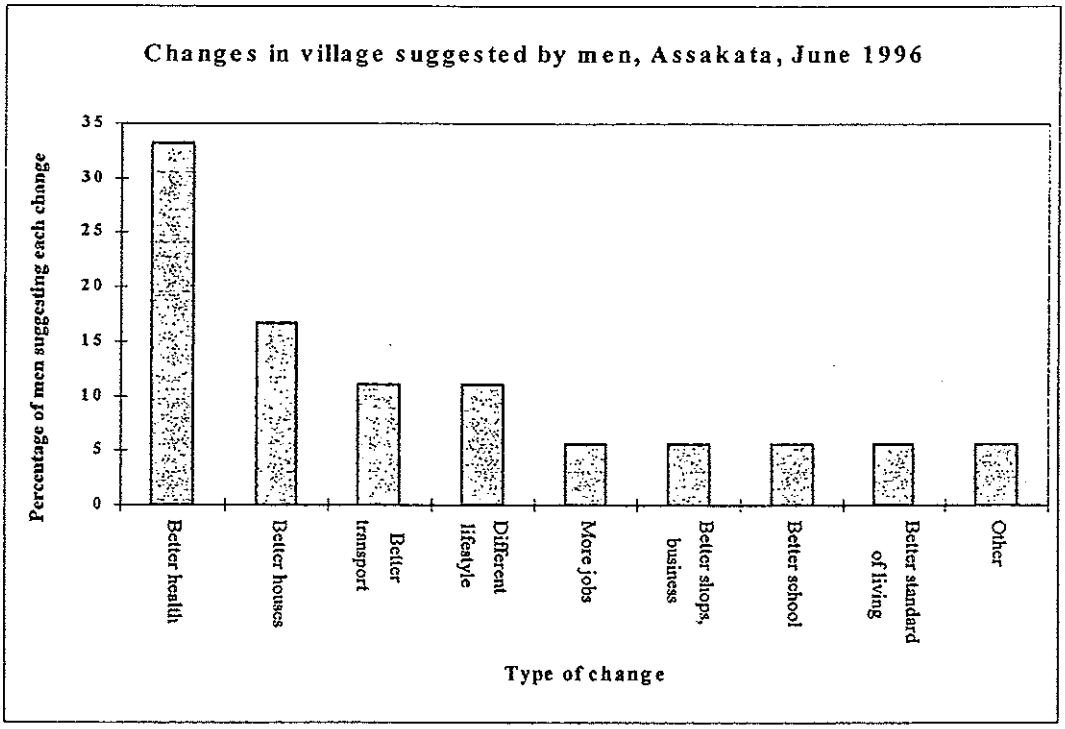
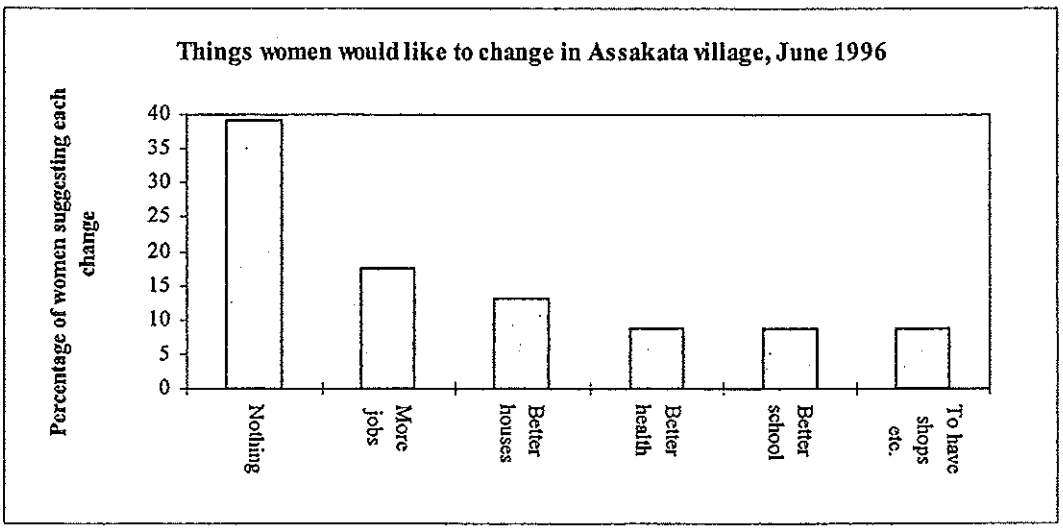


Figure 11. Changes suggested by women.



From the above figures, it is interesting to note that for men, an improvement in health is the most significant change suggested, with better housing and transport also being mentioned. For women, the most frequent suggestion is that nothing should change, implying that maintenance of the traditional lifestyle is perhaps more important to women than to men. In contrast to this however, a higher proportion of women (18%) think that life would be improved if there were more jobs, whereas amongst the men, only 7% suggested that this would bring about an improvement in village life.

These social statistics are included here to illustrate the social value of forests. Some of the points demonstrated by these figures could have important implications to be

considered when designing appropriate development policies for forested areas such as this. It is anticipated that more detailed analysis of various social statistics will be included in the final report, as at this stage this aspect of the work is still in its preliminary state.

8.1. CONCLUSIONS

The ratio of forest inputs to total Net Village Product indicates that 32% of total village output results from the input of nature, in the form of the use of non-timber forest products and services. Since this *rent*, or value added, from the forest amounts to G$4,972,990 p.a., its per capita value per year in Assakata (population of 167), is G$29,778[29]. This relatively significant figure for income accruing from the forest has important implications for these villages. Such an estimate could be used as an indicator of the amount of compensation which would need to be paid (*per person, annually*), in the event of villagers loosing their access to the forest as a household input. Such a situation may arise, for example, in a location where a national park was to be developed, or a logging or mining concession given, or any other activity which may result in the loss of access to an open-access resource.

It is important to consider the fact that the estimated level of *rent* accruing to land (nature), as a result of the use of the non-timber forest products and services is, *ceteris paribus*, an **indefinite** income stream[30]. This has important implications for sustainability, and it is essential that, if the quality of this income stream is to be preserved, action must be taken to ensure that it is not depleted by the decisions and actions of both the policy makers and local residents of the current generation.

Preliminary analysis of the social data elicited by the study indicates that NTFPs play a very important role in the way of life of Amerindians. This is something which may be obvious to the observer, but hopefully, by extending the anecdotal evidence, this empirical examination will draw attention to the importance of NTFPs to the social aspects of sustainability. For policy makers, the importance of this cannot be understated, since sustainable development is only likely to be achieved through cooperation between all of the stakeholders involved.

From this analysis, both the economic and social importance of non-timber forest products and services have been highlighted. The value of NTFPs has been shown to contribute approximately one-third of the NVP of Assakata, and in addition, a preliminary analysis of attitudinal data has shown how great is the perceived importance of NTFPs to the way of life of these Amerindian people. The analysis of the data from the other two villages in the study will be presented later in the final report. This will provide the opportunity to compare the different locations, and to assess the wider implications of the results to the Amerindian people of N.W. Guyana as a whole.

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[29] In this analysis, no attempt is made to evaluate the importance of other environmental services from forests such as carbon sequestration, etc. The inclusion of this would increase the estimate of the monetary value of the intact forest.

[30] This assumes that the demand for these NTFPs from human and other populations does not exceed the carrying capacity of the ecosystem itself.

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Appendix 1.

Data record sheets used to assess non-timber forest products, Guyana, 1996

1. Male head of households
2. Senior female members of households
3. Elders
4. Youths
5. Farmers
6. Non-timber product collectors
7. Palm-heart harvesters
8. Fishermen
9. Hunters and trappers
10. Handicraft workers
11. Diaries
12. Record sheets for activities such as forest walks, etc,

HOUSEHOLD SURVEY DATA SHEET.

HOUSE LOCATION No. ..... RECORDED BY: ..... VILLAGE.....

A. Household structure and composition.

1. HEAD OF HOUSEHOLD .....DATE..... AGE .....

2. NAME & AGE* OF HOUSEHOLD MEMBERS	No. of yrs. schooling	RELATION (To head of household)	BIRTHPLACE
2.....	.....	.....	.....
3.....	.....	.....	.....
4.....	.....	.....	.....
5.....	.....	.....	.....
6.....	.....	.....	.....
7.....	.....	.....	.....
8.....	.....	.....	.....

*For under 15s mark those attending full time education with an *.

3. NUMBER OF PERSONS PASSED AWAY IN THE HOUSEHOLD IN THE LAST YEAR.

*Please give names, ages of death and causes, with details where possible.

NAME	AGE OF DEATH	CAUSE OF DEATH (Old-age, Accident, Disease, Childbirth)
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

4. NUMBER OF FAMILY MEMBERS LIVING ELSEWHERE NOW .....

5. NUMBER AND USE OF FARM PLOTS

LOCATION (Distance from house in walking time)	SIZE (Estimate M^2)	MAIN 3 CROPS
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

6. IN WHICH MARKET DO YOU SELL YOUR PRODUCE? .....

7. DISTANCE & TRANSPORT TO THE MARKET (in hours of travel).....

8. WHICH OF THE FOLLOWING ARE INFLUENCED BY THE SEASONS?

The type of work people do (yes / no) The type of food you eat (yes / no) The amount of food you eat (yes / no)
The number of fish you catch (yes / no) The number of animals you catch while hunting (yes / no)

9. WHICH IS THE MOST PRODUCTIVE SEASON? .....What months .....

P.T.O.

B. Household activities

10. TIME OF WAKING: Adults.....Chn. ..... **TIME TO SLEEP:** Adults.....Chn. .....

11. MAIN and SECONDARY OCCUPATION OF ADULTS IN HH.

MEMBER 1(a.....)(b.....) M / F MEMBER 2 (a.....)(b.....) M / F

MEMBER 3 (a.....)(b.....) M / F MEMBER 4 (a.....)(b.....) M / F

MEMBER 5. (a.....)(b.....).M / F MEMBER 4 (a.....)(b.....) M / F

*Please indicate male or female.

Key: 1 FARMING FOR SELF & FAMILY 2. FARMING FOR OTHERS
3 OTHER EMPLOYMENT IN VILLAGE 4. OTHER EMPLOYMENT ELSEWHERE
5.HOUSEWORK. 6. HANDICRAFTS 7. FIREWOOD COLLECTION 8. STUDENT
9TEACHER 10. TRADER 11. HUNTER 12.FISHERMAN 13. HEALER. 14. OTHER(give details)
.....

ALLOCATION OF TIME PER ACTIVITY PER HOUSEHOLD.

12. NUMBER OF **MAN-HOURS PER DAY** SPENT DOING:
Key: 1 FARMING FOR HH 2. FARMING FOR OTHERS
3 OTHER EMPLOYMENT IN VILLAGE 4. OTHER EMPLOYMENT ELSEWHERE
5.HOUSEWORK. 6. HANDICRAFTS 7. FIREWOOD COLLECTION 8.STUDYING
9.TEACHING 10.TRADING 11HUNTING 12.FISHING 13. HEALING. 14. OTHER (give details)
*Estimate the number of hours **men** spend doing each of the above activities. Give answer in hours.

1..... 2..... 3..... 4..... 5..... 6..... 7.....

8..... 9..... 10..... 11..... 12..... 13 ..... 14.....

13. NUMBER OF **WOMAN-HOURS PER DAY** SPENT DOING:
Key: 1 FARMING FOR HH 2. FARMING FOR OTHERS
3 OTHER EMPLOYMENT IN VILLAGE 4. OTHER EMPLOYMENT ELSEWHERE
5.HOUSEWORK. 6. HANDICRAFTS 7. FIREWOOD COLLECTION 8.STUDYING
9.TEACHING 10.TRADING 11HUNTING 12.FISHING 13. HEALING. 14. OTHER (give details)
*Estimate the number of hours **women** spend doing each of these activities. Give answer in hours.

1..... 2..... 3..... 4..... 5..... 6..... 7.....

8..... 9..... 10..... 11..... 12..... 13 ..... 14.....

14. NUMBER OF **CHILD** HOURS **PER DAY** SPENT DOING:
Key: 1 FARMING FOR HH 2. FARMING FOR OTHERS
3 OTHER EMPLOYMENT IN VILLAGE 4. OTHER EMPLOYMENT ELSEWHERE
5.HOUSEWORK. 6. HANDICRAFTS 7. FIREWOOD COLLECTION 8.STUDYING
9.TEACHING 10.TRADING 11HUNTING 12.FISHING 13. HEALING. 14. OTHER (give details)
*Estimate the number of hours **children** spend doing each of these activities. Give answer in hours.

1..... 2..... 3..... 4..... 5..... 6..... 7.....

8..... 9..... 10..... 11..... 12..... 13 ..... 14.....

C. MAJOR AGRICULTURAL PRODUCTS OF HOUSEHOLD.

15. Please list the 8 main **food crops** produced in a year/season. Estimate approximate amount produced. (in baskets per season ,(b/s) mean weight to be determined later by weighing a sample of such loads.)

1..... .b/s 2..... .b/s 3.....b/s. 4..... .b/s.

5.....b/s. 6..... .b/s 7.....b/s 8..... .b/s

16. WHICH OTHER CROPS ARE GROWN? Please give name and purpose.

NAME	PURPOSE	NAME	PURPOSE
1.....	.....	2.....	.....
3.....	.....	4.....	.....
5.....	.....	6.....	.....
7.....	.....	8.....	.....
9.....	.....	10.....	.....

11..... ..... 12.....

17. OF ALL THE CROPS LISTED ABOVE, INDICATE APPROXIMATELY HOW MUCH IS PRODUCED*, WHAT PROPORTION IS CONSUMED AT HOME, AND WHAT IS CONSUMED OUTSIDE

(basketloads/season, b/s)

CROP	%HOME	%SOLD	CROP	%HOME	%SOLD
1.....	.....	.....	2.....	.....	.....
3.....	.....	.....	4.....	.....	.....
5.....	.....	.....	6.....	.....	.....
7.....	.....	.....	8.....	.....	.....
9.....	.....	.....	10.....	.....	.....
11.....	.....	.....	12.....	.....	.....

18. FOR THE 4 MOST IMPORTANT CASH CROPS, ESTIMATE HOW MUCH TIME IS NEEDED FOR EACH PART OF THE PRODUCTION PROCESS.

CROP 1.
Land clearing ..... days.
Planting ..... days
Weeding etc ..... days
* number of days x fraction of day reqd.
Harvesting .....days
Marketing ..... days
* number of days reqd. to reach market.

CROP 2 .
Land clearing .....days
Planting .....days
Weeding etc. .....days
* number of days x fraction of day reqd.
Harvesting ..... days
Marketing .....days
* number of days reqd. to reach market.

CROP 3.
Land clearing ..... days.
Planting ..... days
Weeding etc. ..... days
* number of days x fraction of day reqd.
Harvesting .....days
Marketing ..... days
* number of days reqd. to reach market.

CROP 4 .
Land clearing .....days
Planting .....days
Weeding etc. .....days
* number of days x fraction of day reqd.
Harvesting ..... days
Marketing .....days
* number of days reqd. to reach market.

19.IDENTIFY AND RANK THE TOP 4 CROPS WHICH ARE THE MOST EXPENSIVE TO PRODUCE IN TERMS OF:

Time: 1. ..... 2..... 3..... 4.....

Fertiliser use:1. ..... 2..... 3..... 4.....

20.WHICH OF THE FOLLOWING ANIMALS DO YOU KEEP? (Put number of each in brackets)

1. Pigs ( ) 2. Cows ( ) 3. Chickens ( ) 4. Goats ( ) 5. Other ( ) .....

21. DO ALL THESE ANIMALS BELONG TO YOU (yes / no)

22. DO YOU USE THEM FOR FOOD (yes / no/)

23. DO YOU SELL ANY ANIMALS (yes / no) How much do you sell them for? .....

24.WHO LOOKS AFTER THEM MOST OF THE TIME. (Children / women / men)

25. MAJOR SOURCES OF FOOD FOR HOUSEHOLD.

Main source ..... Secondary sources: .... & .....

Key: 1. FARMING 2. BOUGHT FROM MARKET. 3. HUNTING 4 FISHING
5. BOUGHT FROM COMPANY SHOP. 6. GATHERING FROM FORESTS 7. OWN LIVESTOCK

26. HOUSEHOLD EQUIPMENT

Please tick to indicate which of the following tools/items are held by the household, and give number of each held in the square brackets.

1. **Cutlass** ( ) 2. **Spade/Shovel** ( ) 3. **Rake** ( ) 4. **Hoe** ( ) 5. **Manual Saw** ( )

6. **Chain Saw** ( ) 7. **Boat Paddle** ( ) 8. **Outboard engine** ( ) 9. **Radio** ( )

10. **Cassette Player** ( ) 11. **Canoe** ( ) 12. **File** ( ) **Other (Specify)** ..... ( ) **P.T.O.**

27. CONCERNS FOR THE FUTURE

Rank or score each of the following issues on a scale of 1 (least important) - 5 (most important), to indicate how important you think each is in terms of (1) the success of the community as a whole, and (2) the wellbeing of your family.

ISSUE	SCORE (from 1 - 5)		
	Community	My family now	My Children's lifetime
1. Education	.....	.....	.....
2. Health	.....	.....	.....
3. Nature/environment	.....	.....	.....
4. Business development	.....	.....	.....
5. Agricultural development	.....	.....	.....
6. Tourism	.....	.....	.....

28. Do you think that the forest makes an important contribution to your family? yes / no

Study the following list of things provided by forests, and score them on a scale of 1 - 5.

Forest function	Score (1 - 5)	Forest function	Score (1 - 5)
Provides shade	.....	Source of food	.....
Provides money income	.....	Place for hunting	.....
Source of firewood	.....	Burial ground	.....
Provides building materials	.....	Influences water flows	.....
Influences weather & rainfall	.....	Spiritual place	.....
Source of medicine	.....	Place of cultural importance	.....

Please give any other function/importance not mentioned above .....

CONTENTMENT.

29.Would you describe yourself as a happy man, generally? yes / no.

30.What would you like to change in the village? .....

31. What would most improve your life? .....

32. Do you want your children to stay in the village or go somewhere else? .....

33. Do you think life will be easier or harder for them in the future? .....

34. Give reasons for your answer .....

35. DO YOU THINK ANY OF THE FOLLOWING THINGS HAVE CHANGED IN THE LAST 10 YEARS?
(for each one, if you think it has changed, say why or how)

a. Your standard of living. (Yes / No) .....

b. The water table in the soil (Yes / No) .....

c. The amount of wind in the air (Yes / No) .....

d. The number of birds around (Yes / No) .....

e. The number of wild animals relatively nearby (Yes / No) .....

f. The number and type of insects about (Yes / No) .....

g. The amount of fertiliser you need to use. (Yes / No) .....

36. LIST ALL THE THINGS THAT YOU CONSIDER TO BE CLASSED AS 'HOUSEHOLD INCOME' WHICH YOUR HOUSEHOLD HAS RECIEVED IN THE LAST WEEK.

.....

.....

.....

.....

WOMEN'S DATA SHEET.

HOUSE LOCATION NUMBER. ..... RECORDED BY .....

1. NAME: ..... AGE .....

2. RESIDENT IN WHICH HOUSEHOLD .....

3. RELATION TO HOUSEHOLD HEAD .....

4. HOW MANY CHILDREN DO YOU HAVE? .....boys .....girls

5. HOW OLD WERE YOU WHEN YOU HAD YOUR FIRST CHILD? .....

6. WOULD YOU LIKE TO HAVE MORE CHILDREN? ..... (yes / no)

7. DID YOU HAVE ANY CHILDREN THAT DIED? ..... (Yes / no)

HOW MANY, ... WHEN .....AT WHAT AGE? .....

8. DO YOU LOOK AFTER ANY OTHER CHILDREN (yes / no) .....(details)

9. WHO LIVES IN YOUR HOUSE (Men .....) (Women .....) (Children .....)

10. WHAT RELATION ARE THEY TO YOU? .....

Key: H-husband, B-brother, S-son, U-uncle, G-grandfather, F-friend
M-mother, D-daughter, GM-grandmother, Si-sister, A-aunt. O-other.
(Give numbers of each e.g.: 2S, 3D, 1G, 2O etc.)

11. WHAT TYPE OF WORK TAKES UP MOST OF YOUR TIME ?

Think about the following activites, and list them in order of how much of your time each takes up:
Start with the one that takes up most of your time and finish with which you spend least time on. Put in brackets the approximate number of hours per week spent on each activity.

KEY: a looking after children b. cooking food c. building
d. collecting firewood e. agriculture f. Washing clothes.
g. collecting from the forest h. leisure i. Other (please specify)

1.....(.....) 2..... (.....) 3..... (.....) 4.....(.....)

5..... (.....) 6..... (.....)

7.....(.....) 8..... (.....) 9..... (.....)

12. WHAT TYPE OF WORK DO YOU LIKE (a)LEAST? ..... (b) MOST.....

13. IS BEING A MOTHER IMPORTANT TO YOU? ..... (yes / no/ not applicable)

14. HOW DO PEOPLE IN YOUR VILLAGE CARE FOR THE OLD AND SICK?

.....

15. DO YOU THINK YOUR CHILDREN WILL LOOK AFTER YOU WHEN YOU ARE OLD OR SICK?

..... (yes / no/ maybe)

16. WHICH PEOPLE IN THE FAMILY ARE MOST INFLUENTIAL IN BRINGING UP THE CHILDREN? (GIVE 3)

....., ..., & .....

Key: H-husband, B-brother, S-son, U-uncle, G-grandfather, F-friend
M-mother, D-daughter, GM-grandmother, Si-sister, A-aunt. O-other.

17. OF ALL THE PLANTS THAT YOU GROW, WHICH ARE THE NINE MOST IMPORTANT TO YOU? (name and use)

1..... 2..... 3.....

4..... 5..... 6.....

7..... 8..... 9.....

18. WHEN YOU GO TO COLLECT PLANTS FROM THE FOREST, HOW LONG DO YOU SPEND DOING THAT JOB? [indicate (by underlining) the average length of time for any trip, including traveling time . Also indicate the longest you are ever likely to spend on such a trip (put an L next to it.)]

eg. morning eg. all day eg. very long day eg. spend overnight eg. long trip

(a. 1 - 4 hours) (b. 4 - 8 hours) (c. 8 - 12 hours) (d. 12 - 48 hours) (e. more than 3 days)

P.T.O.

19. LIST IN ORDER OF IMPORTANCE THE PLANTS YOU COLLECT FROM THE FOREST, GIVE THEIR USES, AND SAY WHAT PART OF THE PLANT WHICH IS USED.

(Continue on a separate sheet if necessary)

	NAME	PART	USE
1.	.....	.....	.....
2.	.....	.....	.....
3.	.....	.....	.....
4.	.....	.....	.....
5.	.....	.....	.....
6.	.....	.....	.....
7.	.....	.....	.....
8.	.....	.....	.....
9.	.....	.....	.....
10.	.....	.....	.....
11.	.....	.....	.....
12.	.....	.....	.....
13.	.....	.....	.....
14.	.....	.....	.....
15.	.....	.....	.....
16.	.....	.....	.....
17.	.....	.....	.....
18.	.....	.....	.....

20. APART FROM THESE PLANTS, HOW MANY OTHER USEFUL PLANTS DO YOU KNOW OF?

.....

21. HOW OFTEN DO YOU GO OUT TO THE FOREST TO COLLECT PLANTS?

(Give number of times per month.....

22. WHICH IS THE EASIEST WAY TO GET FOOD - (a) FROM THE FOREST, (b) HUNTING, (c) FISHING OR (d) AGRICULTURE? (Rank them from easiest (1) to most difficult (4)

1..... 2..... 3..... 4.....

23. WHICH WAY OF GETTING FOOD PROVIDES GREATEST SECURITY OR CONFIDENCE IN FOOD SUPPLIES. (Rank them from best(1) to worst (4)

1..... 2..... 3..... 4.....

24. WHAT ARE THE FOUR MAJOR SOURCES OF FOOD FOR THE HOUSEHOLD.

Main source ..... Secondary sources: .... & .....

key: 1. farming 2. Fresh food bought from market. 3. hunting 4 fishing 5.Tinned or dry food
6. Food from forest. 7. Food bought from company shop 8.other (specify).....

25. HOUSEHOLD EQUIPMENT

Please indicate which of the following items are held by the household, by giving the number of each that have in the brackets provided. (Put a zero if you do not have any of them)

1. **Hammock( ) 2. Mortar & pestle ( ) 3. Cassava squeezer( ) 4. Chair( ) 5. Bed ( )**

2. 6. **Table ( ) 7. Musical instrument * ( ) 8. Toys ( ) 9. Sewing machine ( )**

10. **Books( ) 11. Cooking Pots,tawa etc. ( ) 12. Other (Specify) ..... ( )**

***guitars, drums etc. - not stereos/radios etc.**

26. CONCERNS FOR THE FUTURE

Rank or score each of the following issues on a scale of 1 (most important) - 5 (least important), to indicate how important you think each is in terms of: (A) the success of the community as a whole, (B) the well-being of your family, and (C) in the future of your children's lifetime.

ISSUE	SCORE (from 1 - 5)		
	Community	My family	My children's lifetime
1. Education	.....	.....	.....
2. Health	.....	.....	.....
3. Nature/environment	.....	.....	.....
4. Business development	.....	.....	.....
5. Agricultural development	.....	.....	.....
6. Tourism	.....	.....	.....

27. DO YOU THINK THAT THE FOREST MAKES AN IMPORTANT CONTRIBUTION TO YOUR FAMILY?? ..... yes / no

28. STUDY THE FOLLOWING LIST OF THINGS PROVIDED BY FORESTS, AND SCORE THEM ON A SCALE OF 1 - 5, (depending on how important you think each one is).

Forest function	Score (1 - 5)	Forest function	Score (1 - 5)
Provides shade	.....	Source of food	.....
Provides money income	.....	Place for hunting	.....
Source of firewood	.....	Burial ground	.....
Provides building materials	.....	Influences water flows	.....
Influences weather & rainfall	.....	Spiritual place	.....
Source of medicine	.....	Place of cultural importance	.....

29. CONTENTMENT.

Would you describe yourself as a happy woman, generally? ..... yes / no.

What would you like to change in the village? .....

What would most improve your life? .....

Do you want your children to stay in the village or go somewhere else? .....(Stay / Go)

Do you think life will be easier or harder for them in the future? ..... (easier / harder)

Give reasons for your answer .....

30. HOW MANY FOREST PLANTS DO YOU KNOW THAT CAN BE USED FOR MEDICINE? .....

31. IN WHAT MONTHS OF YEAR DO MOST ILLNESSES OCCUR IN YOUR HOUSE?

.....

32. WHICH TYPE OF FAMILY MEMBERS SUFFER FROM MOST ILLNESS?

Please indicate how often anyone from each group in your household has been ill in the last year.

(Children.....) (Women .....) (Men .....) (Old People .....)

33. WHEN SOMEONE IS SICK IN YOUR HOUSE, DO YOU:

(Wait for the government doctor .....) (Go to the company clinic .....)

(Find medicine in the forest and treat the illness yourself .....)

(Consult another person who knows about these things .....)

(Buy medicine in the town .....) (Other, please specify .....)

34. LIST THE THREE TYPES OF ILLNESS WHICH HAVE OCCURED MOST OFTEN IN YOUR HOUSEHOLD.

a. ..... b..... c.....

P.T.O.

35. WOULD YOU LIKE TO HAVE A JOB WITH A SALARY? (yes / no / maybe)

36. IF YOU GO OUT TO WORK TO GET A SALARY, HOW DO YOU THINK IT WOULD INFLUENCE YOUR HOME AND FAMILY?

.....

.....

37. HOW LONG DOES YOUR HUSBAND STAY AWAY WHEN WORKING?.....days

38. DO YOU THINK THIS IS TOO LONG, OR INCONVENIENT? (Yes / No)

39. GIVE REASONS FOR YOUR ANSWER .....

40. OVERALL, WOULD THINGS BE BETTER FOR YOU IF YOU WORKED FOR A SALARY?
..... (yes / no / don't know)

41. Give reasons for the answer to the question above.

.....

42. DESCRIBE THE TYPICAL MEAL IN YOUR HOME. (Main meal of the day)

.....

.....

.....

43. ON THE BASIS OF FOOD THAT YOU HAVE LISTED ABOVE, INDICATE WHAT PROPORTION OF THE MEAL IS PROVIDED BY EACH FOOD USED.

*Proportions to be indicated using beads representing each type of food, converted to % by wt.

Type of food	Proportion	Type of food	Proportion
1.....	.....	2.....	.....
3.....	.....	4.....	.....
5.....	.....	6.....	.....
7.....	.....	8.....	.....

44. WHAT PROPORTION OF YOUR FOOD IS a. fresh, b. Processed*? a. .....b.....

*commercially produced in some way (tinned, dried, imported etc)

45. DO YOU THINK ALL THE PEOPLE IN YOUR HOUSEHOLD ALWAYS GET ENOUGH FOOD TO EAT? (Yes / No)

46. IF NOT, WHEN IS THE WORST TIME? (give months) .....

47. WHEN IS THE BEST TIME, WHEN THERE IS NO SHORTAGE OF FOOD? (Give months)

.....

48. DO YOU THINK YOU HAVE ENOUGH LAND TO SUPPORT YOUR FAMILY? (Yes / No)

49. WHAT DO YOU THINK IS THE WORST THING ABOUT YOUR LIFE? (Explain)

.....

50. WHAT DO YOU THINK IS THE BEST THING ABOUT YOUR LIFE? (Explain)

.....

.....

DATA SHEET FOR CRAFTSMEN/WOMEN

1. NAME..... RECORDED BY .....

2. AGE ..... M / F DATE ..... TIME .....

3. LOCATION.....

4. MAIN RAW MATERIALS REQUIRED a..... b..... c .....

5. LIST THE DIFFERENT TYPES OF HANDICRAFTS YOU DO. **e.g. Basketry, woodcarving, weaving etc.**

a..... b..... c.....

d..... e..... f.....

6. MOST FREQUENTLY PRODUCED ITEMS

a..... b. ..... c .....

d..... e..... f .....

7. ON AVERAGE, HOW MUCH CAN YOU SELL THE ABOVE ITEMS FOR LOCALLY?
Give figures in G$ or suggest what you would be willing to exchange these items for in terms of other goods

a..... b.....

c..... d.....

e..... f .....

7. WHY DO YOU DO HANDICRAFTS? **(You may tick more than one answer)**

a. to make a living ( ) b. for pleasure ( ) c.nothing else to do. ( ) d. as a hobby ( ) e. to get a bit of extra money ( )

8. WHICH TYPE OF HANDICRAFT DO YOU PREFER?

..... WHY? .....

9. DO YOU THINK THERE ARE MORE OR LESS PEOPLE DOING HANDICRAFTS NOW THAN WHEN YOU WERE YOUNGER?
MORE ( ) LESS ( )

10. LIST ALL THE DIFFERENT ITEMS YOU NORMALLY CAN PRODUCE, SAY HOW LONG THEY TAKE TO MAKE (in hours or days) AND GIVE AN APPROXIMATE ESTIMATE OF THEIR SELLING PRICE OR EXCHANGE VALUE.

ITEM	TIME TO MAKE	VALUE IN G$ OR OTHER GOODS
a.....	.....	.....
b.....	.....	.....
c.....	.....	.....
d.....	.....	.....
e.....	.....	.....
f.....	.....	.....
g.....	.....	.....
h.....	.....	.....
i.....	.....	.....
j.....	.....	.....

11. HOW OFTEN DO YOU WORK DOING HANDICRAFTS?

a. Every day b. 4 times a week c. 2 times a week d. once a week e. less than once a week.

12. WHAT PROPORTION OF THINGS THAT YOU MAKE ARE USED AT HOME AND WHAT PROPORTION IS SOLD OR EXCHANGED FOR SOMETHING ELSE?

Used at home ..... Used for sale/exchange.....

13. DO YOU THINK YOU CAN MAKE A REASONABLE LIVING OUT OF DOING HANDICRAFT? YES / NO

14. DO YOU TAKE THE HANDICRAFT ITEMS YOURSELF TO SELL IN A MARKET, OR SELL THEM FOR MONEY TO A LOCAL TRADER, OR EXCHANGE THEM FOR OTHER GOODS?

a. sell them myself in a market b. sell to a trader c. exchange them for other goods

15. ESTIMATE HOW MANY DAYS A WEEK YOU WOULD HAVE TO WORK DOING HANDICRAFTS IN ORDER TO SUPPORT YOUR FAMILY.

a. 3 or less days b. 4-6 days c. every day of the week d. cannot support the family with handicrafts

17. DO YOU TEACH ANY OF YOUR CHILDREN HOW TO DO HANDICRAFTS?

Please tick: yes ( ) no ( ) **Please tick:** some of them ( ) all of them ( ) none of them ( )

18. DO YOU THINK THAT HANDICRAFTS MAKE AN IMPORTANT CONTRIBUTION TO YOUR FAMILY?

yes/no. SAY HOW: .....

19. DO YOU THINK IT IS IMPORTANT FOR YOUNG PEOPLE TO LEARN HOW TO DO HANDICRAFTS

Yes / no

IF SO, SAY WHY: **a.** to be able to earn a living ( ) **b.** to continue the culture of your people ( ) **c.** both ( )

20. HOW DID YOU LEARN HOW TO DO HANDICRAFTS?

a. From father ( ) b. from mother ( ) c. from brothers or sisters ( ) d. from friends ( )

e. at school ( ) f. from grandparents ( ) g. through a government training programme. ( )

21. DO YOU THINK THAT THE GOVERNMENT COULD DO MORE TO PROMOTE HANDICRAFTS?

Yes / No. **If so, suggest how**.....

22. CAN YOU USUALLY GET HOLD OF THE NECESSARY MATERIALS FOR YOUR HANDICRAFT WORK QUITE EASILY? Yes / No / Sometimes

23. DO YOU THINK THE RAW MATERIALS COST TOO MUCH OR ARE TOO DIFFICULT TO GET HOLD OF?

a. Yes, cost too much ( ) b. Yes, too difficult to get hold of ( ) c. No ( )

24. DO YOU THINK THAT YOU USUALLY MAKE A FAIR PROFIT FOR YOUR WORK? Yes / No.

25. WHERE DO THE RAW MATERIALS FOR YOUR CRAFT COME FROM?

a. from the forest (eg nibbi) ( ) b. from farmers (eg. leather) ( ) c. from some industry (eg. metal) ( ) d.don't know ( )

26. HOW DO YOU GET YOUR RAW MATERIALS?

a. collect them yourself ( ) b. buy them from other people who collect them

c. from another family member who collects them.( ) d. from a trader ( ) e. imported from another country

27. AS A CRAFTSMAN/WOMAN, WHAT IS THE MOST DIFFICULT PROBLEM YOU HAVE?

a. lack of a regular supply of raw materials ( ) b. hard to find a market for the products ( )

c. getting an unfair deal from traders. ( ) d. don't have enough time to do craftwork. ( )

28. ESTIMATE APPROXIMATELY IN G$ WHAT YOU CAN EARN FROM HANDICRAFTS IN A WEEK

(or indicate some exchange value)

.....

29. WHEN YOU DO HANDICRAFTS, ARE YOU WORKING FOR YOURSELF, OR FOR AN EMPLOYER WHO PAYS YOU?

a. For myself ( ) b. for an employer ( ) (if so, give wages paid) .....per week

30. DO YOU THINK THE FOREST IS IMPORTANT TO YOU AS A CRAFTSMAN Yes / No

If so, say how. .....

DATA SHEET FOR HUNTERS

DATE:..... HUNTER'S NAME .....

1. TARGET ANIMALS: RECORDED BY:.....

a..... b..... c.....

d..... e..... f.....

g..... h..... i.....

2. WHAT IS THE SIZE OF THE EXPECTED LOAD TO BE CARRIED BACK?
(To be indicated by size of headload or basket, to be converted to kilos later)

.....

3. WHO WILL CARRY IT BACK? .....HOW?.....

4. HOW DO PEOPLE KNOW HOW TO HUNT? (tick no more than 2)

a. Learning by doing in a group as a child b. Taught by father
c. Taught by mother d. At school
e. From friends f. From Grandparents.

5. WHICH ARE THE SIX MOST IMPORTANT OR VALUABLE ANIMALS/BIRDS TO CATCH?
(put in brackets what price may be expected for the sale of each whole animal)

a.....(.....) b.....(.....)

c.....(.....) d.....(.....)

e .....(.....) f.....(.....)

6. WHY ARE THESE ANIMALS/ BIRDS CONSIDERED VALUABLE?

a. Used a lot at home. b. Easy to sell for money. c. Collectors buy them
d. Useful for exchange for other goods. e. Provide good food for the family.

Animal a..... Animal b..... Animal c.....
Animal d..... Animal e..... Animal f.....

7. ESTIMATE WHAT PROPORTION OF ANIMAL/BIRDS CAUGHT ARE USED AT HOME, AND WHAT ARE SOLD OR EXCHANGED FOR SOMETHING ELSE.

used at home .....% sold or exchanged .....%

8. IN ADDITION TO HUNTING, DO YOU COLLECT ANYTHING ELSE WHILE ON A HUNTING TRIP?
9. (e.g. Honey, insects, nuts etc.)

.....

.....

9. DO YOU THINK HUNTING IS EASIER TODAY THAN IT WAS BEFORE? Yes / No

10. WHY? (tick as many as you think are relevant to your answer)

a. More animals around b. Guns and other modern methods made it easier.
b. Less animals around d. more hunters than before e. Too much forest disturbance
f. No control on hunting g. People have too little respect for animals.
h. Other. (specify) .....

11. IF YOU DID NOT HUNT IN THE FORESTS, HOW WOULD IT AFFECT YOUR FAMILY? (What would they miss?)

.....

12. MAKE A LIST OF THE 6 ANIMALS OR BIRDS WHICH ARE THE MOST DIFFICULT TO CATCH.

1..... 2.....

3..... 4.....

5..... 6.....

13. HOW LONG DOES THE AVERAGE HUNTING TRIP TAKE.

a. less than one day b. 1 - 2 days c. 3 - 4 days d. 5 - 6 days e. One week or more.

14. MAKE A LIST OF EACH TYPE OF ANIMAL YOU HAVE EVER CAUGHT WHILE HUNTING (Include all animals on all hunting trips) INDICATE IF IT IS NOW MORE DIFFICULT, EASIER OR EQUALLY DIFFICULT TO CATCH THESE SAME ANIMALS TODAY.

NAME	EASIER (E), SAME, (S) MORE DIFFICULT (MD)	NAME	EASIER (E), SAME, (S) MORE DIFFICULT(MD)
1.....	.....	2.....	.....
3.....	.....	4.....	.....
5.....	.....	6.....	.....
7.....	.....	8.....	.....
9.....	.....	10.....	.....
11.....	.....	12.....	.....
13.....	.....	14.....	.....
15.....	.....	16.....	.....
17.....	.....	18.....	.....

15. IF THERE WAS NO FOREST TO HUNT IN, WHAT WOULD YOU MISS MOST? (Give three)

1.....2.....

3.....

16. MAKE A LIST OF ALL THE ANIMALS BIRDS ETC WHICH YOU REGULARLY CATCH FROM THE FOREST, AND ESTIMATE HOW MANY OF EACH YOU CATCH EVERY WEEK. GIVE THE APPROXIMATE PRICE OF EACH AT THE NEAREST MARKET

NAME	QUANTITY (No. of animals & average wt)	PRICE in G$/kg.
1.....	.....	.....
2.....	.....	.....
3.....	.....	.....
4.....	.....	.....
5.....	.....	.....
6.....	.....	.....
7.....	.....	.....
8.....	.....	.....
9.....	.....	.....
10.....	.....	.....
11.....	.....	.....
12.....	.....	.....

17. ESTIMATE WHAT PROPORTION OF ALL OF THE FOOD EATEN IN YOUR HOUSE IS HUNTED FROM THE FOREST.

(Bead estimates converted to %)

a.10-20% b.20-40% c. 40-60% d.60-80% e.80-100%

18. HOW OFTEN DO YOU GO HUNTING?

a. once a week b. twice a week c.3 times a week or more. d. Once every 2 weeks e. Once a month

19. DO YOU THINK THAT HUNTING WILL BE MORE DIFFICULT IN FUTURE? Yes / No

20. Why?.....

21. ARE THERE ANY ANIMALS WHICH WERE CAUGHT BEFORE BUT ARE NEVER CAUGHT NOW? if so, name them) **Yes / No.** .....

ACTIVITY TIME SHEET

Please tick ONE.

Hunting trip
Fishing trip
Trip to farm
Palm heart collecting trip
NTFP collecting trip
Transect walk.

RECORDED BY:.....

DATE:.....

VILLAGE:.....

TIME OF DEPARTURE:.....

NAME OF GROUP LEADER .....

NUMBER IN GROUP: **Men**.....**Women**.....**Children**.....

ACCOMPANYING ANIMALS Type ..... Number .....

EQUIPMENT:

ITEM	**NUMBER**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

FOOD AND DRINK TAKEN (give details)

.....

.....

.....

WALKING TIME TO DESTINATION .....

OBSERVATIONS:

.....

.....

.....

.....

.....

TIME SPENT AT ACTIVITY SITE .....

TIME SPENT EATING/DRINKING .....

TIME SPENT RESTING/SLEEPING .....

FOOD EATEN/DRINKS TAKEN .....

ACTIVITIES CONDUCTED AT SITE (give details and lengths of time, if appropriate)

OBSERVATIONS:

.....

.....

.....

.....

.....

.....

.....

WALKING TIME FOR RETURN JOURNEY .....

OBSERVATIONS:

.....

.....

.....

.....

.....

OTHER WALKING TIME (during activities etc.).....

OBSERVATIONS:

.....

.....

.....

.....

WAS TRIP CONSIDERED SUCCESSFUL? .....

TOTAL WEIGHT OF 'CATCH' .....

TOTAL WALKING TIME SPENT DURING TRIP:.....

TOTAL EATING/RESTING TIME .....

TOTAL 'WORKING' TIME .....

ACTIVITY SURVEY OF HOUSEHOLD MEMBERS

HEAD OF HOUSEHOLD ..... House Location. no:.....

RECORDED BY: ..... DAY ..... DATE.....

NAME OF HOUSEHOLD MEMBER	dawn		morning		afternoon		evening			night
	4-6am	6-8am	8-10am	10-12noon	12-2pm	2-4pm	4-6pm	6-8pm	8-10pm	10-12mid.
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										